



BioHealth InnovationSM
Maryland's Commercialization Collaborative

GREENSPRING

ASSOCIATES

BHI Update

Rich Bendis

President & CEO

BioHealth Innovation, Inc.

The Region – Central Maryland

- Unrivaled Research Assets -
- Unfulfilled Commercial Promise -



National Institutes
of Health



State of Maryland: Federal & University Resources



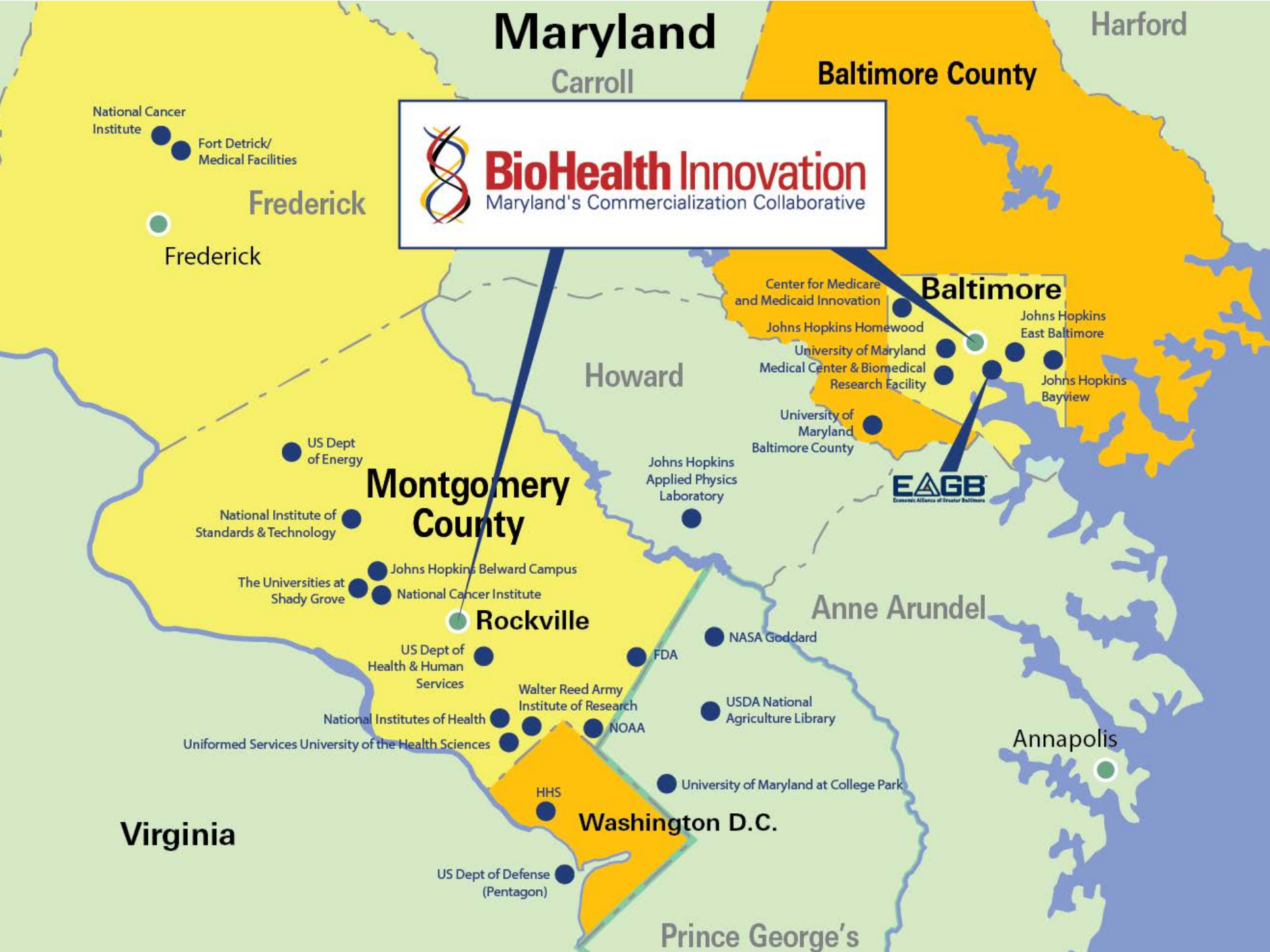
- **Population: 5.9 million people**
- **59 Federal Laboratories, Centers, & Institutes in Maryland**
- **Maryland Federal R&D investment exceeding \$12 billion annually**

JHU and USM represent another \$3.5 billion in annual R&D



JOHNS HOPKINS
UNIVERSITY





Maryland



BioHealth Innovation
Maryland's Commercialization Collaborative

Frederick

Baltimore

Montgomery County

Rockville

Virginia

Washington D.C.

Prince George's

Challenges to Innovation Economy

Lack of connection of innovation resources

Lack of an entrepreneurial culture and C-level executives

Lack of early-stage funding for commercializing technologies

Lack of spin-offs from federal and university R&D

BHI Value Proposition

Connect regional innovation assets

Develop an entrepreneurial talent and support pipeline

Attract funding for technology commercialization

Evaluate commercially relevant federal and university technology

BioHealth Regional Innovation Cluster Assets



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UNIVERSITY



NEA
New Enterprise Associates*

MARYLAND OF OPPORTUNITY. SM

EAGB™

Maryland
Technology-Development-Corporation

APL
The Johns Hopkins University
APPLIED PHYSICS LABORATORY

NIH National Institute of Neurological Disorders and Stroke

NIH National Heart, Lung, and Blood Institute

NIH
National Institutes of Health



NATIONAL
CANCER
INSTITUTE

BIO X MARYLAND

MaBio

Montgomery County, Maryland
Montgomery College

NCATS NIST

Center for Medicare & Medicaid
INNOVATION

WALTER REED
ARMY MEDICAL CENTER



Rockville
Economic Development, Inc.
Known for the Companies We Keep

USDA

HHMI
HOWARD HUGHES
MEDICAL INSTITUTE



National Biodefense Analysis
and Countermeasures Center

TIGR
THE INSTITUTE FOR GENOMIC RESEARCH

FDA

USAMRIID
United States Army
Medical Research Institute
of Infectious Diseases
Biodefense solutions to protect our nation

J. Craig Venter
INSTITUTE



Bio
BIOTECHNOLOGY
INDUSTRY ORGANIZATION

BioHealth Innovation is an Innovation Intermediary

An private-public partnership, serving as an innovation intermediary in Central Maryland with a mission to:

- Advance local technologies, assets and resources
- Accelerate innovation
- Connect sectors, industries, communities, and markets



- Regionally-oriented
- Private-public partnership, 501(c)(3) nonprofit
- Market-driven, private sector-led and funded
- Neither a government initiative, nor a membership organization

Regional BioHealth Ecosystem Partners

ACADEMIA

- RESEARCH/T2
- LIFELONG LEARNING
- ECONOMIC DEVELOPMENT

INDUSTRY

- PROFIT
- PROCESS
- PRODUCT

**INSEPARABLE
MISSIONS**

GOVERNMENT

- SUSTAINABILITY
- INFRASTRUCTURE SUPPORT
- ECONOMIC POLICY

FOUNDATIONS

- ECONOMIC GROWTH
- COMMUNITY INVESTMENT
- REGIONAL COLLABORATION

BHI Partners and Sponsors

Private Sector



Government





Academia



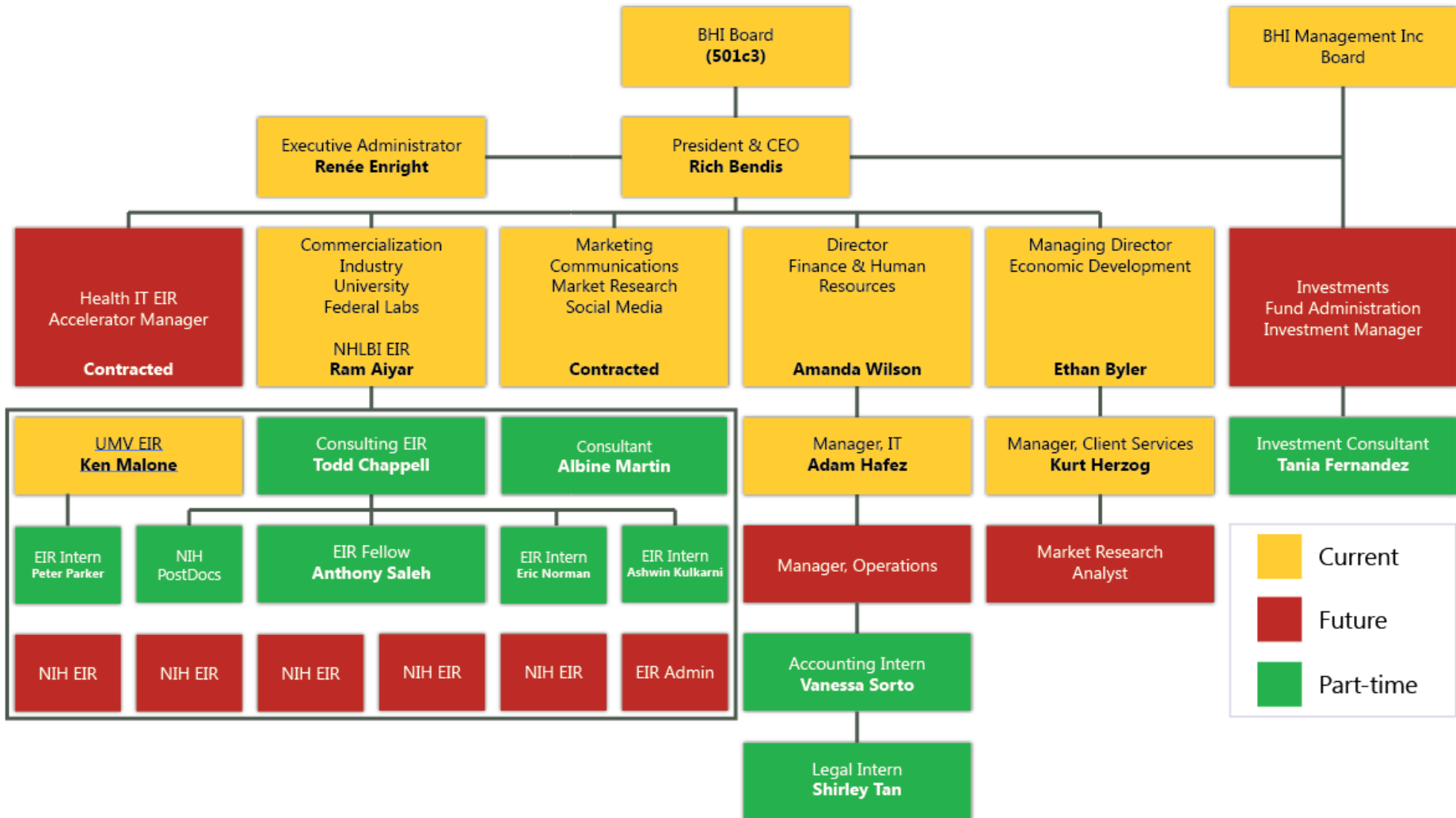
NGOs



BHI Board of Directors

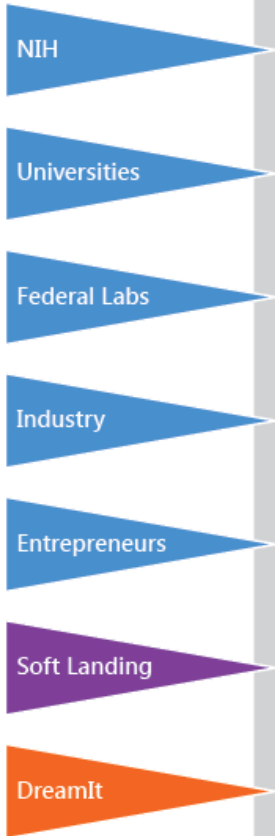
 <p>Daniel J. Abdun-Nabi CEO, Emergent BioSolutions</p>	 <p>Judith Dunn VP, Global Head of Clinical Dev. Roche</p>	 <p>Douglas Liu Senior VP of GO Qiagen</p>
 <p>Michael J. Baader, Esq. General Counsel Greenspring Associates</p>	 <p>Jens Eckstein President SR One (GSK)</p>	 <p>Charles Morton Partner Venable LLP</p>
 <p>Richard A. Bendis President & CEO BioHealth Innovation, Inc.</p>	 <p>David M. Gillece (Secretary) Regional Managing Principal Cassidy Turley</p>	 <p>David Mott General Partner New Enterprise Associates</p>
 <p>Kenneth Carter Chair Noble Life Sciences</p>	 <p>Rick Ivey Vice President R&D BD Diagnostics</p>	 <p>John A. Sackett President Shady Grove Adventist Hospital</p>
 <p>Dave Lemus CEO Sigma-Tau Pharmaceuticals</p>	 <p>Joel Marcus CEO & Founder Alexandria Real Estate</p>	 <p>J. Thomas Sadowski President & CEO EAGB</p>
 <p>Chris Callaghan Group VP, Healthcare Banking M&T Bank</p>	 <p>Beth Meagher Principal Deloitte Consulting LLP</p>	 <p>Reginald Seeto VP, Partnering and Strategy MedImmune</p>
 <p>Ronald J. Daniels President Johns Hopkins University</p>	 <p>William E. Kirwan Chancellor University System of MD</p>	 <p>Thomas Street ACAO MoCo Government</p>

BHI Organizational Chart

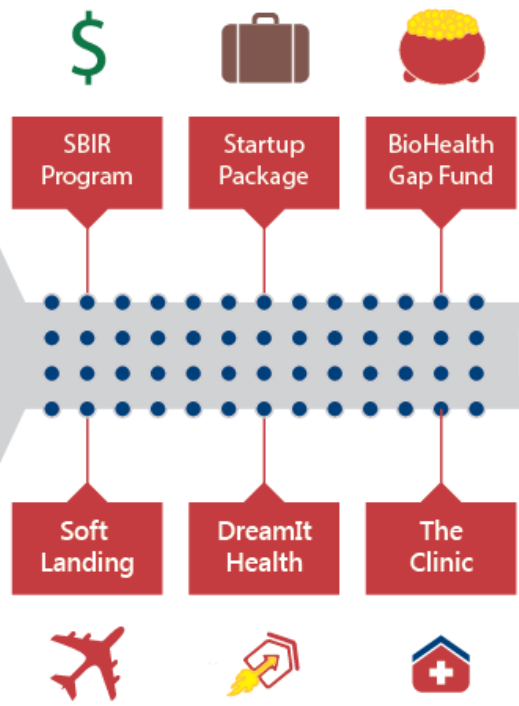


BHI Program Structure

SOURCES



BHI Assistance Programs



Strategic Programs

Financial Sponsors

OUTCOMES

- ★ Technologies Progressed
- ★ Company Growth
- ★ Risk Capital
- ★ New Startups & Spinoffs
- ★ Partnerships
- ★ Mergers & Acquisitions
- ★ Leveraged \$
- ★ Regional Branding
- ★ Jobs
- ★ Economic Development



BHI Technology Focus

- Therapeutics
- Diagnostics
- Medical Devices
- Healthcare Services
- E-Health
- Mobile Health
- Electronic Medical Records
- Health Informatics
- BioHealth Cyber Security

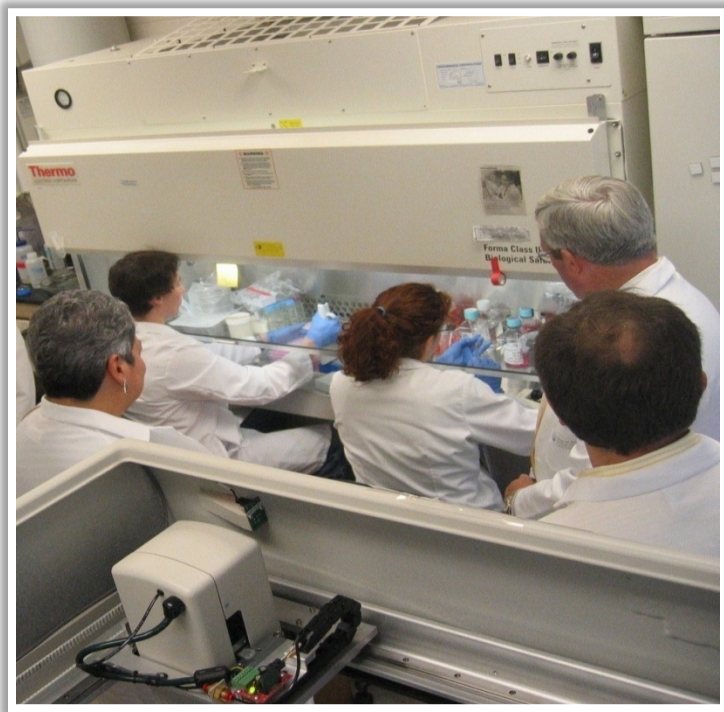


Innovation Paradigm Shift

PROOF OF CONCEPT
(Technological Feasibility)

Laboratory Push

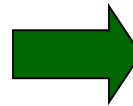
“It Works!”



PROOF OF COMMERCIAL RELEVANCE
(Market Pull)

“It Works To Solve A Problem”

“I’ll Buy It”

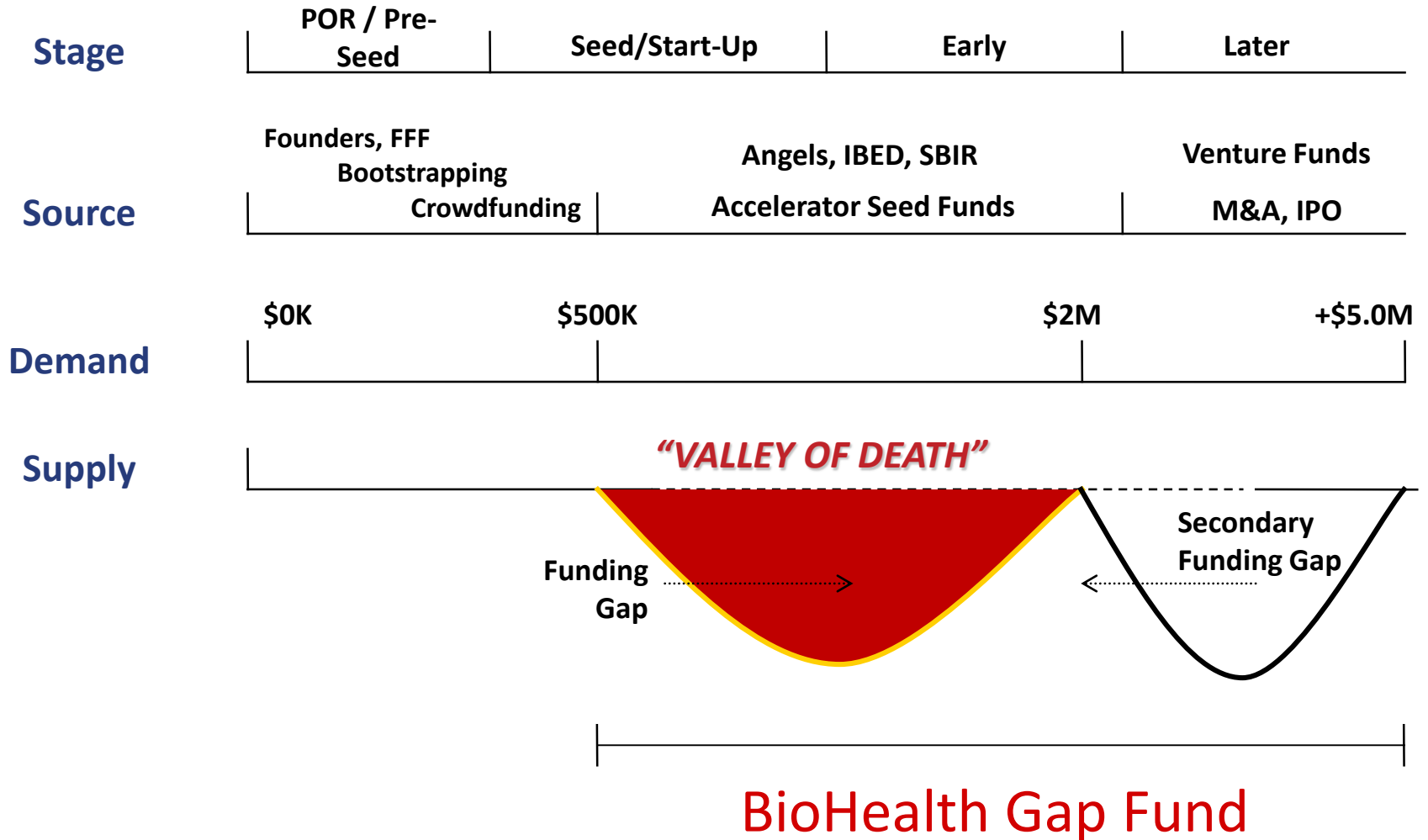


BHI Commercial Relevance Advisory Board



- A pool of experienced biohealth professionals who have agreed to assist BHI in evaluating market-relevant research and product development opportunities
- The CRAB helps determine the commercial applicability of emerging entrepreneurs, companies and their science or technology.

Innovation Capital **Valley of Death**



BHI Innovation Capital Map



Capital Sources by Investment Stage

Pre-Proof of Concept \$25,000 - \$1,500,000 (over 5 yrs)	Translational Research/ Proof of Concept \$15,000 - \$750,000 (over 3 yrs)	Proof of Commercial Relevance/Pre-Seed \$15,000 - \$500,000	Seed/ Start-Up \$50,000 - \$1,500,000	Early Stage \$200,000 - \$2,500,000	Later Stage \$2,500,000+
<ul style="list-style-type: none"> NIH R01 NIH R03 NIH R21 	<ul style="list-style-type: none"> SBIR/STTR Grant Phase 1 NCATS Cures Acceleration Network (CAN) Maryland Stem Cell Research Fund (MSCRF) - Various TEDCO Technology Validation Program - Proof of Concept TEDCO Maryland Innovation Initiative - Phase 1 JHU - Coulter Translational Research Partnership 	<ul style="list-style-type: none"> Maryland Industrial Partnerships (MIPS @ UMD) TEDCO Maryland Innovation Initiative - Phase 2 Maryland Stem Cell Research Fund (MSCRF) - Pre-Clinical TEDCO Technology Validation Program - Market Assessment SBIR/STTR Phase 2 ★ SBIR/STTR Federal Funding Assistance Program 	<ul style="list-style-type: none"> Dingman Center Angels (UMD) BioMaryland Biotechnology Dev. Award - Translational Research TEDCO Patent Assistance Program TEDCO Technology Commercialization Fund TEDCO Maryland Innovation Initiative - Phase 3 SBIR/STTR Phase 2 ★ BioHealth Gap Fund 	<ul style="list-style-type: none"> Propel Baltimore Fund TEDCO Veterans' Opportunity Fund Invest Maryland: Maryland Venture Fund BioMaryland Biotechnology Dev. Award - Commercialization Maryland Health Care Product Development Corporation Abell Venture Fund MMG Ventures LLP TDF ★ BioHealth Gap Fund 	<ul style="list-style-type: none"> Maryland Venture Fund Authority ABS Capital Partners Greenspring Associates Novak Biddle Venture Partners Sterling Venture Partners Harbert Venture Partners JMI Equity New Enterprise Associates (NEA)

Funding Type Key

- Academic
- State of Maryland
- Federal
- BioHealth Innovation, Inc.
- Economic Development
- Private Capital

Tax Credits

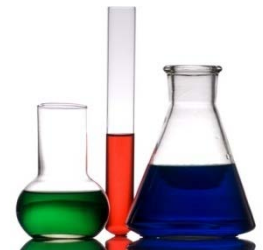
- Maryland Biotechnology Investor Tax Credit
- Montgomery County Biotechnology Investor Tax Credit

BHI Commercialization Pipeline

Source and evaluate biohealth intellectual properties (IP)

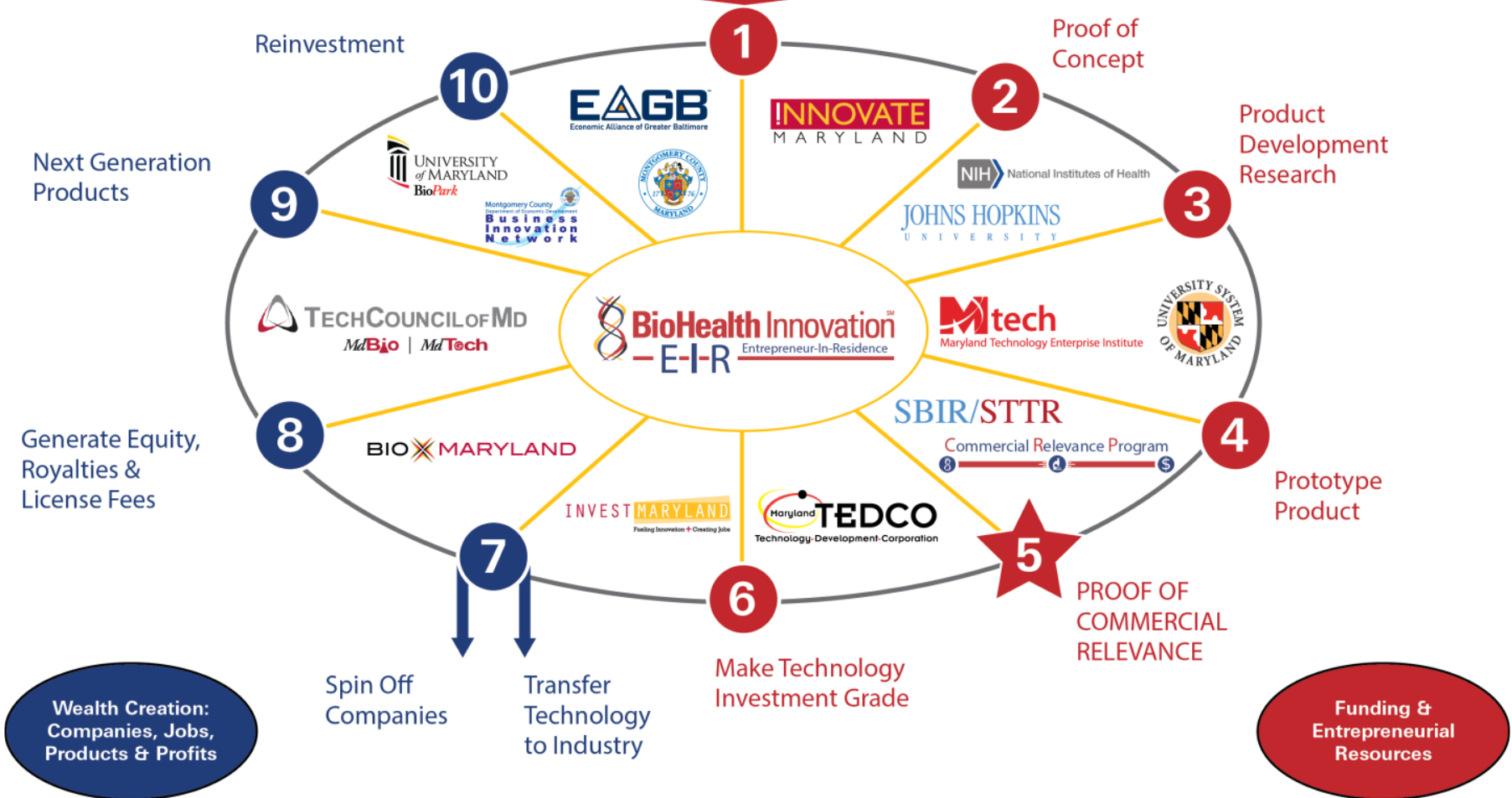
Identify funding for market-relevant IP

Grow and markets businesses and products



BHI Commercialization Model

Inventions patented through Universities, Federal Labs, Private R&D, and Basic Research



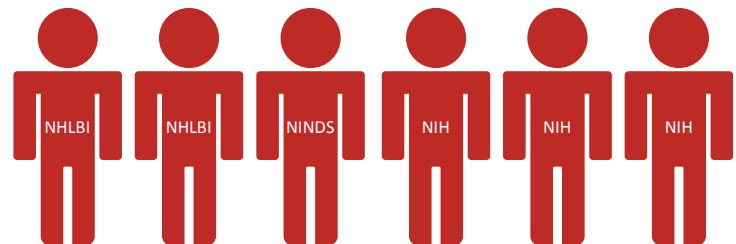
NIH Partnership Agreements



PIA between BHI and NIH's Office of Technology Transfer (OTT) that supports the 27 NIH institutes' \$3 billion intramural research and the Food and Drug Administration to **promote and foster cooperative research and accelerate technology commercialization** among NIH/FDA, businesses, and universities.



NIH Consulting Entrepreneur Services Contract for 5 NIH Entrepreneurs-in-Residence



BHI Entrepreneur-in-Residence Program

A team leader who combines scientific, financial/VC and entrepreneurial management experience to:

- Perform due diligence
- Develop biohealth project-focused companies

Proactively identifies and commercializes **market-relevant** intellectual properties from:

- Federal labs
- Universities
- Private sector

2014 Status

4
EIRs



3

Licenses
Granted



2

Spinouts

1

Submitted
Application License

15

Current Companies

7

Pending Companies

-

Potential New
Companies

2015 Outcomes

- Grow portfolio companies to 20
- Develop specific goals for each portfolio company and aggregate into overall 2015 goal

Who are the Entrepreneurs-in-Residence?



Ram Aiyar (NHLBI)

Ram assists the National Heart Lung and Blood Institute (NHLBI) in translating disruptive science into commercially viable technologies. He works with the relevant stakeholders within the NIH to develop commercial plans and/or develop licensing opportunities such that the NIH technologies can be translated into commercially viable entities that will solve unmet medical needs of patients.



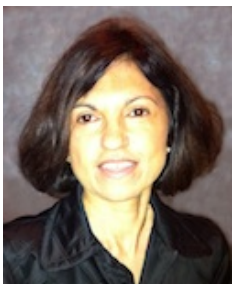
Ken Malone (UM Ventures)

Ken has built his career on creating economic value from science. Whether it was developing new business lines for global corporations or spinning out new ventures from universities, he has engaged in the commercialization of hundreds of new products in advanced materials and life sciences.



Todd Chappell (EIR Consultant)

Todd assists the Office of Technology Transfer (OTT) in the evaluation of existing technologies, provide an entrepreneurial perspective on new licensing proposals from start-up companies, advise on opportunities for new ventures, assist with developmental strategies, and mentor scientists to help ensure their research becomes commercially valuable.

















Albine Martin (EIR Consultant)

Dr. Albine Martin brings over 20 years of product commercialization and corporate development experience with 3 public companies located in Maryland and representing the biotechnology, diagnostics and life sciences sector. She has also served as a member of Active Angels, Inc where she syndicated and provides diligence for early stage investments.

Pending:
5 new NIH EIRs

BHI Company Portfolio

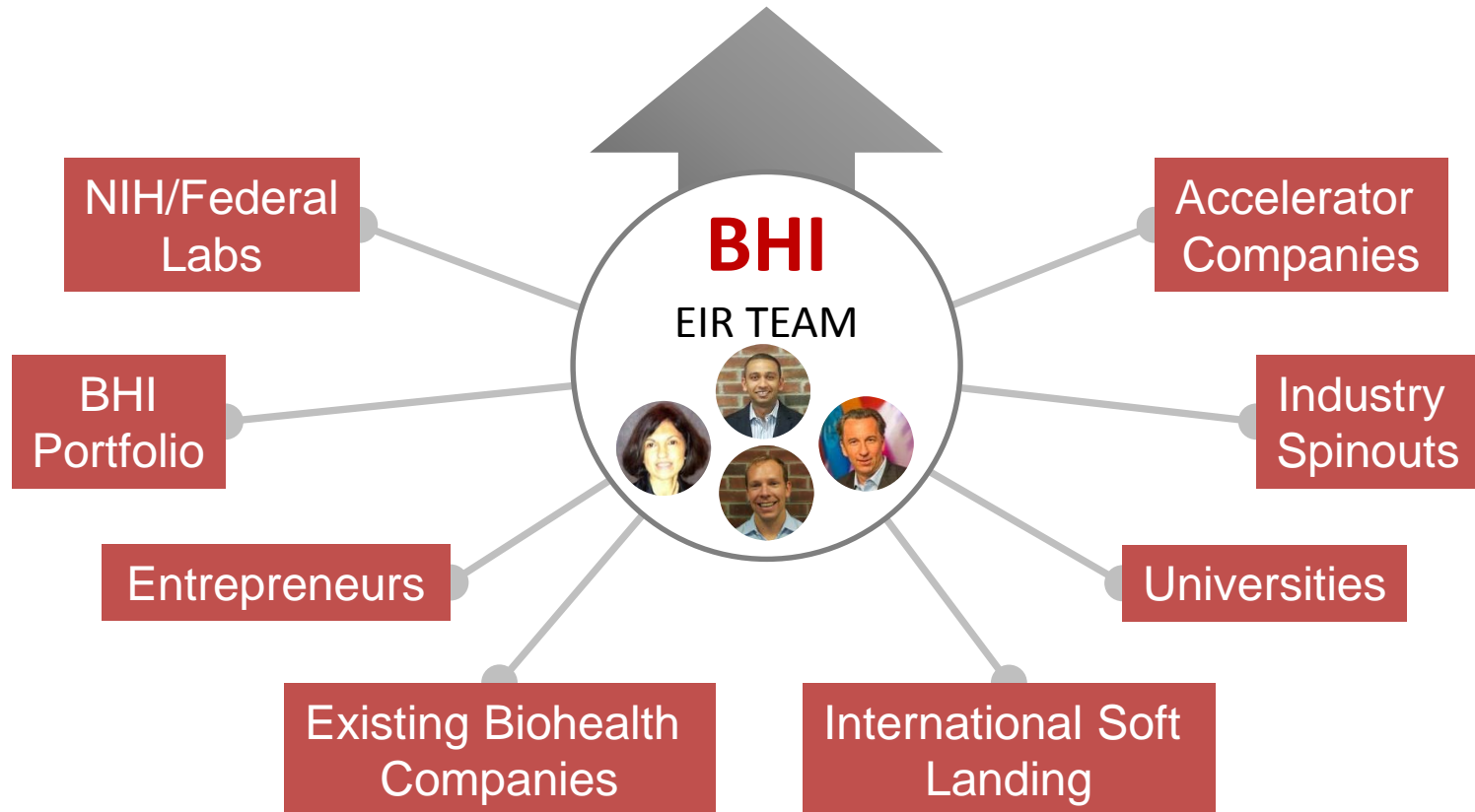
Therapeutic	Ram Aiyar NYU 	Todd Chappell NIH 	Todd Chappell NIAID 	Todd, Tania, Rich MoCo Entrepreneur 	Ram Aiyar Michigan 
Medical Device	Todd JHU 	Ram NY Intravenous Solutions	Todd Physician * Sinus Bath		
Personalized Medicine	Ethan Byler India 	Ethan SG Incubator * 			
Health IT / IT	Ken Malone JHU 	Ethan UMCP * 	Ken Baltimore Entrepreneur 		
R&D Tool	Todd Netherlands 	Todd HGS Entrepreneur 	Todd India * HepTox	Ken Baltimore Entrepreneur 3DBioWorks	
Occupational Safety and Health	Ken UMCP 				

* Pending

BHI Scouting



**BHI
Partners**



Small Business Innovation Research (SBIR) Grant

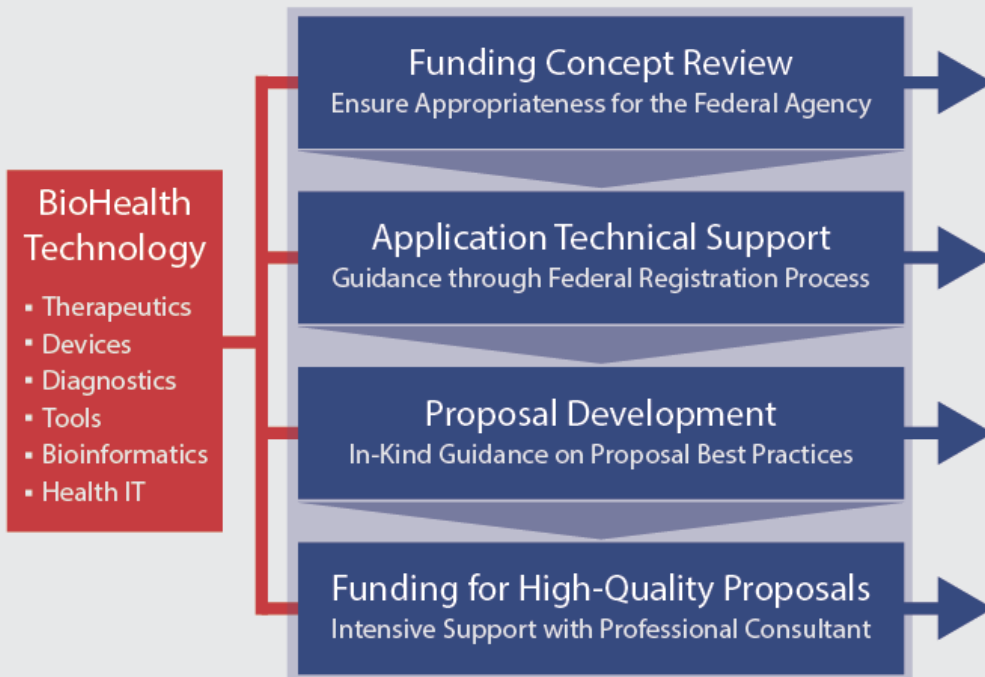
- \$2.2 billion annual United States Government program coordinated by the Small Business Administration provides grants or contracts to small businesses to spur technological innovation
- Grants awarded in 3 phases between \$100,000 and \$1.5 million
- Non-dilutive



BHI Federal Funding Assistance

- \$2.2 billion annual United States Government program coordinated by the Small Business Administration provides grants or contracts to small businesses to spur technological innovation
- Grants awarded in 3 phases between \$100,000 and \$1.5 million
- Non-dilutive

Value Chain of Assistance



Funding Agencies



BHI Federal Funding Assistance

Running Total – Small Businesses Assisted

- 7** Federal awards won; \$2.25M in funding
- 22** Projects supported by BHI funds
- 121** Projects Reviewed
- 46** Grant Proposals Submitted

BHI Startup Package

Corporate Legal



Intellectual Property



Clinical Services



Accounting



Laboratory Space



Incubation



Banking



Payer Advisory Services



Scientific Data Management Services



Grant Consulting



BHI Incubator

BHI interacts with companies and technologies at various stages in the biohealth industry from the results of basic research to companies currently selling products in the market. At these multiple levels of maturity, BHI evaluates whether the organization can help progress the scientist, inventor, entrepreneur, and/or business manager to support the growth of the entity.

We have a dedicated co-working space at our headquarters in Rockville where we support portfolio companies with the goal of progressing the business model for the company.

The BHI Incubator is a member of MBIA, NBIA, and is a certified Maryland TEDCO Incubator.



MockV
Solutions



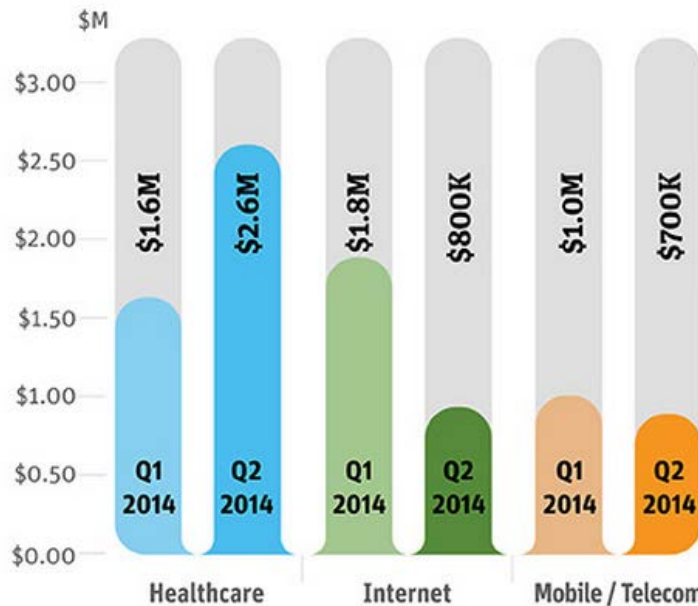
Strand
Genomics



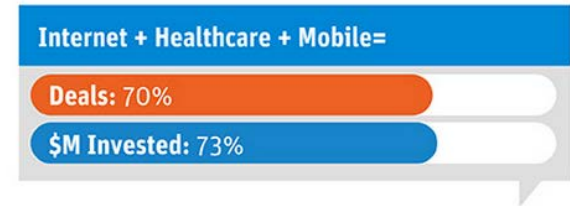
Mimetas
US, Inc.

Health IT ... Booming

- Increased investments in the mobile and healthcare sectors helped boost the median size of angel and angel group syndicate rounds
- Mobile health technologies projected to be worth \$11.8 billion by 2018



* Median round size, including non-angel investors



\$M invested

- (+) Indicates an increase over Q1 2014
- (-) Indicates a decrease from Q1 2014



- A Health IT Accelerator is an intensive 16 week program that admits top-recruited companies and entrepreneurs, provides a curriculum and network of experienced mentors in business, marketing and product development in the Health IT arena to “accelerate” top companies.

- Retain promising high growth HIT entrepreneurs in MD







- **Partners:**

- ❖ BioHealth Innovation, Inc
- ❖ Johns Hopkins University
- ❖ DreamIt Ventures
- ❖ Economic Alliance of Greater Baltimore
- ❖ Northrop Grumman
- ❖ Kaiser Permanente
- ❖ DBED



DreamIt Accelerator Companies

JHU
Affiliated

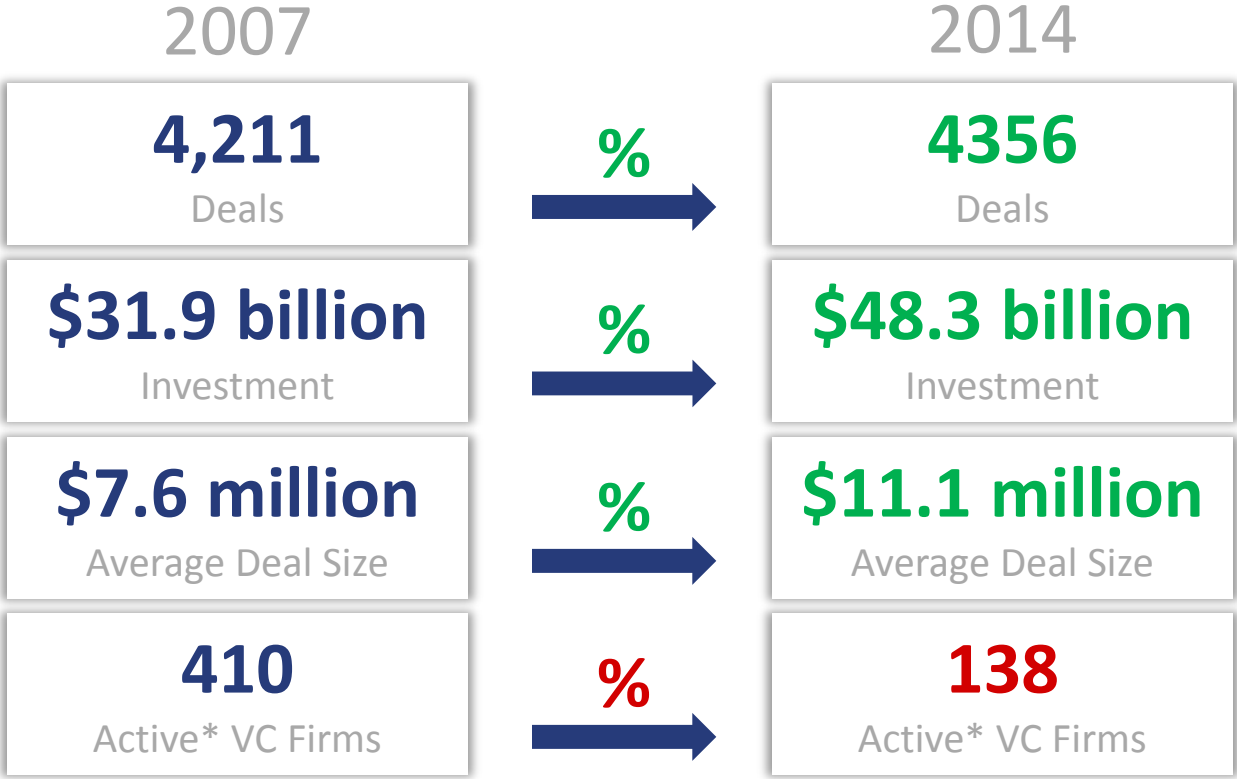
	● Wearable biometric devices	Baltimore, MD	
	● Practicing smarter medicine	Baltimore, MD	
	● Mobile Cognitive Rehabilitation	Talinn, Estonia	
	● Mobile Information Platform	Baltimore, MD	
	● Protecting Patient Data	Baltimore, MD	
	● Respiratory Medical Device	Athens, Greece	
	● Inpatient Care Collaboration	Pittsburgh, PA	
	● Augmented Reality Treatment	Barcelona, Spain	
	● Digital Workflow Management	Baltimore, MD	

Montgomery County Healthtech Accelerator

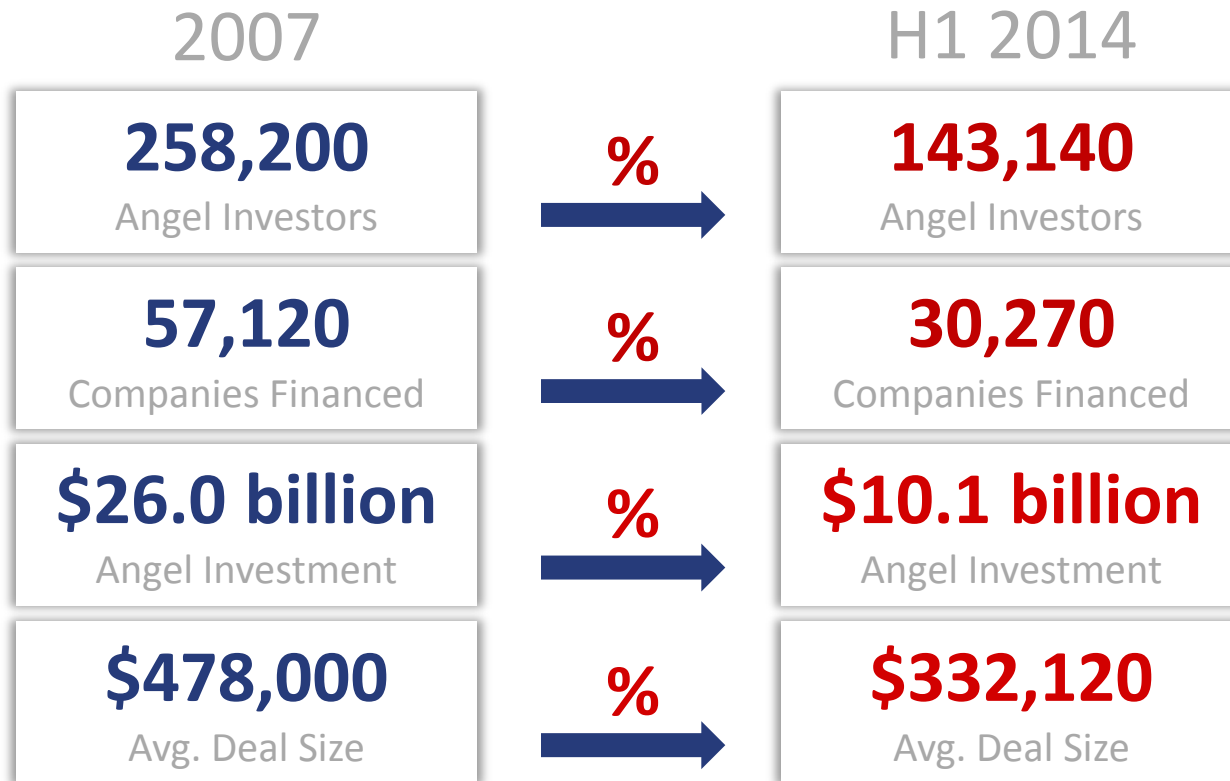


- Business accelerator for health startups in 2015
- 5 month formal co-working program with 7 month continuation
- Connect founders with a strong mentor network
- Help founders grow into a company ready for pilot testing and
- Cohorts of 8 - 10 companies and their founders recruited globally
- Up to \$50,000 in stipends per company
- Product focus
- Software developer pool
- Long term support/transition into Montgomery County Incubator Network
- Close proximity to NIH, FDA, HHS, Health companies, international trade representatives and BioHealth Innovation

US Venture Capital Investment



US Angel Investment

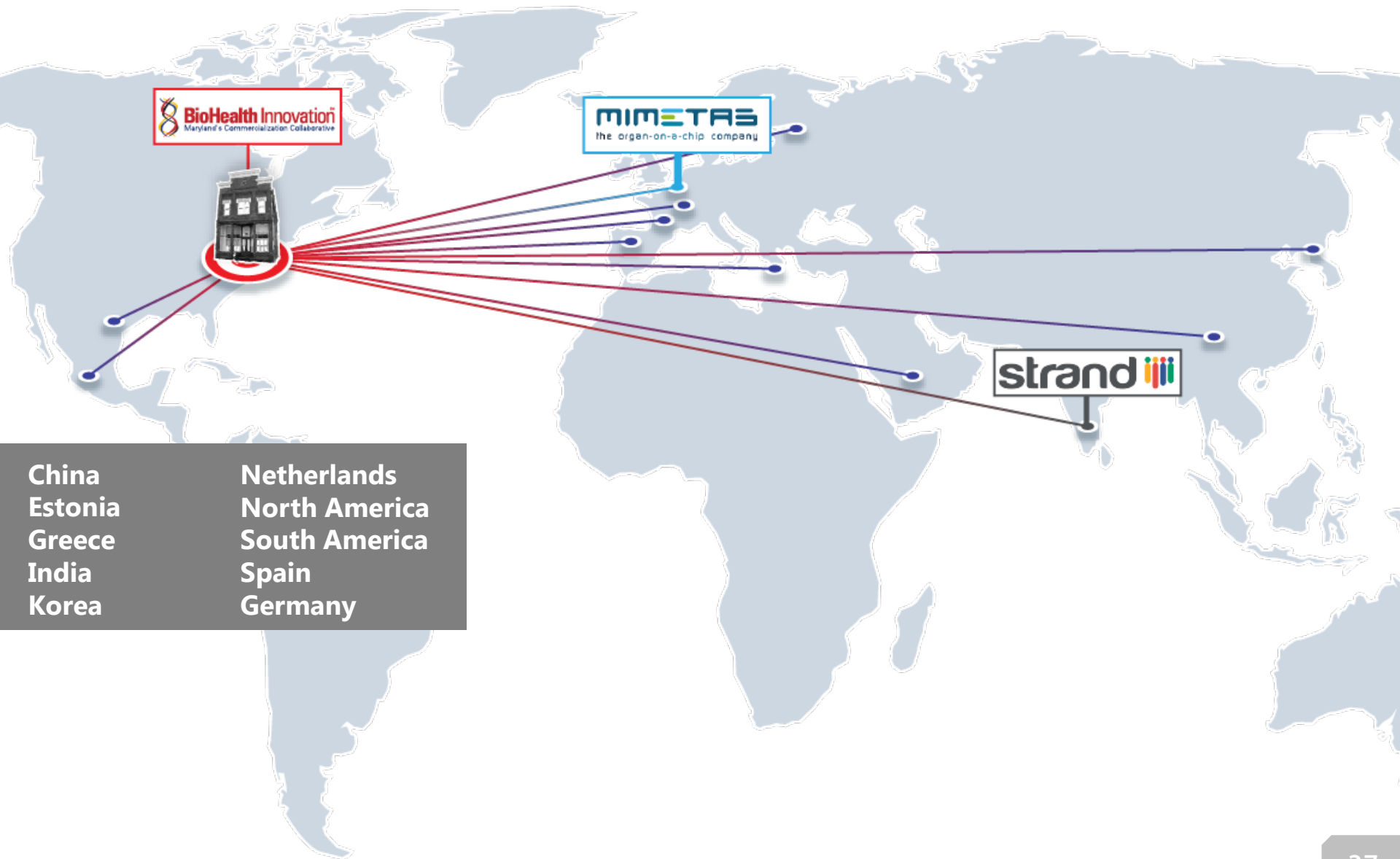


The logo features a stylized DNA double helix on the left, composed of two intertwined strands in red and blue. To the right of the helix, the text "BioHealth Gap Fund" is displayed in a bold, sans-serif font. "BioHealth" is in red, "Gap" is in blue, and "Fund" is in red.

BioHealth Gap Fund

- Will provide direct seed and early-stage equity investments ranging from \$500,000 to \$2,000,000
- Focused on BioHealth companies that fall into the 4 categories: Therapeutics, Medical Devices, Diagnostics, and Health IT
- Goal: Achieve a \$20,000,000 to \$50,000,000 initial fund
- Expectation: 30% of companies generating 10x the original investment
- 2015 – Target first close

BHI International Soft Landing



Maryland Regional Biotech Forum

REGISTER
MAY 10-11
MEDIMMUNE | ONE MEDIMMUNE WAY | GAITHERSBURG, MD 20878
30-31 MARCH 2015

MARYLAND REGIONAL BIOTECH FORUM
GROWING OUR ECOSYSTEM

JOIN US AS WE SHOWCASE ACCOMPLISHMENTS AND DISCUSS OPPORTUNITIES FOR THE FUTURE OF THE BIOTECH INDUSTRY IN THE MARYLAND REGION.

PRESENTED BY

BioHealth Innovation
AstraZeneca
MedImmune
Tech Council of MD

Tech Council of MD
9210 Corporate Boulevard
Suite 470
Rockville, MD 20850

MARYLAND BIOTECH FORUM

AstraZeneca/MedImmune, BioHealth Innovation, and the Tech Council of Maryland have partnered to host a comprehensive two-day biotechnology industry forum that is focused on the Maryland region. Policymakers will discuss growing the biotech ecosystem, while world-renowned leaders from the commercial and academic sectors will talk about their roles in driving development and workforce innovation. Several prominent leaders will be speaking at the event, including Soriot, Executive Director and Chief Executive Officer, AstraZeneca; Martine Rothblatt, Chairman and CEO of United Therapeutics; Rachel King, CEO and founder of GlycoMimetics; Joel Marcus, Chairman, CEO, and founder of Alexandria Real Estate Equities, and Maryland Governor Larry Hogan (invited).

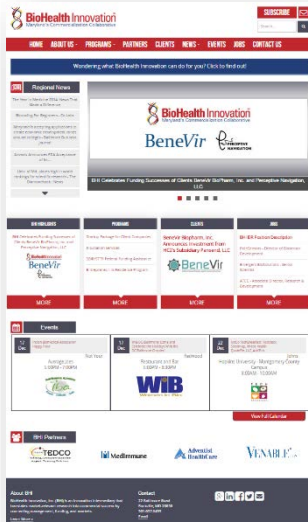
Company showcase breakout sessions will highlight some exciting developments that have come out of the area in diagnostics, therapeutics, medical devices, and health IT. We will also have several targeted and topical scientific and breakout sessions. Join us for an event that will spotlight a world-class biopharmaceutical community that has been a significant economic driver for the region over the past decade.

This is a free, invitation-only event. Seating is limited, so early registration is encouraged. **REGISTER AT WWW.MARYLANDBIOTECHFORUM.COM**

SPONSORED BY



BHI Website and News



BHI Website

The BHI website has news, an events calendar, research publications, regional organization feature stories and resources for the biohealth industry.

<http://www.biohealthinnovation.org>



BHI News

BHI's weekly e-newsletter highlights the Central Maryland region's news articles, national biohealth trends and feature stories.

<http://www.biohealthinnovation.org/news>

Entrepreneur Training Programs



I-CORPS



DC I-corps is a custom commercialization program for biohealth related technologies and startup companies. The six-week program guides teams through a rigorous market assessment and validation process ultimately creating a viable business model.



National Institutes
of Health



The BHI Commercialization Consulting Club is a place where BHI's EIRs and Commercialization Consultants can discuss all aspects of the technologies being researched and make new networking connections.



The Postdoc Conference & Career fair is for current postdoctoral fellows working in Washington, D.C. area federal labs and universities, and for companies recruiting high-level S.T.E.M. (Science, Technology, Engineering and Mathematics) professionals.

KAUFFMAN | **FASTTRAC**.
Startup your idea.

Not currently active



The FastTrac program is a practical, hands-on, entrepreneur-learning program designed to help entrepreneurs hone the skills needed to create, manage, and grow a successful business.

INNoVATE™

Not currently active



The INNovATE program provides applied training for postdoctoral fellows, research scientists, and other professionals who want to start life science based companies.

BHI: The Triple Bottom Line

Grows high-paying jobs and businesses

A large, hollow, downward-pointing arrow with a thin grey outline, centered between the first and second boxes.

Expands tax base; improves economic vitality

A large, hollow, downward-pointing arrow with a thin grey outline, centered between the second and third boxes.

...and benefits human health!

BHI Key Staff

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- BHI's Office Space

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