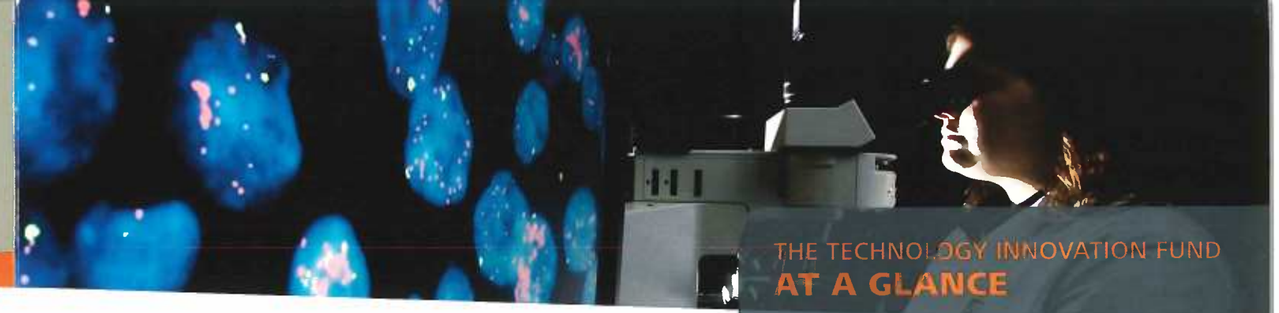
From Vision to Reality:
New Technologies Propel Cancer Research



Over the past two decades, physician-scientists at Dana-Farber Cancer Institute have discovered that cancer is not one disease, but rather, many distinct diseases with varying levels of complexity. An essential key to unraveling the mysteries of cancer and reaching the next stage of discovery: robust, cutting-edge technology.

The Technology Innovation Fund has enabled Dana-Farber to build a sophisticated platform centered on five scientific areas: genomics, chemical biology, imaging, informatics and computational biology, and proteomics. These technologies are empowering our physician-scientists to collaborate across laboratories, uncover new scientific breakthroughs, and speed the translation of proven discoveries into lifesaving treatments for patients.

GENOMICS

Dana-Farber uses state-of-the-art genomics–the identification and analysis of the genes expressed in human cells–to better understand the diversity of cancer, discover new cell targets for the treatment of cancers, and conduct "smart" clinical trials. By mapping an individual patient's "cancer signature," genome-based technologies provide a direct route to therapies that are both tailored to an individual's disease and targeted to the particular mutations causing that disease. Such tailored and targeted therapies hold out the hope of making cancer a manageable, if not always curable, disease.

Profile: An Unprecedented Study

Pioneering discoveries at the Institute have led to the creation of our enterprise genomic testing platform, ***Profile***. By testing the tumors of all consenting patients for alterations in more than 300 different cancer genes, we are uncovering unforeseen links between genetic alterations and cancers, and advancing the use of personalized medicine–using the precise drug to target an individual's specific gene mutation.

CHEMICAL BIOLOGY

Chemical biology is fundamental to accelerating drug discovery at Dana-Farber. Employing revolutionary technology, our cancer chemical biologists are using very small molecules to assemble compounds in versatile shapes and sizes. These compounds provide a novel way of exploring suspect genes to see if they are involved in disease and vastly expand the pool of "druggable targets" that can be attacked with therapies. Further, Dana-Farber scientists have synthesized molecules in their laboratories that are already in clinical trials. This research has built an exceptionally strong foundation for dramatic progress in experimental therapeutics and has also led to the development of new classes of drugs that are helping cancer patients worldwide.

IMAGING

Dana-Farber physician-scientists use imaging technology to look deep within the most intricate mechanisms of a cell, allowing them to closely detect, diagnose, guide, and monitor cancer treatment. High-powered imaging lets them instantly view the effects of a particular drug on a tumor–from observing whether the tumor has grown or shrunk, to seeing if a drug has hit its intended target–which provides timely insight for more efficient treatment decisions and improved patient outcomes.

INFORMATICS AND COMPUTATIONAL BIOLOGY

High-throughput genomics and other technologies instrumental in a program like *Profile* generate massive amounts of data that must be collected, stored, analyzed, interpreted, and easily retrieved. Dana-Farber's computational biologists interpret this data through the use of applied mathematics, statistics, and computer science, and are capable of simulating the behaviors of organisms down to their molecular level.

PROTEOMICS

Proteomics is the large-scale study of proteins, which are the products of genes that execute all cellular functions. In order to understand what goes wrong when cancer strikes, it is critical to comprehend the roles that different proteins and protein complexes play in cancer, as well as the interaction between them. Dana-Farber is using new proteomic technologies, including high-powered mass spectrometers, to gain perspective on key protein activities in cancer cells. This will lead to a clearer idea of how cancer can be arrested, prevented, or reversed for the benefit of patients.

TECHNOLOGY is at the core of Dana-Farber research and is propelling our progress against cancer

THE TECHNOLOGY INNOVATION FUND
AT A GLANCE

- The completion of the Human Genome Project in 2003, a decade-long effort to produce the first comprehensive map of all human genes, represented a profound accomplishment for humankind. Scientists had reached a revolutionary new understanding of the complex biological mechanisms that cause cancer.
- Dana-Farber immediately recognized the need to take full advantage of this body of work and build a robust technology platform to achieve the next level of discovery, and translate laboratory breakthroughs into effective therapies for adults and children battling cancer.
- The Institute is exceptionally fortunate to have Trustees who are gifted technology entrepreneurs. Paul and Kathleen Severino, Michael and Maureen Champa, and Jim and Lucille Dow established the first Technology Innovation Fund and inspired other investors–including Trustee Roger Marino and Trustee Jack Blais and his wife, Shelley–to move the fund forward.
- Since its creation, the fund has fundamentally contributed to the paradigm shift toward Dana-Farber's delivery of personalized cancer medicine for patients, as well as positioned the Institute as a recognized world leader in cancer.
- Now, future investments in the Technology Innovation Fund will propel Dana-Farber into the next phase of research, moving toward our ultimate goal: a world without cancer.

Powering Innovation at Dana-Farber

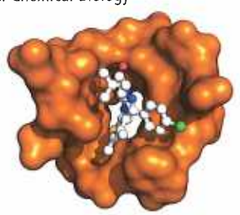
Early on, the Institute recognized that exceptional cancer research hinged on advanced technology

1999
Dana-Farber begins to invest in microarray technology

2005
The Dana-Farber Center for Cancer Genome Discovery opens

2006
Dana-Farber creates the Blais Proteomics Center

2008
Dana-Farber names the Linde Family Program in Cancer Chemical Biology



2009
The Dana-Farber Center for Cancer Computational Biology opens

2010
Dana-Farber's Lurie Family Imaging Center opens

2011
Dana-Farber launches *Profile*

2013
A milestone of 5,000 genetic profiles of tumor DNA are collected for *Profile*

2015
Dana-Farber opens new research space at the Longwood Center