BHI Introduction

Rich Bendis
President & CEO
BioHealth Innovation, Inc.
The Region – Central Maryland

- Unrivaled Research Assets -
- Unfulfilled Commercial Promise -
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
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
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

GOVERNMENT
- Sustainability
- Infrastructure Support
- Economic Policy

FOUNDATIONS
- Economic Growth
- Community Investment
- Regional Collaboration

INSEPARABLE MISSIONS
BHI Partners and Sponsors

Private Sector

Government

Academia

NGOs

Private Sector

- GlaxoSmithKline
- AstraZeneca
- BD
- Adventist HealthCare
- SR-one
- Roche
- MedImmune
- emergent biosolutions
- NORTHROP GRUMMAN
- VENABLE LLP
- KAISER PERMANENTE
- United Therapeutics Corporation
- Arion
- GenVec

Government

- Montgomery County Economic Development
- University of Maryland Innovate MD Network
- INVEST MARYLAND
- Innovation Network
- BIO-MARYLAND
- Maryland's Innovation Initiative
- EDA
- Maryland Economic Development Administration
- Maryland of Opportunity
- Frederick Bioscience Development

Academia

- University System of Maryland
- UMD Ventures
- University of Maryland BioPark
- Johns Hopkins University
- M-Tech

NGOs

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

BHI Assistance Programs

- SBIR Program
- Startup Package
- BioHealth Gap Fund

Strategic Programs

- Soft Landing
- DreamIt Health
- The Clinic

Financial Sponsors

- BD
- NIH
- Adventist HealthCare
- Johns Hopkins University
- M&T Bank
- United Therapeutics Corporation
- NEA
- Venable LLP
- AstraZeneca
- GSK
- SR-one
- Sigma-Tau
- Roche

Outcomes

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

Sources

- NIH
- Universities
- Federal Labs
- Industry
- Entrepreneurs
- Soft Landing
- DreamIt
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

<table>
<thead>
<tr>
<th>Stage</th>
<th>POR / Pre-Seed</th>
<th>Seed/Start-Up</th>
<th>Early</th>
<th>Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Founders, FFF</td>
<td>Angels, IBED, SBIR</td>
<td>Venture Funds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bootstrapping</td>
<td>Accelerator Seed Funds</td>
<td>M&amp;A, IPO</td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>$0K</td>
<td>$500K</td>
<td>$2M</td>
<td>$+5.0M</td>
</tr>
</tbody>
</table>

**"Valley of Death"**

- Funding Gap

- Secondary Funding Gap

**BioHealth Gap Fund**
# BHI Innovation Capital Map

## Capital Sources by Investment Stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Range</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Proof of Concept</td>
<td>$25,000 - $1,500,000</td>
<td>NIH R01, NIH R03, NIH R21, SBIR/STTR Grant Phase 1, NCATS Cures Acceleration Network (CAN)</td>
</tr>
<tr>
<td>Proof of Concept</td>
<td>$15,000 - $750,000</td>
<td>TEDCO Technology Validation Program, Maryland Stem Cell Research Fund (MSCRF) - Various, JHU - Coulter Translational Research Partnership</td>
</tr>
<tr>
<td>Proof of Commercial Relevance/Pre-Seed</td>
<td>$15,000 - $500,000</td>
<td>Maryland Industrial Partnerships (MIPS @ UMD), TEDCO Maryland Innovation Initiative - Phase 2, Maryland Stem Cell Research Fund (MSCRF) - Pre-Clinical</td>
</tr>
<tr>
<td>Seed/Start-Up</td>
<td>$50,000 - $1,500,000</td>
<td>TEDCO Technology Validation Program - Market Assessment, SBIR/STTR Phase 2, SBR/STTR Federal Funding Assistance Program</td>
</tr>
<tr>
<td>Early Stage</td>
<td>$200,000 - $2,500,000</td>
<td>Dingman Center Angels (UMD), BioMaryland Biotechnology Dev. Award - Translational Research, TEDCO Patent Assistance Program</td>
</tr>
<tr>
<td>Later Stage</td>
<td>$2,500,000+</td>
<td>Maryland Venture Fund Authority, Propol Baltimore Fund, TEDCO Veterans' Opportunity Fund, Invest Maryland: Maryland Venture Fund, BioMaryland Biotechnology Dev. Award - Commercialization</td>
</tr>
</tbody>
</table>

## 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

1. Proof of Concept
2. Product Development Research
3. Prototype Product
4. SBIR/STTR (Commercial Relevance Program)
5. Proof of Commercial Relevance
6. Make Technology Investment Grade
7. Spin Off Companies
8. Transfer Technology to Industry
9. Next Generation Products
10. Reinvestment

Wealth Creation: Companies, Jobs, Products & Profits

Funding & Entrepreneurial Resources

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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

<table>
<thead>
<tr>
<th>4</th>
<th>EIRs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Licenses Granted</td>
</tr>
<tr>
<td>2</td>
<td>Spinouts</td>
</tr>
<tr>
<td>1</td>
<td>Submitted Application License</td>
</tr>
</tbody>
</table>

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.
BHI Scouting

BHI Partners

NIH/Federal Labs
BHI Portfolio
Entrepreneurs
Existing Biohealth Companies
International Soft Landing

Accelerator Companies
Industry Spinouts
Universities
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
• $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

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
<table>
<thead>
<tr>
<th>Corporate Legal</th>
<th>Intellectual Property</th>
<th>Clinical Services</th>
<th>Accounting</th>
</tr>
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<tbody>
<tr>
<td><img src="image1" alt="Venable LLP Logo" /></td>
<td><img src="image2" alt="Intellectual Property Logo" /></td>
<td><img src="image3" alt="Clinical Services Logo" /></td>
<td><img src="image4" alt="Accounting Logo" /></td>
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<table>
<thead>
<tr>
<th>Laboratory Space</th>
<th>Incubation</th>
<th>Banking</th>
<th>Payer Advisory Services</th>
<th>Scientific Data Management Services</th>
<th>Grant Consulting</th>
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<tr>
<td><img src="image5" alt="Laboratory Space Logo" /></td>
<td><img src="image6" alt="Incubation Logo" /></td>
<td><img src="image7" alt="Banking Logo" /></td>
<td><img src="image8" alt="Payer Advisory Services Logo" /></td>
<td><img src="image9" alt="Scientific Data Management Services Logo" /></td>
<td><img src="image10" alt="Grant Consulting Logo" /></td>
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**BHI Startup Package**
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 client 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.
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**

Source: 2014 Halo Report
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
<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aegle</td>
<td>Wearable biometric devices</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>Avhana health</td>
<td>Practicing smarter medicine</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>Cognubes</td>
<td>Mobile Cognitive Rehabilitation</td>
<td>Talinn, Estonia</td>
</tr>
<tr>
<td>Emocha</td>
<td>Mobile Information Platform</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>Protenus</td>
<td>Protecting Patient Data</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>Respi</td>
<td>Respiratory Medical Device</td>
<td>Athens, Greece</td>
</tr>
<tr>
<td>Patientfeed</td>
<td>Inpatient Care Collaboration</td>
<td>Pittsburgh, PA</td>
</tr>
<tr>
<td>Phobious</td>
<td>Augmented Reality Treatment</td>
<td>Barcelona, Spain</td>
</tr>
<tr>
<td>Quantificecare</td>
<td>Digital Workflow Management</td>
<td>Baltimore, MD</td>
</tr>
</tbody>
</table>
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

2007

- **4,211** Deals
- **$31.9 billion** Investment
- **$7.6 million** Average Deal Size
- **410** Active* VC Firms

2014

- **4,356** Deals
- **$48.3 billion** Investment
- **$11.1 million** Average Deal Size
- **138** Active* VC Firms

*Note: Active VC Firms data is approximate and may vary.
US Angel Investment

<table>
<thead>
<tr>
<th>Year</th>
<th>Angel Investors</th>
<th>Companies Financed</th>
<th>Angel Investment</th>
<th>Avg. Deal Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>258,200</td>
<td>57,120</td>
<td>$26.0 billion</td>
<td>$478,000</td>
</tr>
<tr>
<td>H1 2014</td>
<td>143,140</td>
<td>30,270</td>
<td>$10.1 billion</td>
<td>$332,120</td>
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</tbody>
</table>
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

- China
- Estonia
- Greece
- India
- Korea
- Netherlands
- North America
- South America
- Spain
- Germany
Maryland Regional Biotech Forum

NOW
REGISTER
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
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

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC I-corps</td>
<td>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.</td>
</tr>
<tr>
<td>NIH</td>
<td>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.</td>
</tr>
<tr>
<td>Postdoc Conference &amp; Career fair</td>
<td>The Postdoc Conference &amp; 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.</td>
</tr>
<tr>
<td>FastTrac</td>
<td>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.</td>
</tr>
<tr>
<td>INNoVATE</td>
<td>The INNoVATE program provides applied training for postdoctoral fellows, research scientists, and other professionals who want to start life science based companies.</td>
</tr>
</tbody>
</table>

*Not currently active*
BHI: The Triple Bottom Line

Grows high-paying jobs and businesses

Expands tax base; improves economic vitality

...and benefits human health!
**BHI Key Staff**

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