NOVEMBER 15, 2018

4TH ANNUAL

Brandeis Innovation Showcase

SHAPIRO SCIENCE CENTER

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IN PARTNERSHIP WITH:

GLOBAL ENTREPRENEURSHIP WEEK USA

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Welcome to Brandeis University's 4th Annual Innovation Showcase!

Throughout the event we encourage you to view the poster presentations, learn more about the startups and products launched by Brandeis students, faculty, and staff, visit our exhibitors, enter the raffle and vote for your favorite innovation.

The Brandeis Innovation Showcase was made possible through the generous support of the Hassenfeld Family Initiatives and our event sponsors

Hassenfeld Family Innovation Center

BRANDEIS INTERNATIONAL BUSINESS SCHOOL

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SPARK

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Brandeis Innovation Welcomes You!

Brandeis
Innovation Showcase

The Office of Technology Licensing and the Hassenfeld Family Innovation Center

Come visit our table for our raffle and giveaways, meet the staff and learn more about startups and technologies coming out of Brandeis!

The OTL serves researchers, inventors, entrepreneurs and industry. We provide support and infrastructure to Brandeis investigators for technology development, commercialization and the development of products. We provide industry with cutting edge technologies for licensing, as well as research collaborations.

The Hassenfeld Family Innovation Center provides a hub for innovation across the Brandeis campus. The center engages students, faculty, researchers, alumni and staff, promoting collaboration and discovery through research, grants and partnerships, including our signature programs, I-Corps™, SPARK and SPROUT.

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Poster Abstracts

#1 A.I. Capital Management - Solve the game of quantitative trading with A.I.

Team: Marshall Chang

We build Deep Reinforcement Learning (A.I.) quantitative trading solutions to generate returns in the financial markets, through launching our AlphaFX A.I. Fund with A.I. Capital Management. As we all know, A.I. is transforming many industries, and the quant hedge funds are no difference. We specialize on this set of algorithms that beat us in Go, Poker and Dota-II, aiming to be the first few to adapt it successfully in trading. Since winning SPARK in early 2018, we used the funding to build our A.I. training infrastructure and went on to complete MassChallenge Boston summer cohort. We have made continuous progress in development, testing, operations and fundraising, and now we are getting close to launch our first hedge fund, one step closer to our goal of revolutionizing the hedge fund industry with A.I.
https://www.aicm.world/

#2 TRIBE: A Transformative Approach To Study RNA-Binding Proteins

Team: Reazur Rahman, Joshua Lepson, Weijin Xu, Michael Rosbash

Ten percent of our genes create a special class of proteins called RNA-binding proteins (RBPs). RBPs play central roles in essential biological processes and have been implicated in many diseases such as Amyotrophic Lateral Sclerosis, Fragile X Syndrome, and cancer. RBPs govern these processes by binding to target RNAs in a cell-specific manner. Therefore, accurate and cell- specific RNA target identification for an RBP is crucial to unraveling its role in physiological and disease states. We developed a technology capable of identifying RBP targets in as little as 150 Drosophila neurons known as Targets of RNA-binding proteins Identified By Editing (TRIBE), which resulted in three publications. Because competing technologies, crosslinking and immunoprecipitation (CLIP) and RNA immunoprecipitation (RIP) analysis, are unable to investigate RBP-RNA targets in a cell-specific manner, TRIBE is the only technology that can identify biologically relevant RBP targets implicated in heterogeneous disease cells. By using sprout grant, we seek to improve upon TRIBE by employing a computational approach to create a ranked list of targets that minimizes potential false positive signals. Since TRIBE induces a molecular mark on RNA targets, we aim to harness the distinct patterns of these marks to create a discriminative score for each RNA target. We hypothesize that ranking based on a discriminative score will reflect the binding strength of the RBP-RNA interactions. This computational advancement will enable researchers to focus on selected RBP targets implicated in disease states, catalyzing key advancements in pharmaceuticals and academic research.

#3 LatamBiz

Team: Fernando Aguilera, Taha Allaith, Juan S. Zuluaga (advisor)

LatamBiz is an online platform designed to connect startups from Latin America with investors from around the world. Startups are provided with the tools needed to raise capital from the "right" investors, and investors are presented with curated startups that have been vetted through a custom due diligence process, alongside relevant metrics to the startup and industry, enabling more confident decision making.

The entrepreneurship ecosystem in Latin America is rapidly growing every year, both in terms of number of startups and amounts invested. However, these growths are not occurring in tandem; as the market continues to be vastly disconnected, startups with high potential still struggle to raise capital from the right investors, if raise any capital at all. The lack of data, market fragmentation and a standardized process also burdens investors and deter them from making an actual investment.As such, LatamBiz caters to two kinds of users: Startups from all backgrounds and phases that offer solutions to problems, and investors with different investment requirements, whether venture capital firms, angel investors, accelerators looking to manage a pool of startups, or a public or private institution with a stake in the ecosystem.

For the first 18 months of going live, we plan to capture US$300 million, representing 7% of the total capital available in the ecosystem as projected. The SPARK capital has allowed us to conduct preliminary research and create the Beta development scheduled to launch in February 2019.

#4 SafeRide

Team: Joe Wilson, Lena Mutemba, Baker Kasawuli

SafeRide is a network of licensed motorcycle taxi riders trained in defensive driving and equipped with safety gear. In Liberia, weak requirements to become a rider has flooded the industry with many untrained riders resulting in high numbers of accidents and deaths. Our startup will reduce accidents while providing efficient transportation. Passengers will request a ride through the SafeRide website or hotline and pay a standardized rate using a mobile money account. The project will begin in Monrovia with a pilot focused on university students who are one of the largest users of motorcycle taxis. We will engage customers through outreach events, social media, and networking with a long-term plan to expand within Liberia and into other West African countries.

#5 GreenChoice™

Team: Galen Karlan-Mason, Rafael Martins Guimaraes, Peitong Xue, Maeve Donohue , Sofia Regalado

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. GreenChoice™ plans to license their GreenScore™ database and technology to ecommerce sites and grocers. By providing consumers with a meaningful personal shopping tool, they help grocery stores' personalize their online customer experience and retain/gain conscious consumers.

#6 Boosting rational drug design for Hepatitis B by large-scale production of the X antigen

Team: Amy Milne, Chie Ueda, Michelle Langton, Maria-Eirini Pandelia

HBx is the smallest protein encoded in the HBV genome and has been shown to be a major agent in the progression of cirrhosis and hepatocellular carcinoma (HCC) that results from chronic HBV infection. HBx affects multiple cellular processes, either on its own or together with the proteins that it targets. Though its tumorigenic potential has been demonstrated, neither its structure nor the molecular mechanisms by which it mediates liver-associated diseases are known.

Our studies provide the possibility to overproduce this antigen in high yields and at concentrations that exceed the solubility limit of its commercially available lyophilized forms in a cost-efficient manner. The outcome of our studies is expected to provide the stepping stone to overcome the scant availability of the HBx protein, and will have the following impact: a) allow for extensive clinical trials, b) facilitate high-throughput drug and small molecule inhibitor screening, c) allow for structural studies making downstream development of pharmacological inhibitors targeting HBx by rational design possible. These 'milestones' are of particular value, especially because chronic infection by HBV is a leading cause of human cancer worldwide. Therefore, the low-cost availability of highly pure and functionally homogeneous HBx will serve in accelerating development of novel antiviral therapies and provide much-needed new therapeutic approaches.

#7 African Women Energy Solutions (AWES)

Team: Enet Mukurazita, Gbenga Oni, Priscilla Rwandarugali

The aim of African Women Energy Solutions (AWES) is to economically empower communities in Africa, especially women, through increasing their access to productive resources and assets, including renewable sources of energy, to enhance their economic well being and effective participation in the mainstream economic activities within their community, country and continent at large. AWES partners with a women's organized group to set up a business that produces and sells biogas and organic fertilizer from a community biodigestor. AWES will invest in the biodigestor and co –operate the business for a period of one and a half years during which they will enter into a profit-sharing agreement with the women's group. After the period has elapsed AWES will exit the partnership and go and invest in a new community. The problem that we are trying to address is energy poverty in Sub Saharan Africa. Over 600 million people in this part of Africa do not have access to a renewable source of energy and 67% of them live in the rural area. The most affected are women because the biggest burden of energy is on household cooking done by them. The funds we received from SPARK have assisted us in registering AWES in Zimbabwe because even to run a pilot in a rural area you need to be registered. The funds were also used to enter and attend other business pitch competitions to augment the pilot funds. The remaining funds are for the construction of the biodigestor which we expect to begin soon.

#8 The Noosphere

Team: Daniel Garcia Murillo

The Noosphere transforms the research and learning experience online into an interactive interface that displays webs of concepts tied to interdisciplinary connections and applications. By presenting concepts at various levels of complexity and giving users the chance to collaborate, the Noosphere brings the joy of knowledge and research to anybody willing to learn, no matter their location or educational background. The Noosphere operates on top of an ontology or framework that helps organize concepts in an interconnected way. The Noosphere finds unique connections between fundamental and seemingly disparate ideas, providing critical insights for any researcher, student, or business. The Noosphere attempts to provide a foundation for the democratization of knowledge, enabling anyone anywhere to have access or contribute to new developments in science and technology.

#9 GreenLabs

Team: Brenda Lemos, David Waterman

GreenLabs is a plastic waste recycling company working to tackle the problem of plastic lab waste by collecting it and reintroducing it back into an $80 billon market as raw material. More plastic has been manufactured in the last 10 years than all of the last century. This overplastification has had detrimental effects in our planet. Laboratory work is partly to blame in that routine lab work revolves around single-use, disposable plastic items, such as pipette tip boxes. While efforts have been made to promote recycling in the lab, 98% of all lab plastic waste ultimately ends up in landfills. We will tackle this problem by collecting pipette tip boxes and transforming them into goods made from 100% recycled, locally sourced materials. Pipette tip boxes are commonly used in all research facilities and are made from high-quality polypropylene (5PP) plastic. Single-use pipette tip box sales in the North East exceed 4.3 million units / yr equating to 1 million pounds of clean, high quality, single-use plastic dumped into market annually. Instead of disposing of pipette tip boxes, we offer academic institutions and Biotech companies a collection service. After collection, we recycle the pipette tip boxes into new products made from 100% recycled material and focus product sales towards research and LEED Green facilities. The Greater Boston Area is an ideal place to launch GreenLabs as it's a Biotech hub, 16 academic research facilities and over 100 LEED Green certified buildings.

#10 Vaccines Targeting HIV Sugars for Broad Neutralization

Team: Dung Nguyen, Isaac Krauss

SPROUT

The goal of this project is to determine whether slow-release immunization methods can elicit quantitatively and qualitatively better antibodies against HIV. In previous research, we have developed carbohydrate-based vaccines containing a sugar (Man9 oligosaccharide) that is common on the surface of HIV. Antibodies that bind to this sugar are among the most broadly-neutralizing antibodies that develop in patients infected with the virus. Thus, stimulation of similar sugar-binding antibodies by vaccination is considered a promising approach to HIV vaccines. Using our novel directed evolution technology, we designed sugar cluster vaccines that were then tested in rabbits. We found that the antibodies raised in the original approach bind preferentially to the core rather than the tips of the sugars. For the current project, we tested slow-release immunization, and we find that much higher antibody titers can be obtained by this method. Studies to evaluate antibody selectivity are underway.

#11 A Novel Inhibitor of mTOR in the Diseases of Aging

Team: Anna Henkin, Lizbeth Hedstrom

SPROUT

Cancer and neurodegenerative diseases are frightening specters looming on the horizon of our old age. The baby boomer generation is now face to face with these devastating conditions, and it is swiftly becoming a massive public health burden. Dysregulation of the mammalian Target of Rapamycin (mTOR) signaling pathways is a common feature of these diseases, and targeted inhibition of mTOR holds great promise as a route of treatment. Our laboratory has discovered a novel inhibitor of mTOR signaling (CB3A). CB3A acts through a distinct mechanism from previously described mTOR inhibitors, which suggests it may have a therapeutic benefit for some diseases. We are currently continuing work to elucidate the mechanism of action in order to identify the diseases most likely to respond to CB3A-based treatment.

#12 A Strategy to Treat Chronic Infections

Team: Deviprasad Gollapalli and Lizbeth Hedstrom

Most recurrent and difficult to treat infections are caused by bacteria that are susceptible to commonly used antibiotics. Such chronic bacterial infections account for approximately 500,000 deaths annually in the U.S., and are a major complication in hip and knee replacement surgeries, where the incidence of infection is 1-2%. Chronic infections persist because antibiotics are only effective against actively growing bacteria. However, a small number of bacteria in an infection are quiescent, and therefore survive treatment. These quiescent cells are known as "persisters". The long courses of treatment required for tuberculosis and Lyme disease can also be attributed to the difficulty in eliminating persister cells. Lastly, persister cells are believed to play an important role in the emergence of antibiotic resistance. These observations demonstrate that a drug to treat persister cells would address a critical unmet need.

A handful of anti-persister compounds have been reported in the literature, but none have reached the clinic. We have discovered a compound, **P226**, that causes bacteria to initiate growth prematurely. We hypothesize that this compound will cause quiescent cells to become sensitive to commonly used antibiotics, thus providing a more effective treatment for chronic infections.

#13 A.K.A.

Team: Amelie De Cirfontaine

A.K.A (Also Known As culture) 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. In addition A.K.A aims to start collaborations with artisans from the culture they highlight in the given lines. Their business model follows ethical manufacturing and production.

#14 Nomad Dairy

Team: Roba Bulga Jilo , Elizabeth Keeffe, Kyle Plummer, Iwona Matczuk

Nomad Dairy is a for profit start-up focused on preserving the rights of indigenous populations through local foods. We partner with an established cooperative in Ethiopia made up of 41 members who collect camel milk from camel herders and then transport the raw product to a market in the capital, Addis Ababa.

The cooperative is losing 40% of their product daily during transport due to sun exposure. We will provide the cooperative with the technical and business knowledge to modify their truck into a refrigerated vehicle with existing technology. Then the cooperative will be able to increase collection quantities to meet the high demand for camel milk and capture the full market value of their high quality product.

#15 sySTEMic Flow

Team: Jessica Sanon, Adwoa Asare

SPARK

sySTEMic Flow aims to increase STEM *(science, technology, engineering, mathematics)* diversity and have black women be the forefront leaders in these industries and improve economic opportunities for minority women. The program serves to supplement girls in the Greater Boston area with access to prerequisite courses in their STEM track and connect them with other leaders in the field.

There is a dire need to increase STEM diversity within major corporations and industries with innovation platforms. However, despite educational progress over the past several years, high school minority students still lack access to the educational resources that will prepare them for college success. Data gathered from the Office for Civil Rights showed that black students are much less likely to have access to Advanced Placement courses in STEM fields. This lack of access to foundational STEM skills puts black students at a significant disadvantage in preparing for advanced STEM courses and careers. As a consequence, students in STEM fields are about 6 percent more likely to change majors than non-STEM students. Furthermore, the number of black women in STEM has not improved in the last 13 years and in fact, declined by 1%. As a result, 2% of black women are represented in the STEM workforce.

STEM careers provide exciting opportunities for breaking the norm and offering upward mobility and economic security to women and minorities. This program will give our students the educational tools that will open doors to collegiate and employment opportunities in the STEM field.

#16 Learn Through Technology

Team: David Hampton, Pooja Chandrakar, Zixiao Chen, Vivekanand Pandey Vimal

In order to fundamentally change the foundation of our high school educational system, we need to show every student that they are not just the retainers of knowledge but also can be the creators of new knowledge and research. To do this we will have to fundamentally change the relationship between scientists and the community. We will use an established and successful model that has worked for 7 years (the WHS-Brandeis Summer Research Program), where underprivileged high school students are paired with graduate student mentors during the summer and conduct inquiry based STEM research projects. Our objective is to run this program during the school day at Waltham High School, so that it has a transformative effect on the general high school population.

To implement this, we will provide 3 components: 1. An inexpensive kit of materials allowing deep research in an emerging field that can be investigated simply. These kits will span a range of topics from augmenting the human using technology to using yeast to study mutations. 2. Matching researcher to HS students where grad students are recruited to lead a module of the research course at the high school. 3. Curriculum Design where we will provide all the relevant literature and where we will teach the graduate students to design and lead rigorous research based projects with the HS students.

We have already tested our first prototype, where WHS students created a device that consisted of using sensors that detected acceleration and tilt from gravitational vertical and converted it into vibrations felt on the skin of a person. This year, these students will lead and conduct experiments after school with the WHS biotech club. Next year, we aim to run a research based course at WHS. Everyone is welcome to collaborate (somde@brandeis.edu).

Brandeis Innovation Partners

MassChallenge

MassChallenge is the most startup-friendly accelerator on the planet. So friendly, that they take no equity from any of their startups. They give out over $2M globally each year in equity-free cash prizes to startups who are solving giant problems ranging from ending infant mortality and curing blindness in children, to harnessing the ocean's energy or eradicating the arsenic water crisis in Bangladesh, and even to subverting cultural norms around menstruation.

The Brandeis University Graduate Professional Studies

Graduate Professional Studies (GPS), a division of the Rabb School of Continuing Studies, extends the benefit of a Brandeis University graduate education to a diverse working professional population. We offer 12 fully online, part-time master's degrees and one post-graduate certificate in today's in-demand fields. With four 10-week sessions each year, students benefit from a flexible degree completion timeline that meets their needs as full-time professionals. Our courses are asynchronous, enabling students to engage from anywhere in the world, while our web conferencing tools enable faculty office hours, group work, and presentations. Students learn in classes that are small by design, capped at 16 or 20 depending on the level. Courses are led by industry experts who deliver individualized support and professional insights.

Brandeis International Business School

- **The 3 Day Startup (3DS)** program aims to create a living entrepreneurship laboratory on university campuses by bringing together students with diverse backgrounds ranging from freshmen to freshly-minted PhDs. Participants gain experience in cross disciplinary collaboration, brainstorming and ideation, and group productivity, including ad-hoc leadership under severe time constraints. They also become a proud partner of a startup, ready to be launched at the end of the event. To add to this, participants gain tremendous

opportunities to network with mentors who are thought-leaders and experts in the field of entrepreneurship.

- **The Asper Center for Global Entrepreneurship** was founded by Leonard Asper, `86, the Center serves as a campus-wide hub to examine and understand entrepreneurship across cultures and borders; provide a diverse range of learning experiences through courses, seminars, internships, business plans competitions, field visits, and meetings with global entrepreneurs; present the annual Asper Award for Global Entrepreneurship and Brandeis Alumni Entrepreneurship Awards.
- **The Entrepreneurship and Innovation Lab** is focused on developing the startup culture among budding entrepreneurs and enriching the spirit of innovation and transformation through action and example. Among various workshops and activities this year, the first annual Entrepreneurship Conference hosted a panel discussion on 'The future of Data analytics in Startups' with the panelists sharing their personal insights towards this pioneering field. We look forward to seeing you in our future events!

Brandeis MakerLab

Supporting educational, social and technological innovation, the Brandeis MakerLab is oriented around a vision of social justice designed to support makers who mend. They collaborate on computing projects to develop new forms of culture and craft in a community-centered setting.

The Hiatt Career Center

The Hiatt Career Center assists students and alumni in developing the skills to transform their unique backgrounds, liberal arts education and experiential learning into meaningful professional futures and relationships. Hiatt engages employers, colleagues, parents and families and the greater Brandeis community to achieve this mission.

MassBio

MassBio is a not-for-profit organization founded in 1985 that represents and provides services and support for the world's leading life sciences supercluster. MassBio is committed to advancing Massachusetts' leadership in the life sciences to grow the industry, add value to the healthcare system and improve patient lives.Representing 1,000+ biotechnology companies, academic institutions, disease foundations and other organizations involved in life sciences and healthcare, MassBio leverages its

unparalleled network of innovative companies and industry thought leaders to advance policy and promote education, while providing member programs, events, industry information, and services.

Sustainable Brandeis

Sustainable Brandeis' goal is to help fulfill the University's commitment to social justice, and our responsibility to the global community, by reducing our carbon footprint. Sustainable Brandeis hosts periodic sustainability competitions to engage the community in activities like energy reduction and recycling. The upcoming competition is North vs. Massell Sustainability Competition which residents of each quad compete to post real-life sustainability actions online, reduce its electricity use and improve its recycling rate.

Design Museum Boston

Design Museum Boston is a nomadic museum, turning the entire city into a museum. They put exhibitions and events in places where people already go: retail space, public space—even outside, with the focus on educating the world about design, from architecture to video game design, furniture to fashion, products to graphics.

Mass Technology Leadership Council

As the largest and most powerful technology association in the region, MassTLC's mission is to accelerate growth, innovation, and the development of an inclusive tech ecosystem in Massachusetts. For more than 30 years, MassTLC has served as the premier network for thousands of companies and entrepreneurs seeking valuable connections.

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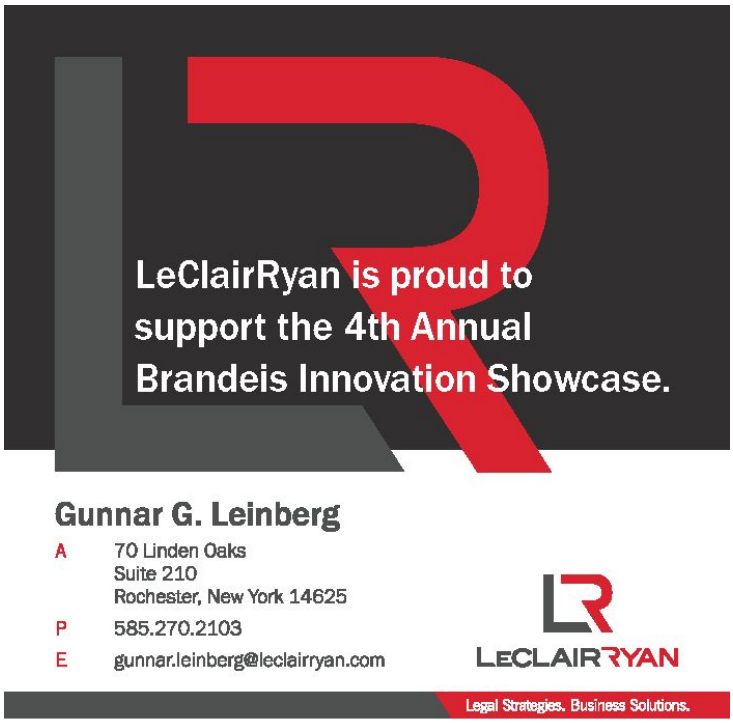

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