



Department of Data Science: Improving Patient Outcomes with Data



WHAT WE DO

Every day, the Department of Data Science fights cancer by creating the most widely used tools in cancer genomics, collaborating on research across Dana-Farber and beyond, and supporting hundreds of active clinical trials across the globe. The department also provides statistical leadership for Dana-Farber/Harvard Cancer Center's Biostatistics Core and other leading cancer research groups.

OUR PEOPLE

The Department of Data Science unifies more than 250 faculty, research scientists, postdoctoral fellows, staff, and students committed to improving cancer care through data-driven approaches. Our faculty are leading experts with appointments at Harvard Medical School and Harvard T.H. Chan School of Public Health.

Biostatisticians

enable a better understanding of cancer risk and treatment efficacy through their expertise in statistical methodology, clinical trial design, and analysis of population and health systems data

Computational Biologists

build data-analysis tools that enable basic science discoveries and improve clinical approaches in cancer and biomedical research worldwide

Knowledge Systems Engineers

develop applied genomics and data sciences software to power cancer genomics (the study of all the genetic material within cells) research and precision cancer medicine

Machine Learning Experts

improve patient outcomes by applying artificial intelligence tools to help investigators design new data-driven approaches to diagnosis and treatment



OUR CONNECTION TO PATIENTS

At Dana-Farber, data science improves the lives of our patients and empowers researchers to make new discoveries that will transform cancer care. Examples of this innovative, patient-centric research include:

POSITIVE

The international POSITIVE study evaluates whether it is safe for women to interrupt endocrine therapy to attempt pregnancy after breast cancer. Patients with hormone-sensitive breast cancer may be prescribed endocrine therapy for 5-10 years to reduce the risk of recurrence, which impacts the ovaries and prevents conception while on treatment. The first clinical study of its kind to prospectively address pregnancy after breast cancer, this trial has enrolled 518 young women, with 191 babies born as of July 2020.

The BayesMendel Lab

Family history of cancer is the most powerful predictor of inherited susceptibility to the disease; however, millions of cancer-free individuals may carry inherited genes without knowledge of the risk. The BayesMendel Lab at Dana-Farber is dedicated to developing methodologies, models, and software related to cancer susceptibility genes. With data related to personal and familial history of cancer, tumor characteristics, and risk-reducing interventions, the BayesMendel models can estimate the probability of carrying a mutation and the future risk of cancers. These models are the only tool available to address both carrier probabilities and future risk with such high accuracy.

Brain Cancer Glioblastoma (GBM) Pilot Clinical Trial

Data science tools can be used to optimize the timing and dosage of chemotherapy and radiation treatment, which can improve GBM patient outcomes and minimize side effects of treatment. In this trial, researchers generated mathematical models of GBM tumors that predicted the radiation treatment schedule that would have the greatest impact on tumor growth, as well as an optimized schedule using both radiation treatment and chemotherapy. These schedules extended survival in preclinical models, compared with the standard of care. The success of this study led to a pilot clinical trial to test the feasibility of a modified radiation therapy schedule in patients with refractory GBM.



FUNDING OPPORTUNITIES

Patients diagnosed with cancer do not have time to wait. A gift of any size to the Department of Data Science makes it possible to achieve its cross-cutting mission. Here are some high-impact opportunities to drive progress in cancer research and deliver better care for our patients:

\$25,000

covers three months of vital statistical support for practice-changing clinical trials across all areas of oncology, including pediatrics, melanoma, and hematology

\$45,000

purchases one new computing node with two GPUs. Each node quadruples our capacity to analyze massive cancer data sets and deliver promising results faster

\$400,000

creates two Artificial Intelligence Research Fellowships for two years, allowing the brightest new computer science graduates to tackle the biggest challenges in cancer research

\$1 million

establishes the Data Science Collaboration & Innovation Fund to accelerate creative ideas and joint projects, support leadership and professional development, and drive progress in cancer research

\$2.5 million

creates an Endowed Dana-Farber Chair, allowing the Department to recognize and honor a senior-level faculty member in perpetuity

FOR MORE INFORMATION please contact: