“... from so simple a beginning, endless forms most beautiful.”

-CHARLES DARWIN
NATURALIST AND GEOLOGIST
IMAGINE

a dynamic, transparent, 3-D and collaborative space in the desert
Using a handful of elementary design rules, Nature - master architect - has drawn up plans for the wondrous forms that surround us: symmetries of sea dwelling microorganisms, towering forests of sequoia, mountain gorillas, and members of a species capable of writing symphonies and unlocking the mysteries of Nature herself.

The Biodesign Institute at Arizona State University draws its inspiration from Nature’s boundless inventiveness, boldly extending the tools of design to address society’s most critical issues in human health, environmental sustainability and national security.

Established in 2004, Biodesign represents a new kind of research enterprise, fusing diverse scientific domains, from game-changing studies of the human genome to the effects of gravity on infectious pathogens; from leading-edge vaccine research to carbon-free biofuel development; harnessing microbes to clean up pollution and defending populations from biothreats.

Celebrating 10 years of bioinspired research and discovery, the institute now looks to the horizon.

ASU develops the first university research institute devoted to nature-inspired science and discovery.
THE BIODESIGN INSTITUTE’S REAL-WORLD IMPACT:

14 research centers
96 diseases studied
42 patents
540 inventions
11 startup companies
34 licensed technologies
Imagine creating a gateway to the campus that is also a transdisciplinary, collaborative research environment.

**The Goal:** To create a transdisciplinary, collaborative research environment. The building’s design team looked at ways space itself could foster cross-disciplinary interaction between researchers, motivated by the understanding that science is a creative process.

**What if:** Interaction among scientific professionals could create cross-pollination of ideas that transcend disciplines, leading to unexpected results.

**The Goal:** To create an eastern gateway to the university and intellectual access to science.

**What if:** The bioswale and entry garden is a visual metaphor: one leaves the urban environment at Rural Road behind, walks through a piece of the Sonoran desert, and enters into the world of Biodesign, where research harnesses the power of nature. The garden connects people with the natural beauty of the desert through daylight and local materials.
The building maximizes connection to campus and community through its siting and materials: opaque and transparent. The opaque volume of brick echoes the masonry of the other buildings on campus. The transparent sheet of glass opens the building up, demonstrating how science reaches out to the community. All the offices face the garden, allowing researchers to stay connected to nature and the rhythms of the day. The garden provides a place for the researchers to reflect and interact when outside the building.

THE BIODESIGN INSTITUTE’S REAL-WORLD IMPACT:
2004-2014

$1.5B gross state product
$115.3M state & local tax revenues
1,600 average jobs each year
Scientists solve complex problems by emulating Nature’s design rules and creating bioinspired solutions.

Our health care challenge is addressing the global threat of infectious disease, still the leading cause of death in the world:

• Biodesign is developing systems that monitor a person’s health using biomarkers and wearable or portable sensors to detect and predict chronic diseases like cancer and diabetes before symptoms even appear.

• Biodesign spinout Breezing™ has developed the world’s first portable metabolic tracker for weight management and fitness applications on a smartphone.

• Biodesign focuses on novel molecular tools that assess disease risk and diagnose disease earlier and more accurately.

• Biodesign hosts DNASU, one of the world’s largest DNA clone repositories, with its capacity of more than 850,000 samples. Access to these samples helps researchers to identify which proteins in the blood can be used as biomarkers to predict disease.

• Biodesign played a key role in the development of the plant-based experimental drug used by Mapp Biopharmaceutical to treat Ebola.
THE BIODESIGN INSTITUTE’S REAL-WORLD IMPACT: commercialization

Breezing
the world’s first mobile metabolism tracker

Kentucky BioProcessing
plant-based pharmaceutical proteins, including Ebola treatment

HealthTell
diagnostics to detect cancer & other diseases

Roche
nanopore technology to decode an individual’s complete genome for less than $1,000
SUSTAINING THE PLANET

“What is design? It’s where you stand with a foot in two worlds - the world of technology and the world of people and human purposes - and you try to bring the two together.”

-MITCHELL KAPOR
SOFTWARE ENTREPRENEUR

The Biodesign Institute places a major emphasis on research into alternative bioenergy sources along with bioremediation methods aimed at developing more sustainable systems.

Efforts such as the development of a 4,000-liter bioreactor holding microalgae capable of producing renewable biofuels (opposite page) and the use of bioremediation to utilize microbes and other nature-inspired solutions to clean harmful contaminants from the environment are just some of the discoveries and innovations leading us into the future.
Biodesign is developing new ways to protect people in harm’s way, either from natural disasters or human conflict. Often, tools developed for improving human health can also be used to sense chemical and biological agents, identify and treat people exposed to bioweapons, or treat disaster victims.

Biodesign leads a multimillion-dollar technology project to support mass screening of radiation exposure cases resulting from an unplanned nuclear event (opposite page, bottom left).

“In response to the demands and opportunities of a changing world, the American research university must evolve.”

-MICHAEL M. CROW, PhD
PRESIDENT, ARIZONA STATE UNIVERSITY
Biodesign’s bright future ...
why not dream big?

Conceptual rendering by Gould Evans
Arizona, the youngest state in the contiguous United States, could emerge as the next global hub for bioscience innovation.

The future promises to be even brighter for the Biodesign Institute at ASU, with expanded infrastructure and key clinical and industrial partnerships translating more discoveries into the marketplace.

Biodesign is poised to double its research capacity and impact in the coming decade.

In the future, technology that combines computer chips and biology will be used to identify a patient’s complete DNA and protein blueprint. This advancement allows us to treat diseases before symptoms even appear and will one day become a routine part of medical care.

Biodesign hosts more than 200 students each semester to provide hands-on training of the next generation of scientists.

The Biodesign Institute will continue to play a critical role to build a vibrant bioscience corridor of high-paying, knowledge economy jobs that benefit not only people of the Phoenix area, but also others throughout the nation and the world.

THE BIODESIGN INSTITUTE’S REAL-WORLD IMPACT: 2014-2023

$2.9B gross state product
$240.5M state & local tax revenues
3,165 jobs each year
THE NEXT GLOBAL HUB FOR BIOSCIENCE INNOVATION