



FY 2018 HIGHLIGHTS

Brandeis | EXPLORE
WITHOUT
BOUNDARIES





Introduction

Throughout the Brandeis campus, scientists and innovators are working on solving the big challenges we face as a society: From global warming to infectious disease, Brandeis innovators are creating breakthroughs that have the potential to improve the lives of millions around the world.

We are proud of our interdisciplinary approach. Biologists work alongside computer scientists to harness the power of artificial intelligence to speed the time to cures. 3D printing merges with orthopedics to improve outcomes for patients. It's not just in science that Brandeis teams are leading the way. From an app to help consumers vet the green claims of products to a microbusiness initiative that helps women in Africa become energy entrepreneurs, our inventors are coming up with creative solutions across the board and around the world. We aim to foster an atmosphere where good ideas and good people collide, leading to creative solutions no one has tried before. We do this by providing the infrastructure where innovation can thrive. Through events, grants, mentorship, competitions, and training, we give Brandeis innovators the tools they need to succeed. In these pages, we share some of the top accomplishments of the past 12 months. We hope you can join us on this journey to new discoveries, and we look forward to another amazing year supporting Brandeis innovators.



Rebecca Menapace

**Associate Provost for Innovation and
Executive Director, Office of Technology Licensing**

Brandeis University is a research leader in the natural, social, physical, and information sciences. Our unique strength is our collaborative approach, leading to cutting-edge, cross-disciplinary discoveries from our 50+ research labs. We are one of only four National Science Foundation I-Corps™ sites in Massachusetts. We rank second (after Caltech) out of more than 4,200 colleges and universities in the percentage of faculty who have been inducted into the National Academy of Sciences (NAS), National Academy of Medicine, and American Academy of Arts and Sciences, and elected as fellows of the American Association for the Advancement of Science. We are a member of the Association of American Universities as one of the 62 leading research universities in the US and Canada.



A Culture of Innovation

IP assets created by Brandeis University's research programs have powered several successful startups, including:

Syntonix, acquired by Biogen and spun off as Bioverativ™, developer of two FDA-approved hemophilia drugs: Eloctate™ and Alprolix™; ThermoGenix, creator of PCR additives to enable better sequencing sample prep; RC Analytics, providing data analytics solutions for organizational performance optimization; Dexela, producer of Complementary Metal-Oxide-Semiconductor X-ray detection technologies, acquired by PerkinElmer; ArQule®, pioneer in small molecules for biomarker-defined oncology and rare disease therapeutics.

Select Brandeis Products in the Market

Partnering with Brandeis University means tapping into our deep expertise in functional foods, neuroscience, research reagents, chemistry, therapeutics, materials science, AI, and data analytics. We have a wide variety of IP and technologies available for licensing. Our diverse portfolio has a strong track record in the market, with 37 active licenses, including:

- Two FDA-approved hemophilia therapeutics, **Eloctate™** and **Alprolix™**
- **Corazonas Heartbars**: Utilizes non-esterified plant sterols to lower cholesterol and promote cardiovascular health
- **Bio-Seeq PLUS**: A portable high precision instrument for detecting trace levels of biological warfare agents through DNA replication
- **Smart Balance®**, **Earth Balance®**, **Bestlife™**: All use a Brandeis-developed 1:1 blend of saturated and polyunsaturated fats to improve cholesterol ratios



Brandeis Research at a Glance

12

startups
launched

37

active licenses
generating \$2.9M
in annual revenue

2

Nobel Prize
Winners
in 2017

**NSF
I-Corps™
site**

—one of only four
in Massachusetts

Leadership

in neuroscience,
therapeutics,
functional foods,
research materials,
AI, and data
analytics

**2nd
highest**

number of AAAS
& NAS Fellows of
any university in
North America





Brandeis
Innovation
programs serve
researchers,
inventors,
entrepreneurs
and industry.



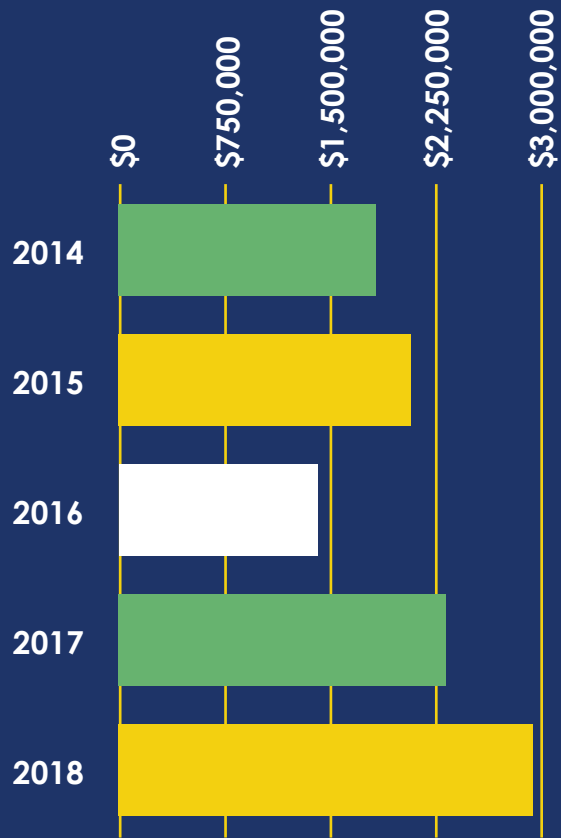
Brandeis Innovation programs serve researchers, inventors, entrepreneurs and industry. We provide support and infrastructure to the University's investigators for technology development, product development, and commercialization. We provide a full range of services in licensing, business development and legal matters for transferring technologies created within Brandeis. We also provide training, resources and funding for innovative Brandeis startups and technologies. In addition, we patent and license technologies developed through our programs. We are the bridge between researchers and the resources they need, connecting them to materials, funding, partnerships, collaboration, and expertise.

We support discoveries from Brandeis University's investigators, helping the successful commercialization of innovations:

- Evaluating new invention disclosures and managing intellectual property for those with significant market potential
- Determining commercialization pathways, seeking qualified licensees and structuring licensing deals
- Supporting development of industry-academic collaborations, partnerships, funding options and materials sharing
- Maintaining long-term relationships with licensees, assuring compliance with agreement terms and distributing any income generated by licenses in accordance with the University's IP Policy

Creating a Bridge Between University Research and Industry

Royalties Generated



50 Invention Disclosures



10 Patents



215 Materials Transfer Agreements



10 Sponsored Research Agreements



20 Non-Disclosure Agreements



6 License Agreements





Providing Opportunities and Visibility for Brandeis Innovators

1,626

Event Attendees

1,160

Office Hours

195

Mentorship Hours

750

Training Hours

8 Million

Media Impressions



« Innovation is a natural
occurrence on our campus. »

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Team Spotlight: Modibrace

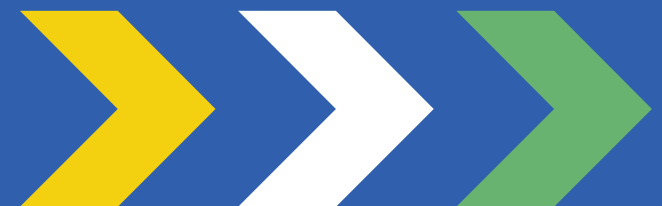
Having had scoliosis herself as a child, Ingrid Marko, a current Brandeis PhD student and innovator, has been working on a redesigned scoliosis brace for the past few years. She was motivated to speak to others about the disorder, since it's not one that is talked about enough. Presenting at the Annual Innovation Showcase, her project was something that people could actually see and touch, and visitors were able to experience the project in person. As a prime example of the fantastic work taking place at Brandeis, Ingrid and the team she built took second place at the 2017 Annual Innovation Showcase and also met prospective investors at the event! Ingrid's journey at Brandeis shows that there are limitless possibilities when you partner with people who want to see you succeed!



Innovator Spotlight: William Tarimo, PhD '16



William received a SPARK grant to develop a technology to improve higher education classroom teaching. His Brandeis Innovation project, Discovery Teaching, is hoping to create transformative new technology that brings the dialog of traditional learning into the mobile age. His project aims to foster dialog and knowledge creation by fixing the gap between what college faculty think is happening in the classroom, and what students think is happening. If that sounds provocative, it is. Many faculty rely on infrequent assessments to determine whether students are learning, or just reading students' expressions. While that works in a seminar, it can leave students disengaged or struggling in a large lecture course. As with many educational challenges, Discovery Teaching aims to solve this longstanding issue with new technology.





Brandeis Innovation Funds*



SPROUT

7 Teams
36 Participants

UP TO
\$100,000



SPARK

10 Teams
35 Participants

UP TO
\$50,000



17 Teams
41 Participants

UP TO
\$35,000

*Annually, on average





I-CORPS

In 2017, Brandeis University received a grant from the National Science Foundation (NSF) to create an I-Corps™ site. The I-Corps program prepares scientists to extend their focus beyond the university laboratory, accelerating the economic and societal benefits of basic research. Brandeis is one of four I-Corps sites in Massachusetts. Working with select teams, we provide training, resources and funding for innovative startups developed by Brandeis students, faculty and staff.



Support with Research:

The Office of Technology Licensing provides support in the form of mentor introductions and training sessions.



Customer Discovery Funding:

Up to \$3,000 is provided to each team for expenses related to customer discovery and equipment or materials.



Eligibility for Future NSF Funding:

Teams that successfully complete I-Corps training become eligible to apply to the NSF I-Corps Teams Program to receive additional support—in the form of mentoring and funding (up to \$50,000)—to accelerate the translation of knowledge derived from fundamental research into emerging products and services that can attract subsequent third-party funding.

Meet the Current I-Corps Teams

Cardiac Care Center

—Diana Bowser, ScD (Faculty, Heller)



New Strategy to Treat Chronic Infections

—Lizbeth Hedstrom, PhD (Faculty, Chemistry & Biology), Deviprasad Gollapalli (Staff Scientist, Biology), Minjia Zhang (Staff Scientist, Biology), Ryan Cullinane (BS Student, Biochemistry), Xingyou Wang (PhD Student, Chemistry)

Recip Grocery Data Platform

—Benjamin Segal (BS Student, Computer & Neuroscience), Rafi Cohen (BS Student, Computer Science), Geoffry Kao (BS Student, Computer Science), Anthony Liu (BS Student, Computer Science), Dani Sim (BS Student, Computer Science), Nick Krebs (BS Student, Computer Science)



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Open Source Science Supplies

—Stephen Van Hooser, PhD (Faculty, Biology), Shen Wang (PhD Student, Neuroscience), Andrea Stacy (PhD Student, Neuroscience), Chelsea Groves-Kuhnle (PhD Student, Neuroscience), Nathan Schneider (BS Student, Neuroscience)

Enzymatic Cleavage of Branched Peptides for Targeting Mitochondria

—Hongjian He (PhD Student, Chemistry), Xiaoyi Chen (MS Student, Chemistry)



Artificial Intelligence Capital Management (A.I. Capital Management)

—Marshall Chang (MBA '16, IBS), Zhengyang Zhou (MS Student, Computer Science), Joyce Yu (MA and BA '17, IBS)

Stryx Biotech: Biomarker Monitoring

—Richard A. Roy (PhD '18, Biochemistry), Jacqueline L. Naffin, PhD (Brandeis Research Associate), Mengchun Li (MBA Student, Finance, IBS), Víctor Manuel Suárez (MS/MBA Student, Biology and Healthcare Management, Heller/GSAS)



Effy: Augmented Reality for Cognitive Development

—Diego Placido (BS'15), Samantha Malmberg (MS Student, Neuroscience), Xiaotong Liu (MS Student, Finance, IBS), Francis Hwang (MPP Student, Heller/GSAS)

Diversitydatakids: Monitoring Inclusion in the U.S.

—Clemens Noelke, PhD (Research Director, ICYFP, Heller), Huiyan Zhang (BS Student, Computer Science, Mathematics, and Economics), R Matthews (BS/BA Student, Computer Science and African & Afro-American Studies)



iRemember: Memory Support App

—Olivia Hoy (BS Student, Biology), Ryan Xu (BS Student, Applied Mathematics and Neuroscience)

Arca: Open-Access 3D Printing Platform

—Alexandra Ratzlaff, PhD (Faculty, Department of Classical Studies), Yu Lu (MBA '17), Kun Qiu (MS Student, Business Analytics)



Transcriptional Enhancer Prediction (TEP) for Cancer Research

—Cherubin Manokaran (BS Student, Neuroscience and Computer Science), Ana Ward (MS/MBA Student, Biotech and Healthcare Management)

Drosophila “Flyght” Arena

—Zachary Knecht (PhD '18, Neuroscience), Tatevik Sarkissian (PhD Student, Molecular and Cell Biology), Eric Sun (Undergraduate Student, '21)



SPROUT

The SPROUT Program, funded by the Provost's Office and the Office of Technology Licensing (OTL), is designed to encourage and support entrepreneurial activity within the Brandeis community for students (graduate and undergraduate), postdocs, faculty and staff in the Division of Science. The awards are intended to help bring innovative research and entrepreneurial ambitions to life.

Meet the Current SPROUT Teams



Vaccines Targeting HIV Sugars for Broad Neutralization

—Isaac Krauss, PhD (Faculty, Chemistry), Dung Nguyen (PhD Student, Chemistry)

Up to 20% of people infected with HIV develop antibodies against the virus. Many of these antibodies use a specific pathway to attack the disease, homing in on a particular carbohydrate on the virus' envelope. This potential vaccine aims to replicate that natural antibody's process.

Boosting Rational Drug Design for Hepatitis B by Large-scale Production of the X Antigen

—Maria-Eirini Pandelia, PhD (Faculty, Biochemistry), Amy Milne (Lab Manager), Chie Ueda (PhD Student, Biochemistry), Michelle Langton (PhD Student, Biochemistry)

HBx, a key protein of the Hepatitis B virus, is a major agent in how it damages cells, and has been shown to be instrumental in both cancer and cirrhosis development. This team is working on large-scale production of the protein to speed research.



TRIBOX: Developing an Assay Kit for Easy RNA-binding Protein Target Identification

—Michael Rosbash, PhD (Peter Gruber Endowed Chair in Neuroscience, Nobel Laureate), Reazur Rahman, PhD (Brandeis Research Associate), Weijin Xu (PhD Student, Molecular Biology)

Building on his Nobel Prize-Winning work on circadian rhythms, Michael Rosbash and his team have developed a method called TRIBE (Targets of RNA-binding proteins Identified By Editing) to better study RNA-binding proteins that have been implicated in ALS and Parkinson's.

A Novel Strategy for mTOR Inhibition

—Lizbeth Hedstrom, PhD (Faculty, Biology & Chemistry), Anna Henkin, (PhD Student, Biochemistry and Biophysics)

The mammalian target of rapamycin (mTOR) is dysregulated in many diseases including cancers, immunosuppression and neurodegeneration, and is a clinically validated therapy target. This team has discovered a small molecule (CB3A) that inhibits mTOR signaling and are investigating its potential against certain targets.



SPROUT

Optimization of HyperTRIBE Analysis

—Michael Rosbash, PhD (Peter Gruber Endowed Chair in Neuroscience, Nobel Laureate), Reazur Rahman, PhD (Brandeis Research Associate), Weijin Xu (PhD Student, Molecular Biology), Joshua Lepson (BS Student, Biology)

HyperTRIBE is a software with an in vitro assay kit, helping researchers study even small samples of RNA-binding proteins more accurately. This can lead to better understanding of many genetic diseases.



A New Strategy to Treat Chronic Infections

—Lizbeth Hedstrom, PhD (Faculty, Chemistry & Biology), Devi Gollapalli, PhD (Research Scientist)

Antibiotic-resistant bacteria represent one of the biggest public health threats of the 21st century. Antibiotics are unable to kill certain dormant bacteria, which then stay behind, then can revive and evolve to resist antibiotics. This innovation makes these “sleeper” bacteria awoken prematurely, so that they can be eliminated by antibiotic treatment.

Greenlabs: Sustaining Science Through Recycling

—David Waterman, PhD '18 (Staff Scientist), Brenda Lemos (PhD Student, Cell/Cellular and Molecular Biology), both of Jim Haber's Lab

Much of lab-grade plastics cannot not be recycled traditionally. Until now: this team is working on a project to recycle America's 6 Million tons of plastic lab waste.

◀ Science is not about saying I'm going to do X,Y,Z and then I accomplish X,Y,Z.

If you're too dead set on specifically accomplishing X,Y,Z, you're not necessarily going to discover all the things out there to discover. ▶▶

Isaac Krauss

Associate Professor of Chemistry



Faculty Spotlight: Isaac Krauss, PhD

SPROUT grant recipient Isaac Krauss, assistant professor of chemistry at Brandeis, and his lab team have been researching possible HIV vaccines, and through their targeted work, used directed evolution to create antigenic mimics of the virus. One focus of his research is the portion of HIV protein gp120 which is bound by 2G12, a broadly-neutralizing antibody which protects against the virus. Good mimics of this glycocluster have potential as HIV vaccines. Isaac has been highlighted in Chemical & Engineering News and reviewed in Nature Chemical Biology and Current Opinion in Chemical Biology.



Faculty Spotlight: Lizbeth Hedstrom, PhD

SPROUT grant recipient Lizbeth Hedstrom, a professor of biology and chemistry at Brandeis, is also an innovator in the community. Along with teammate Devi Gollapalli, they've identified a way to spur premature bacteria growth which they believe can make pathogens more vulnerable to antibiotics. An innovation team at Brandeis could make it easier to fight infections and that's what our programs are all about, changing the world with innovative steps, big and small.





SPARK

Brandeis' SPARK Program is designed to encourage and support entrepreneurial activity within the Brandeis community, including students (graduate and undergraduate), postdocs, faculty and staff. The awards are intended to help bring ideas and entrepreneurial ambitions to life.

Meet the Current SPARK Teams

Nomad Dairy

—Roba Bulga Jilo (*Graduate Student, Heller*), Elizabeth Keefe (*Graduate Student, Heller*), Kyle Plummer (*Graduate Student, Heller*), Iwona Matczuk (*Graduate Student, Heller*)



Nomad Dairy partners with pastoralist communities to distribute quality camel milk in Ethiopia. They provide existing cooperatives with the technical and business knowledge to access markets, starting with refrigerated transportation and expanding to value added products. Nomad Dairy envisions a future in which indigenous peoples' quality of life is preserved through the sale of environmentally friendly products.



sySTEMic Flow

—Jessica Sanon (*Graduate Student, Heller*), Adwoa Asare (*Graduate Student, Heller*)

sySTEMic Flow is a nonprofit organization that works with female minorities in grades 11 through the second year of college to stimulate their success in STEM careers. SySTEMic Flow exists to bridge the transitional gap that young women of color face when entering college by providing pre-college courses, mentorship, and access to practical experience.



A.I. Capital Management

—Marshall Chang (*Alumnus, IBS*), Joyce Yu (*Graduate Student, IBS*), Yuwen Han (*Graduate Student, IBS*), Yuwei Lin (*Graduate Student, IBS*), Zhengyang Zhou (*Graduate Student, IBS*)

A.I. Capital Management is a Fintech hedge fund startup building Artificial Intelligence trading systems to trade Foreign Exchange markets, using cutting edge Deep Reinforcement Learning (RL) method. Their A.I. traders are able to achieve stable profits trading live markets. The startup is in the process of starting a hedge fund fully managed by A.I.

A.K.A also Known as Culture

—Amelie de Cirfontaine (*Undergraduate Student, Studio Art*), Adam Elkaim (*Graduate Student, IBS*), Karthik Rangan (*Undergraduate Student, Business and Economics*)

A.K.A is a Fashion brand that informs consumers the cultural influences behind their clothes. Each season A.K.A designs a line of clothes that is influenced by a culture, each article of clothing holds a story to it that is printed on its tag.



« We couldn't have made this much impact this early on. »

Marshall Chang, BA/MBA '17

Founder, A.I. Capital Management

« It was a great experience for me and I actually landed my summer internship at a biomedical device company because of it. »

Yawai Soe, MBA '19



GreenChoice™

—Galen Karlan-Mason (Alumnus, IBS), Rafael Martins Guimaraes (Graduate Student, IBS), Peitong Xue (Non-Brandeis), Maeve Donohue (Non-Brandeis), Sofia Regalado (Non-Brandeis)

GreenChoice™ helps consumers quickly identify and purchase products that align with their values. GreenScores™ are personalized to user preferences and evaluate food products for freshness, nutritional value, health safety, animal welfare practices, corporate sustainability and transparency.

ChangeCard

—Nadav Raichman (Undergraduate Student, Computer Science), Susan Chen (Undergraduate Student, Computer Science)

ChangeCard is an electronic wallet-card for panhandlers that allows you to donate easily through virtual transactions while eliminating misuse of donation money. ChangeCard comes with a QR code that allows you to donate directly, while eliminating misuse by preventing cash withdrawal from the wallets and limiting transactions to trusted vendors.



SafeRide

—Joe Wilson (Graduate Student, Heller), Lena Mutemba (Graduate Student, Heller), Baker Kasawuli (Graduate Student, Heller)

SafeRide is a network of licensed riders trained in defensive driving and equipped with safety gear. Passengers request a ride through the SafeRide website or hotline and pay a standardized rate using a mobile money account.

Latam Biz

—Fernando Aguilera (Graduate Student, IBS), Juan Sebastian Zuluaga (Graduate Student, IBS)

Latam Biz is the first multi-sided SaaS platform that connects startups from Latin America and emerging markets to investors from all over the world. It fosters win-win situations by giving the tools needed to develop, grow and raise capital, while providing investors with management capabilities and aggregate data collected from startups.



Noosphere

—Daniel Garcia Murillo (Undergraduate Student, Neuroscience and Computer Science)

Noosphere transforms the research and learning experience online into an interactive interface that displays webs of concepts tied to interdisciplinary connections and applications.





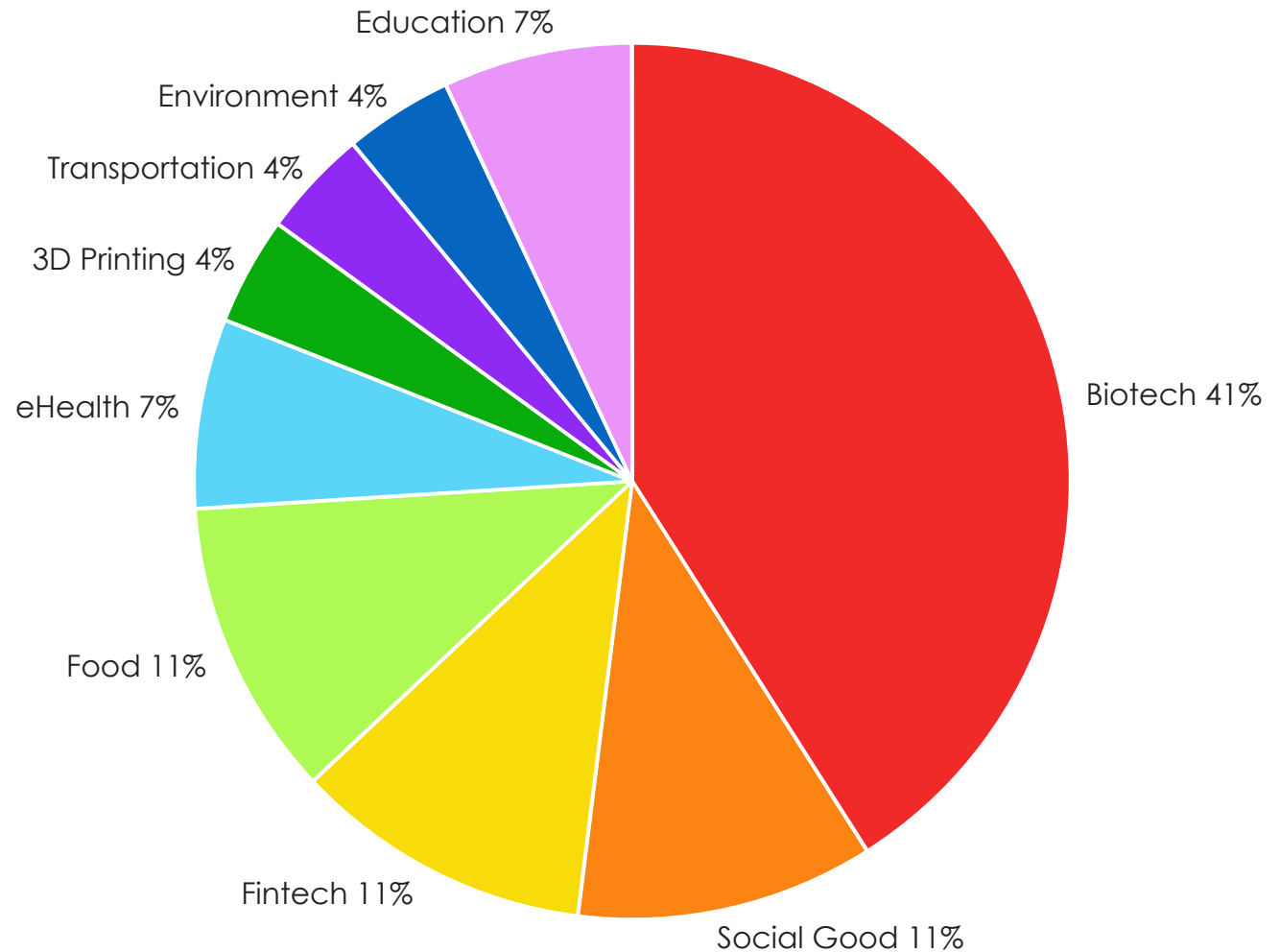
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Diverse Projects, Common Goals

In FY '18, Brandeis Innovation teams represented the widest range of sectors to date:





Do you have an idea
for a startup, a new
invention, or a social
impact project?

Visit us at:
[Brandeis.edu/Innovation](https://brandeis.edu/Innovation)

◀ Today, innovation at Brandeis continues to bring students and faculty together to push the boundaries of knowledge and to confront some of the most demanding challenges in our society and world. We are thrilled to support anyone who wants to partake in research, invention, entrepreneurship, and discovery. ▶▶

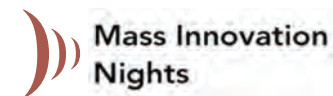
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Cultivating a community through Innovation





Brandeis Innovation

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