



BioHealth InnovationSM

Maryland's Commercialization Collaborative

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

Carroll

Harford

Baltimore County

National Cancer Institute
Fort Detrick/
Medical Facilities

Frederick

Frederick



BioHealth Innovation

Maryland's Commercialization Collaborative

Baltimore

Center for Medicare
and Medicaid Innovation

Johns Hopkins Homewood

University of Maryland
Medical Center & Biomedical
Research Facility

University of
Maryland
Baltimore County



Johns Hopkins
East Baltimore

Johns Hopkins
Bayview

Howard

US Dept
of Energy

Montgomery County

National Institute of
Standards & Technology

The Universities at
Shady Grove

Johns Hopkins Belward Campus

National Cancer Institute

Rockville

US Dept of
Health & Human
Services

National Institutes of Health

Uniformed Services University of the Health Sciences

Walter Reed Army
Institute of Research

NOAA

FDA

NASA Goddard

USDA National
Agriculture Library

Anne Arundel

Annapolis

Virginia

Washington D.C.

HHS

US Dept of Defense
(Pentagon)

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



JOHNS HOPKINS
UNIVERSITY



NEA
New Enterprise Associates*

MARYLAND OF OPPORTUNITY. SM

EAGGB™



APL
The Johns Hopkins University
APPLIED PHYSICS LABORATORY

BIO X MARYLAND

MdBio



NATIONAL
CANCER
INSTITUTE



NCATS NIST

Center for Medicare & Medicaid
INNOVATION



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



HHMI
HOWARD HUGHES
MEDICAL INSTITUTE



National Biodefense Analysis
and Countermeasures Center

TIGR
THE INSTITUTE FOR GENOMIC RESEARCH



J. Craig Venter
INSTITUTE



Bio
BIOTECHNOLOGY
INDUSTRY ORGANIZATION

What is A Regional Innovation Intermediary?

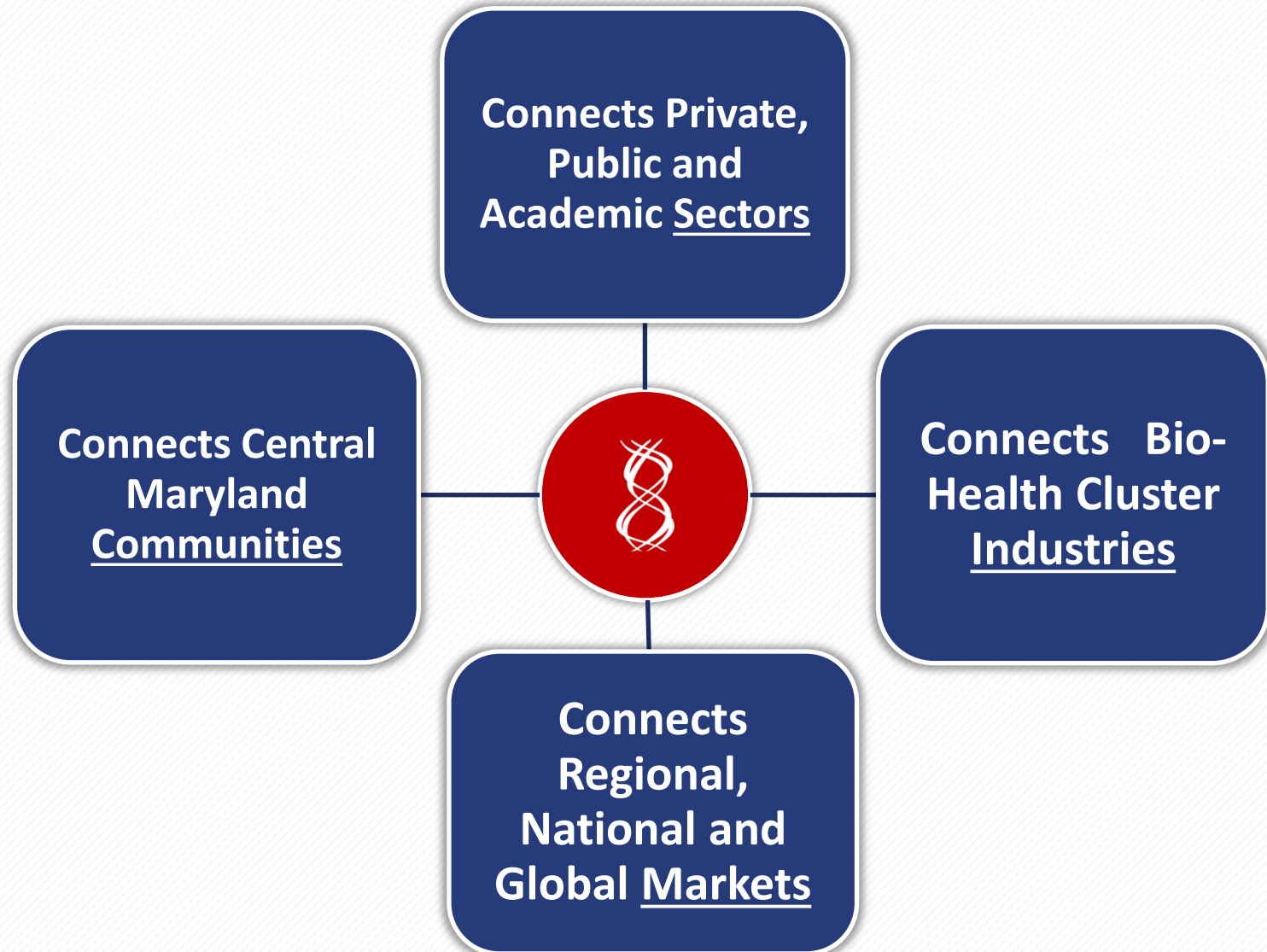
An organization at the center of the Central Maryland region's efforts to:

- Align local technologies, assets and resources
- Advance Innovation



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

BHI: An Innovation Intermediary that Connects



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



Non-Governmental



BHI Board of Directors

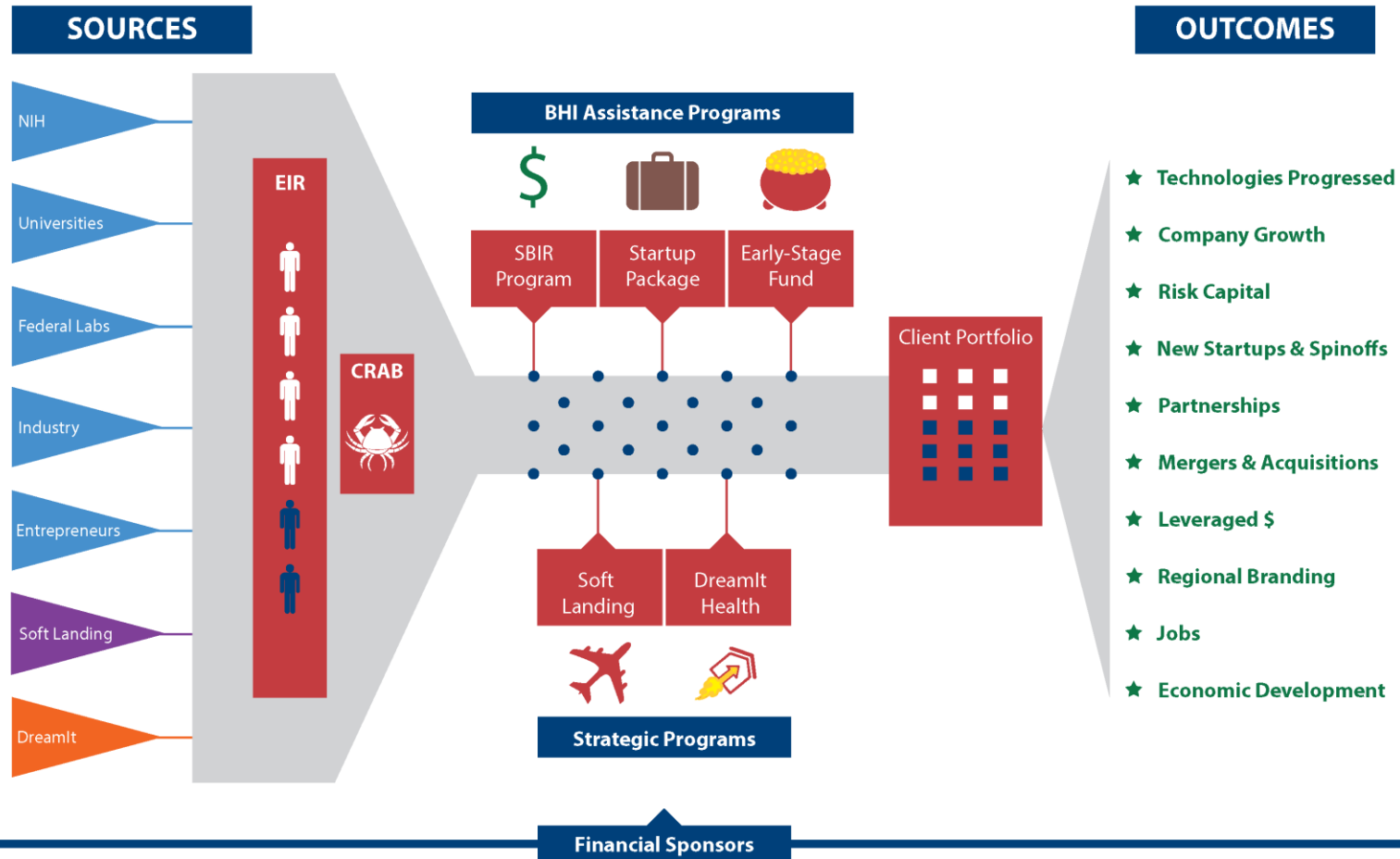
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	Michael J. Baader, Esq. Managing Director Venable LLP
	Richard A. Bendis President & CEO BioHealth Innovation, Inc.
	Kenneth Carter Chair Noble Life Sciences
	Cynthia L. Collins CEO Clariant, GE Healthcare
	Scott Dagenais Senior Vice President M&T Bank
	Ronald J. Daniels President Johns Hopkins University
	Jens Eckstein President SR One (GSK)
	David M. Gillece (Secretary) Regional Managing Principal Cassidy Turley

	Rick Ivey Vice President R&D BD Diagnostics
	William E. Kirwan Chancellor University System of MD
	Douglas Liu Senior VP of GO Qiagen
	David Mott General Partner New Enterprise Associates
	William G. Robertson President & CEO Adventist Healthcare
	J. Thomas Sadowski President & CEO EAGB
	Reginald Seeto VP, Partnering and Strategy MedImmune
	Thomas Street ACAO MoCo Government

BHI Program Structure

Mission

BioHealth Innovation connects market relevant research assets to appropriate funding, management, and markets to facilitate the development of commercially viable biohealth products and companies.



BHI Technology Focus

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

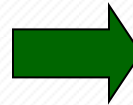


Innovation Paradigm Shift

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”

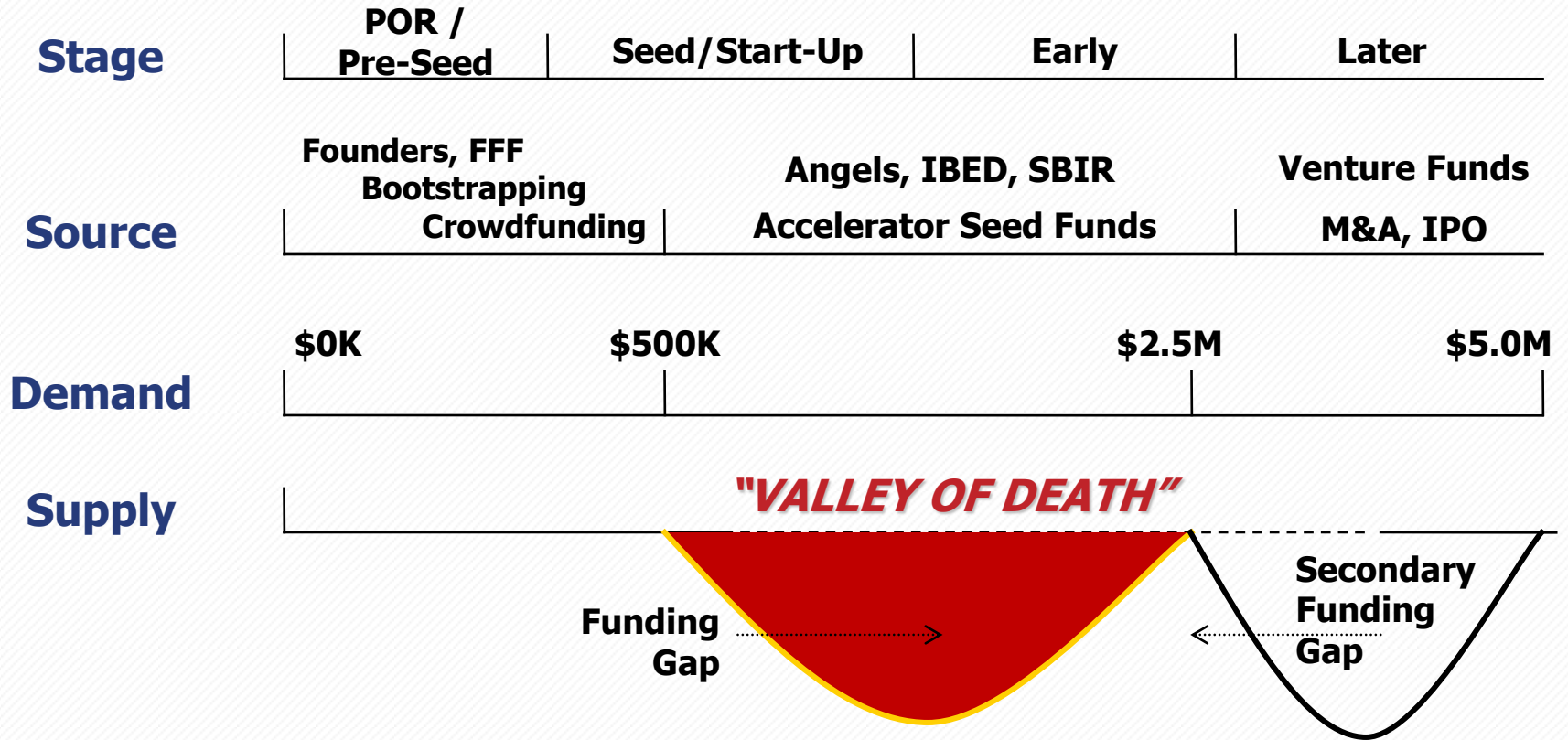


BHI Commercial Relevance Advisory Board



- 31 experienced biohealth professionals assisting 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

Pre-Proof of Concept	Translational Research/ Proof of Concept	Proof of Commercial Relevance/Pre-Seed	Seed/ Start-Up	Early Stage	Later Stage
\$25,000 - \$1,500,000 (over 5 yrs)	\$15,000 - \$750,000 (over 3 yrs)	\$3,000 - \$500,000	\$50,000 - \$1,500,000	\$200,000 - \$2,000,000	\$2,000,000+
<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 ★ BHI SBIR/STTR Federal Funding Assistance Program 	<ul style="list-style-type: none"> Dingman Center Angels (UMD) BioMaryland Biotechnology Dev. Award - Translational Res. TEDCO Patent Assistance Program TEDCO Technology Commercialization Fund TEDCO Maryland Innovation Initiative - Phase 3 SBIR/STTR Phase 2 ★ BHI Commercial Relevance Fund(CRF) 	<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 	<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

Associations

Association of University Resource Parks (AURP)	Angel Capital Association (ACA)	Mid-Atlantic Venture Association (MAVA)	National Venture Capital Association (NVCA)
Association of University Technology Managers (AUTM)			
Licensing Executive Society (LES)			

Funding Type Key

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

Tax Credits

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

BHI Commercialization Pipeline

Sources and evaluates biohealth intellectual properties (IP)

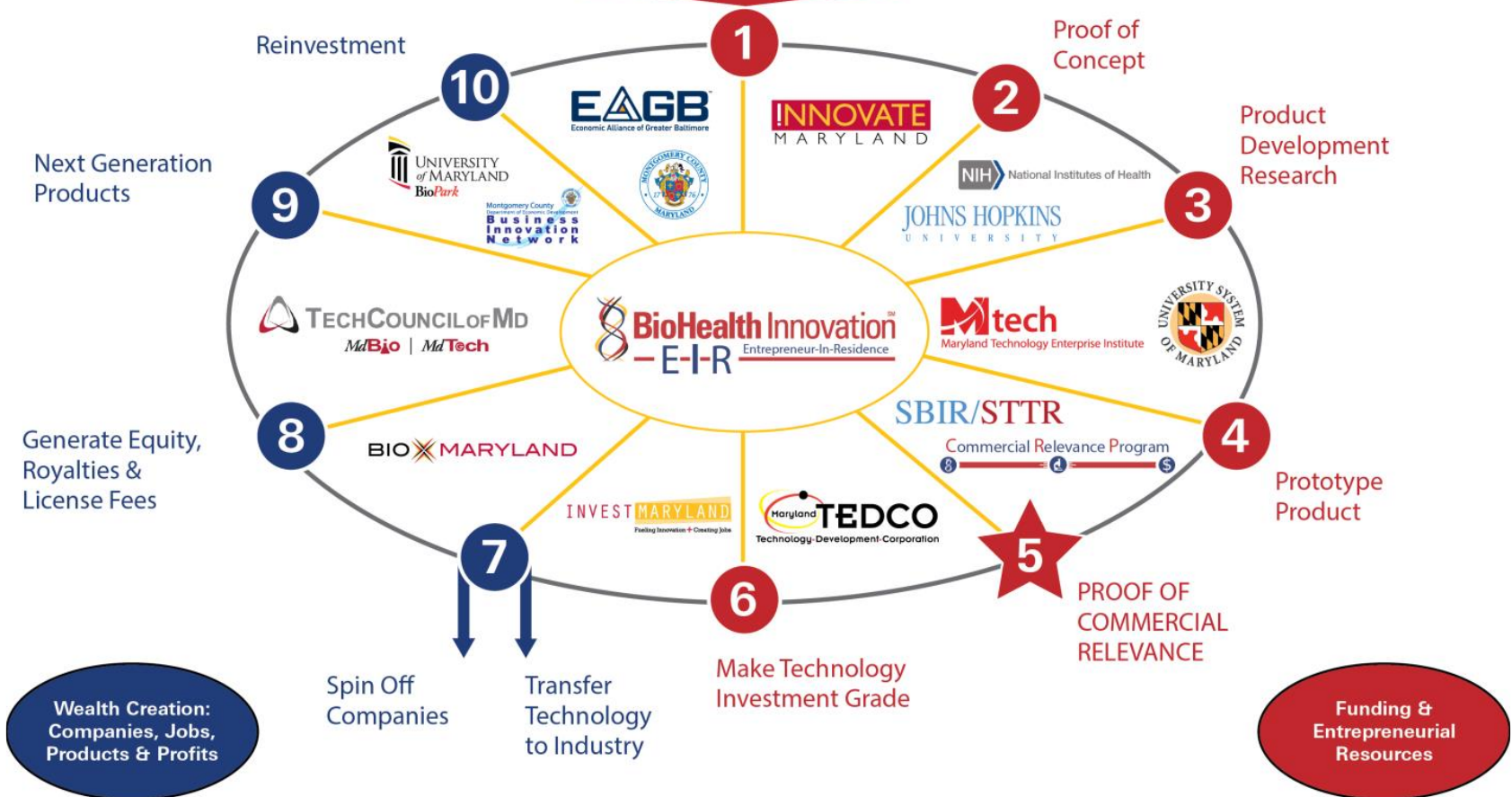
Funds market-relevant IP

Grows and markets businesses and products



BHI Commercialization Model

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



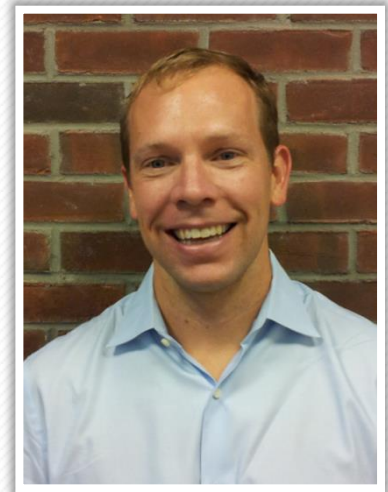
BHI Entrepreneur-in-Residence Program

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



Todd Chappell

2013 Status



114 NIH
63 Industry

Technology Reviews
Conducted

4

EIRs



1

EIR MOU



8

Current Clients

3

Pending Clients

4

Potential New
Clients

Future

- Add 2 EIRs
- Create 5 spinouts or tech placements
- Develop education programs

BHI Entrepreneurs-in-Residence



Todd Chappell (NIH-OTT)

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.



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.



Rich Moore (NIH-OTT)

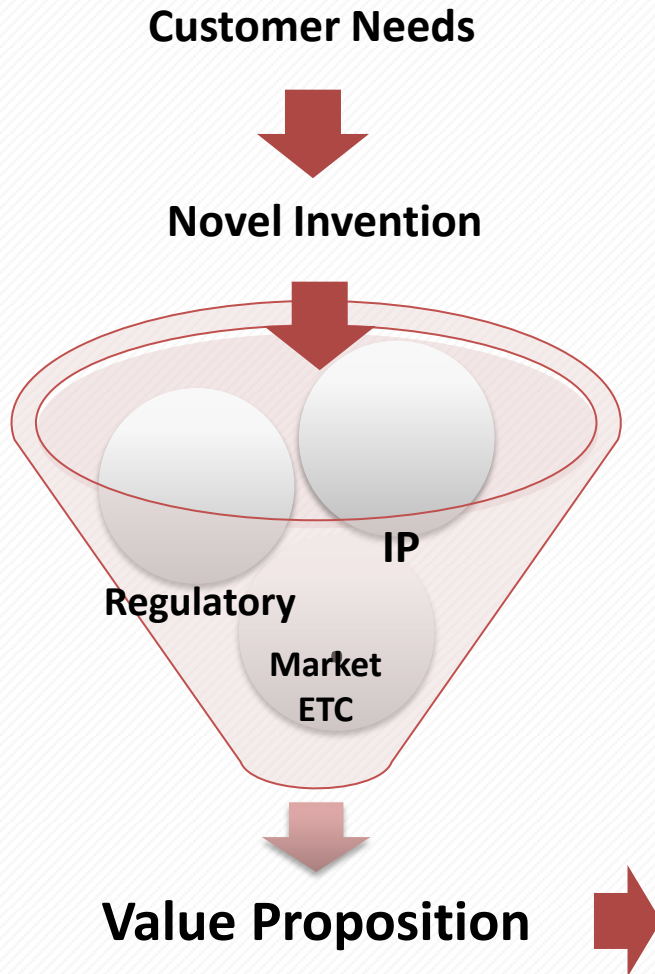
Dr. Moore previously served as the Chief Scientific Officer for OpGen, Inc. In that role, Dr. Moore provided leadership over multiple R&D functions, and led the company's Scientific and Clinical Advisory Boards. Prior to that, he spent 12 years at BD Diagnostics holding various positions, most recently as R&D Director, Systems Integration and Advanced Technology.



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.

How Do We Determine **Commercial Relevancy**?



The Entrepreneur-in-Residence process for determining commercial relevancy is what makes us **unique**.

Identifying Opportunities

Lead Approach (NIH)

Technology Review Committees

Technology Transfer Branch
Chiefs and Licensing Managers

Successful Scientists

Systematic Approach (NIH + Other Institutions)

Evaluation of market needs from
regional players

Directed analysis using database
and meetings with scientists

Commercial, development, and
funding analysis

BHI Client Companies

BeneVir

- Developing a therapeutic platform that can be adapted to target a wide variety of cancers.



- Specializes in automatically diagnosing medical conditions in medical scans, tests, and sensors with minimal human support.



- Developing and marketing Organ-on-a-Chip solutions for the pharmaceutical industry.

Mehr Medical

- Developing devices for cardiovascular procedures that will solve high unmet needs in the transcatheter valve replacement space.

MockV

- Developing novel viral clearance kits to be utilized during process development bio therapeutics.



- Developing sensors that can detect harmful chemicals mixed in air in very small quantities, such as industrial chemicals, and other pollutants.



- Developing medical devices related to image-guided, minimally-invasive niche markets.

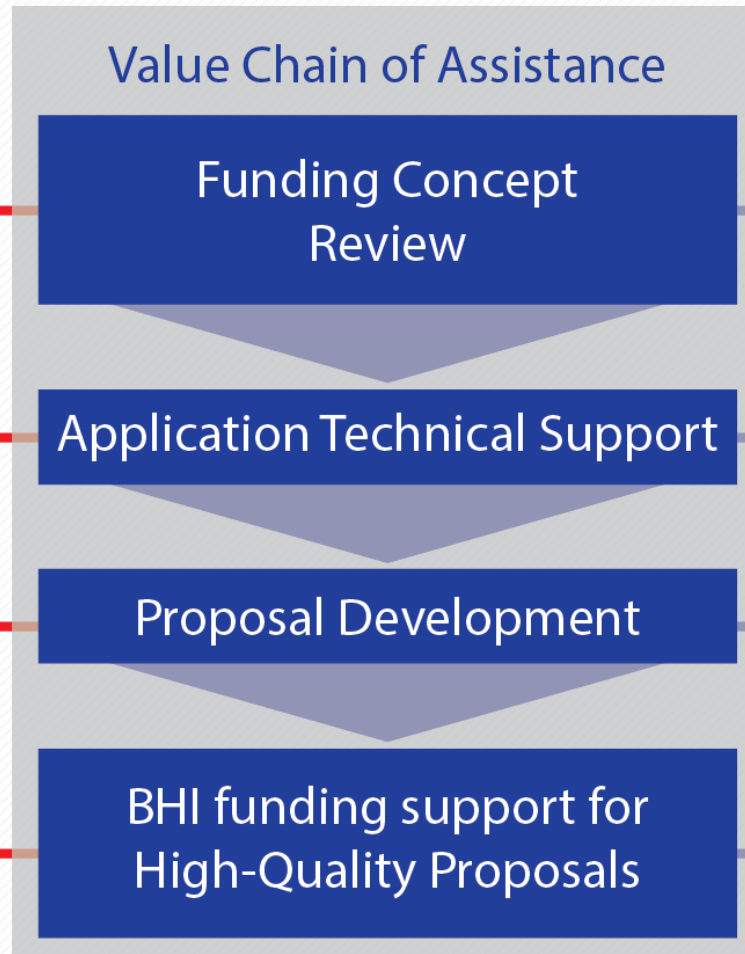


- Developing a platform vaccine like particle technology that has the potential to be used for various diseases including cancer.

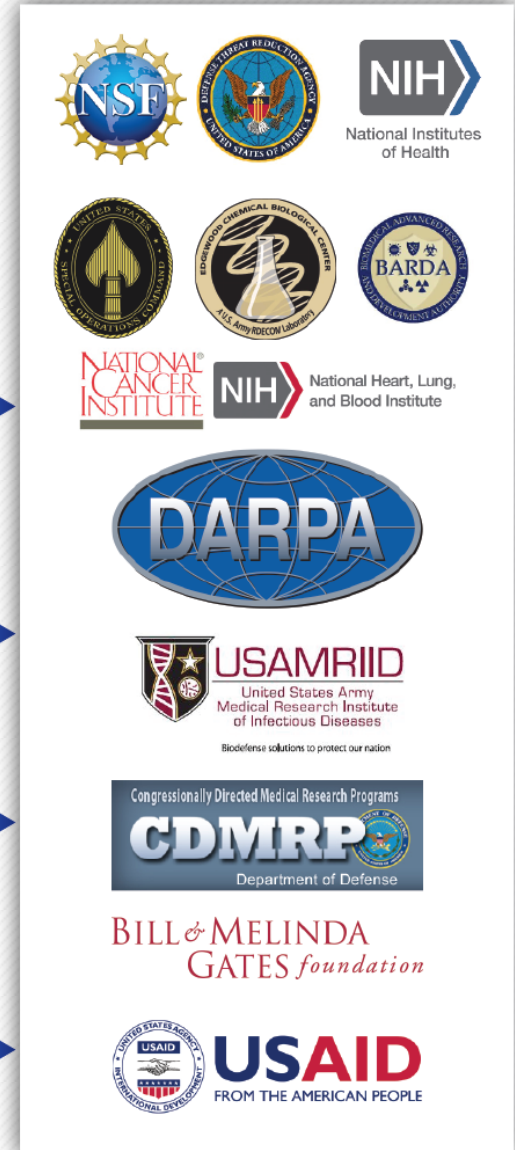
Federal Funding Assistance



Central
Maryland
BioHealth
Startups



Funding Agencies



BHI Federal Funding Assistance

2013 Performance

55

Total
Number
Reviewed

18

Grant
Proposals
Submitted

13

Not
Yet
Submitted

14

Not Further
Pursued by
Company

10

Flawed:
No Action
Taken

Other Notable Activities

- NHLBI Innovation Conferences – evaluated SBIR companies to present at regional showcases (San Diego; San Francisco)
- NHLBI Centers for Accelerated Innovation – supporting performance metrics & process evaluation for CAIs

BHI Startup Package

Corporate Legal

VENABLE[®]
LLP

Intellectual Property



Laboratory Space



Accounting



Banking



Grant Consulting



ScienceSherpa
Help and Heavy Lifting For Successful Grants and Proposals

DreamIt

Health Baltimore

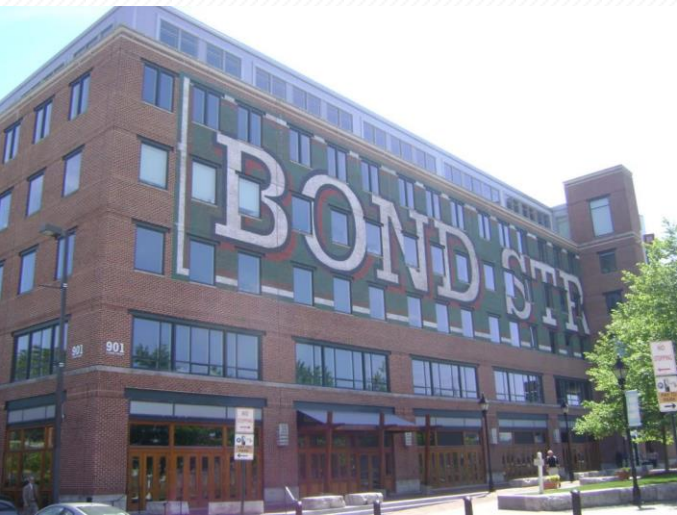


- Health IT Accelerator
- Help 9 companies achieve critical business milestones in 4 months
- Provide guidance from successful entrepreneurs
- Give companies the chance to tap into the region's wealth of federal healthcare institutions

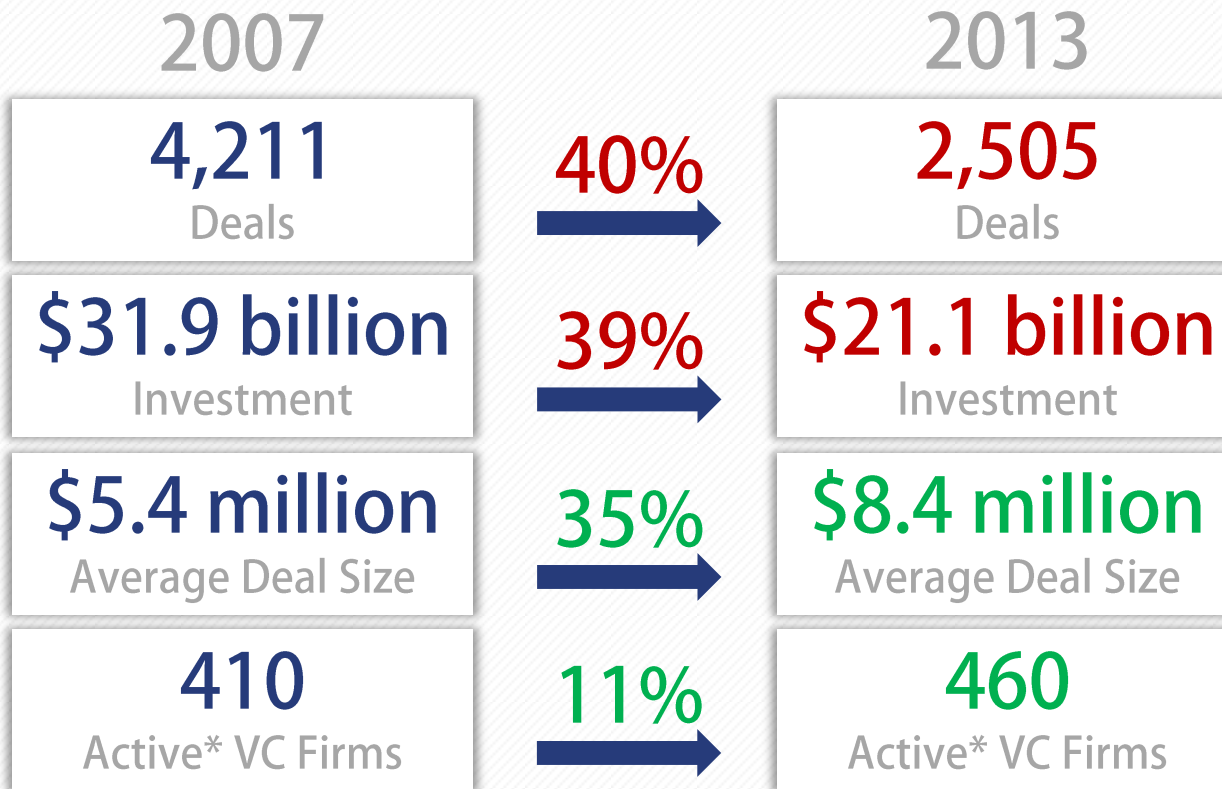
DreamIt Accelerator Companies

JHU
Affiliated

	<ul style="list-style-type: none"> ● Wearable biometric devices 	Baltimore, MD
	<ul style="list-style-type: none"> ● Next generation clinical decision support for the electronic health record 	Baltimore, MD
	<ul style="list-style-type: none"> ● Cognitive rehabilitation of patients suffering from stroke and traumatic brain injury through mobile games 	Tallinn, Estonia
	<ul style="list-style-type: none"> ● Mobile capture of data for medication adherence and clinical trials 	Baltimore, MD
	<ul style="list-style-type: none"> ● Digital management of patient consent and other administrative workflows 	Baltimore, MD
	<ul style="list-style-type: none"> ● Smartphone-based spirometry and respiratory data platform 	Athens, Greece
	<ul style="list-style-type: none"> ● Collaboration tools for inpatient care 	Pittsburgh, PA
	<ul style="list-style-type: none"> ● Treatment of behavioral health issues through mobile augmented reality 	Barcelona, Spain
	<ul style="list-style-type: none"> ● Integration and distribution of clinically relevant mobile health devices 	Baltimore, MD

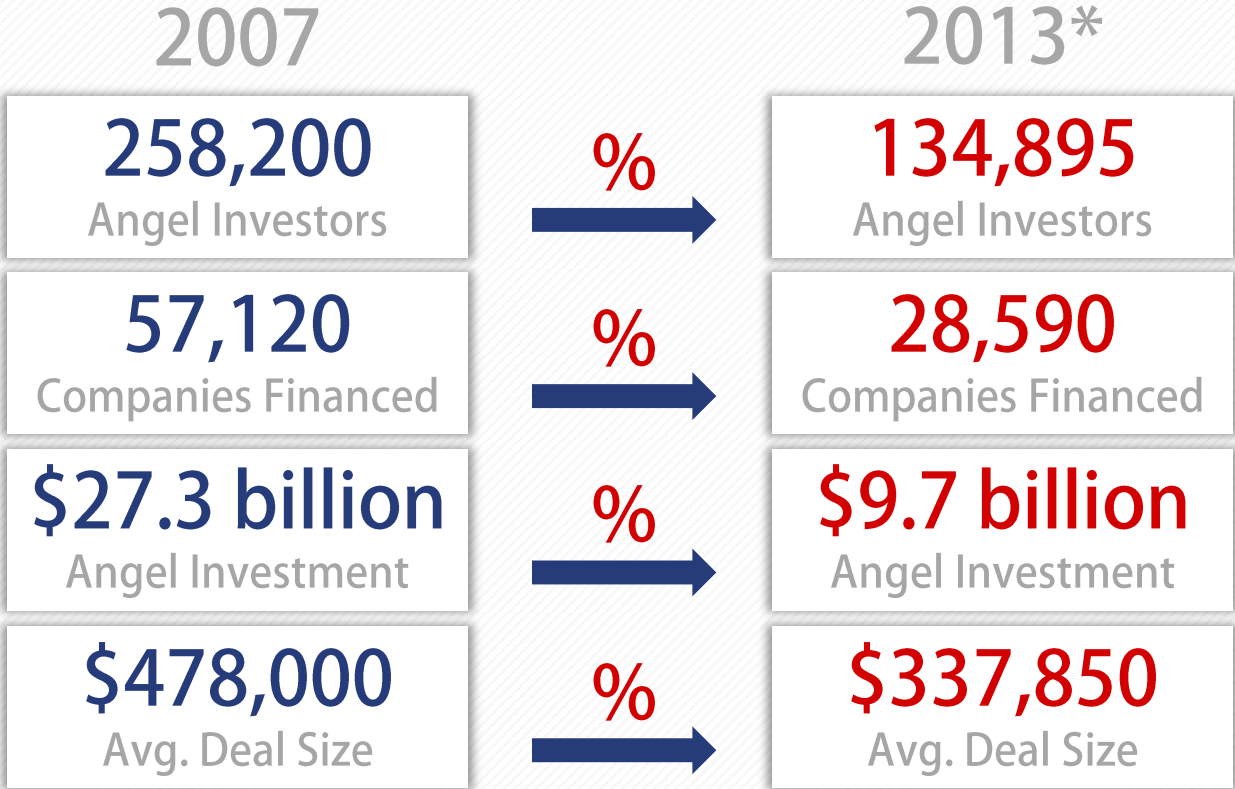


US Venture Capital Investment



*VC firms completing 4 or more deals per year

US Angel Investment



*For Q1&Q2

BHI Commercial Relevance Fund

- Will provide direct seed and early-stage equity investments ranging from \$50,000 to \$1,000,000
- Focused on BioHealth companies that fall into the 4 categories: Therapeutics, Medical Devices, Diagnostics, and Health IT
- Goal: Achieve a \$5,000,000 to \$10,000,000 initial fund
- Expectation: 30% of companies generating 10x the original investment
- 2014 — Identify Investors

BHI Global Outreach

- EIR MOU in place for a CLFD EIR to serve as a biohealth intermediary between BHI and China.
- 3 International DreamIt Health Accelerator companies
 - Cognuse (Estonia)
 - Respi (Greece)
 - Phobius (Spain)
- BHI Soft Landing Program
 - Mimetas (Netherlands)

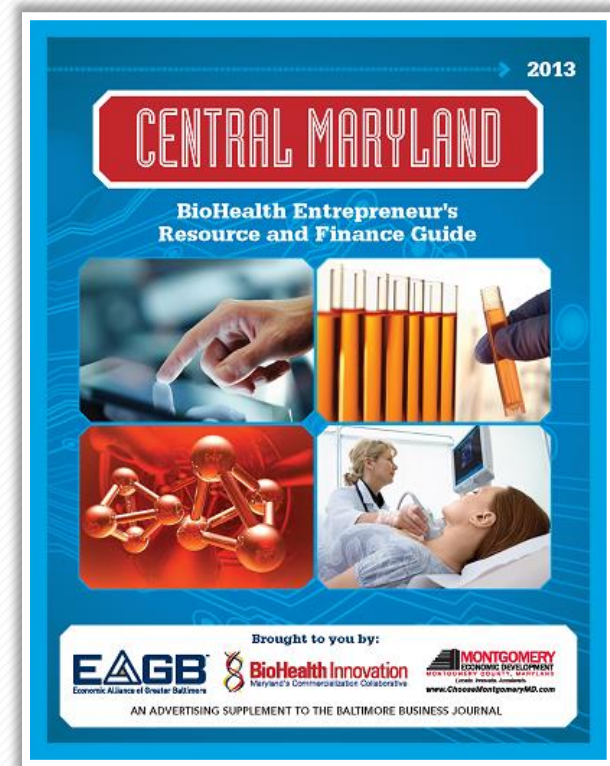


Entrepreneur's Resource and Finance Guide



Financing and Entrepreneurial Resource for Montgomery County and the Greater Baltimore Region

- Entrepreneur and Innovation Resource Network
- Innovator Financing Guide
- The Startup's Guide to Intellectual Property
- Federal Labs Listing



BHI Website and News



BHI Web site

The BHI Web site 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.

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



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™



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



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.

BHI: The Triple Bottom Line

Grows high-paying jobs and businesses

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

Expands tax base; improves economic vitality

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

...and Benefits human health!

BHI Key Staff

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The Wire Hardware store
- BHI's Office Space

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