Washington Forum on US-Sino Innovation and Collaboration

Economic Development and Innovation

Rich Bendis, President & CEO, BioHealth Innovation

Trump National Golf Club, Sterling, VA 20165

October 3, 2017
The Global Innovation Imperative

- Innovation is Key to Growing and Maintaining a Country’s **competitive** Position in the Global Economy and to address Global Challenges
- **Collaboration** among Small and Large Businesses, Universities, and Research Institutes is Essential for Innovation & Commercialization
- **New Institutions and New Incentives**, are increasingly important to support collaboration and foster innovation
- Competitive advantages are increasingly tied to human capital and innovation
- **Economic growth** is closely related to education/workforce, energy, climate change, environmental, natural resource, geopolitical issues & entrepreneurship
How Leading Regions Respond to the Innovation Imperative?

- They are providing four things:
  - High-level Focus
  - Sustained Support for R&D: Leveraging Public and Private Funds
  - Support for Innovative SMEs
  - New Innovation **Partnerships** to bring new products and services to market
Why Is Innovation Essential?

“INNOVATION DISTINGUISHES BETWEEN A LEADER AND A FOLLOWER.”

- STEVE JOBS

INNOVATION is the creation and transformation of knowledge into new products, processes, services that meet market need and interactions, entertainment forms, and ways of communicating and collaborating.
“Never before in history has innovation offered promise of so much to so many in so short a time.”

Bill Gates - Microsoft
Five Key Components to Consider When Defining Unique Regional Assets

**ECONOMIC BASE**

- Location, Infrastructure, Amenities, Factor Costs, Natural Resources

**ENTREPRENEURSHIP**

- Your capacity to create companies wholly new or from existing firms

**TALENT**

- What you do: your workforce skills & human capital base

**INNOVATION & IDEAS**

- Your capacity to innovate and generate new ideas

**The basic conditions defining the economic milieu of the region**

- What you make, including your existing & prospective industry clusters
Economic Development

- Economic Development is like a 4-legged stool:
  - Attraction
  - Retention
  - REINVENTION
  - Grow Your Own

- IBED requires patience and persistence, continuity and consistency

- Working with early-stage companies takes time

- A balanced portfolio economic development strategy is best!
Goals of Innovation-Based Economic Development

Intervene at the margins of private sector investment flows of capital (financial and intellectual) to:

- Address economic transition
- Capture the benefit of investments in research and development, higher education
- Build entrepreneurial cultures
- Help existing companies grow
- Diversify both rural and urban economies
- Develop global innovation network
The Secret Recipe to Building an Innovation Ecosystem

- There is none!
- Key Ingredients: Universities, Governments, NGOs, Incubators, and Startups
- These are nothing compared to: A committed group of people with a high degree of trust, collaboration, sharing, and interdependency
Welcome to the

Our Goal:
To become a Top 3 BioHealth Hub by 2023

www.biohealthcapital.com
Unrivaled Research Assets | Unfulfilled Commercial Promise

800+ BioHealth Companies
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
BHI is a public-private partnership, 501(c)(3) nonprofit. Our mission is to connect market relevant technology to business resources with the goal of elevating the BioHealth Capital Region.

- Regionally-oriented
- Private-public partnership, 501(c)(3) nonprofit
- BioHealth Innovation Management, a for-profit subsidiary
- Market-driven, private sector-led and funded
- Neither a government initiative, nor a membership organization
**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
Major Regional BioHealth Companies
Public BioHealth Companies Headquartered in the Region

- altimmune
- emergent biosolutions®
- GENVEC
- GlycoMimetics, Inc.
- INTREXON®
- MACROGENICS
- MaxCyte®
- NEURALSTEM INC
- Northwest Biotherapeutics
- NOVAVAX
- Osiris THERAPEUTICS, INC.
- ReGenX BIOSCIENCES
- rexahn PHARMACEUTICALS
- SUCAMPO
- Supernus Pharmaceuticals
Recent Venture Capital Investments
Regional BioHealth Ecosystem Partners

**ACADEMIA**
- Research/T2
- Lifelong Learning
- Economic Development

**INDUSTRY**
- Profit
- Process
- Product

**GOVERNMENT**
- Sustainability
- Infrastructure Support
- Economic Policy

**FOUNDATIONS/NGOS**
- Economic Growth
- Community Investment
- Regional Collaboration

INSEPARABLE MISSIONS
# BHI Board of Directors

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Company/Institution</th>
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</thead>
<tbody>
<tr>
<td>Daniel Abdun-Nabi</td>
<td>(Vice-Chairman)</td>
<td>Emergent BioSolutions, Inc.</td>
</tr>
<tr>
<td>Richard A. Bendis</td>
<td>President &amp; CEO</td>
<td>BioHealth Innovation, Inc.</td>
</tr>
<tr>
<td>Jarrod Borkat</td>
<td>Senior Director, External Partnerships and Collaborations</td>
<td>MedImmune/AstraZeneca</td>
</tr>
<tr>
<td>Robert Caret, Ph.D.</td>
<td>Chancellor</td>
<td>University System of Maryland</td>
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<tr>
<td>Kenneth Carter, Ph.D.</td>
<td>Chairman</td>
<td>Noble Life Sciences</td>
</tr>
<tr>
<td>Christopher Callaghan</td>
<td>Group Vice President, Healthcare Banking</td>
<td>M&amp;T Bank</td>
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<tr>
<td>Ronald J. Daniels</td>
<td>President</td>
<td>Johns Hopkins University</td>
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<tr>
<td>Jens Eckstein, Ph.D.</td>
<td>President</td>
<td>SR One (GSK)</td>
</tr>
<tr>
<td>David M. Gillee</td>
<td>Market Leader</td>
<td>Cushman &amp; Wakefield</td>
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<tr>
<td>William Hearl, Ph.D.</td>
<td>Founder and CEO</td>
<td>Immunomic Therapeutics, Inc.</td>
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<tr>
<td>Rick Ivey</td>
<td>Vice President R&amp;D</td>
<td>BD Diagnostics</td>
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<tr>
<td>Dave Lemus (Treasurer)</td>
<td>CEO</td>
<td>Medigene, Inc.</td>
</tr>
<tr>
<td>Douglas Liu (Chair)</td>
<td>Senior VP of Global Operations</td>
<td>Qiagen</td>
</tr>
<tr>
<td>Joel Marcus</td>
<td>CEO &amp; Founder</td>
<td>Alexandria Real Estate Equities, Inc.</td>
</tr>
<tr>
<td>David Mott</td>
<td>General Partner</td>
<td>New Enterprise Associates</td>
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<tr>
<td>Charles Morton (Secretary)</td>
<td>Partner</td>
<td>Venable LLP</td>
</tr>
<tr>
<td>Beth Meagher</td>
<td>Principal</td>
<td>Deloitte Consulting LLP</td>
</tr>
<tr>
<td>Lily Qi</td>
<td>Assistant Chief Administrative Officer</td>
<td>Montgomery County Government</td>
</tr>
<tr>
<td>John A. Sackett</td>
<td>President</td>
<td>Shady Grove Adventist Hospital</td>
</tr>
<tr>
<td>Robert Silverman</td>
<td>Head Externalized Drug Discovery Partnering</td>
<td>Roche</td>
</tr>
<tr>
<td>Mike Gill (Ex-Officio)</td>
<td>Secretary</td>
<td>Department of Commerce</td>
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BHI Business Model

Sources
- NIH
- Universities
- Federal Labs
- Industry
- Entrepreneurs
- Soft Landing
- Accelerators

Entrepreneur-in-Residence
- NIH
- USM
- JHU
- BHI

CRAB

BHI Assistance Programs
- SBIR Program
- Startup Package
- BioHealth Gap Fund
- International Soft Landing
- GIC & RIC Incubators
- BHI Incubator
- Launch Labs
- Relevant Health

Non-client Support

Company Portfolio

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

Strategic Programs

Financial Sponsors
BHI Technology Focus

- Therapeutics
- Diagnostics
- Medical Devices
- Healthcare Services
- E-Health
- Mobile Health
- Electronic Medical Records
- Health Informatics
- BioHealth Cybersecurity
- Personalized Health
- Convergence
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”
### 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>
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<tr>
<td>Demand</td>
<td>$0K</td>
<td>$500K</td>
<td>$2M</td>
<td>+$5.0M</td>
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**“VALLEY OF DEATH”**

- Funding Gap

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# BHI Innovation Capital Map

<table>
<thead>
<tr>
<th>Pre-Proof of Concept</th>
<th>Translational Research/Proof of Concept</th>
<th>Proof of Commercial Relevance/Pre-Seed</th>
<th>Seed/Start-Up</th>
<th>Early Stage</th>
<th>Later Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25,000 - $1,500,000 (over 5 yrs)</td>
<td>$15,000 - $750,000 (over 3 yrs)</td>
<td>$15,000 - $1,500,000</td>
<td>$50,000 - $1,500,000</td>
<td>$200,000 - $2,500,000</td>
<td>$2,500,000+</td>
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</table>

- **NIH ROI**
- **NIH R01**
- **NIH R21**
- **Maryland Stem Cell Research Fund (MSCRF)**
- **SBIR/STTR Grant Phase 1**
- **NCATS Cures Acceleration Network (CAN)**
- **Maryland Stem Cell Research Fund (MSCRF)**
- **TEDCO Technology Validation Program - Proof of Concept**
- **TEDCO Maryland Innovation Initiative - Phase 1**
- **JHU - Couler Translational Research Partnership**
- **UVA - Couler Translational**
- **Maryland Industrial Partnerships (MIPS @ UMD)**
- **SBIR/STTR Phase 2**
- **TEDCO Maryland Innovation Initiative - Phase 2**
- **Maryland Stem Cell Research Fund (MSCRF) - Pre-Clinical**
- **Virginia BioScience Health Research Corporation**
- **Dingman Center Angels (UMD)**
- **Maryland Momentum Fund**
- **UVa Seed Fund**
- **TEDCO Seed Fund**
- **CIT BioSeed Fund**
- **Baltimore Angels**
- **New Dominion Angels**
- **SBIR/STTR Phase 2**
- **VTC Innovation Fund**
- **Maryland Venture Fund**
- **ABG Capital Partners**
- **Greenspring Associates**
- **Novak Biddle Venture Partners**
- **Sterling Ventures Partners**
- **Harbert Venture Partners**
- **JMI Equity**
- **New Enterprise Associates (NEA)**
- **VMG Ventures LLP**
- **TDF**

## Funding Type Key
- Academic
- Federal
- Private Capital

## Tax Credits
- **Maryland Biotechnology Investor Tax Credit**
- **Virginia Angel Investor Tax Credit**
- **Montgomery County Biotechnology Investor Tax Credit**
BHI Commercialization Model

Inventions sourced from Universities, Federal Labs, Private R&D, Basic Research, Industry Spinoffs, and Entrepreneurs

1. Proof of Concept
2. Product Development Research
3. Funding & Entrepreneurial Resources
4. Prototype Product
5. PROOF OF COMMERCIAL RELEVANCE
6. Make Technology Investment Grade
7. Transfer Technology to Industry
8. Generate Equity, Royalties & License Fees
10. Next Generation Products

Reinvestment
NIH Partnership Agreements

NIH Consulting Entrepreneur Services Contract for 6 NIH Entrepreneurs-in-Residence

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.
Who are the Entrepreneurs-in-Residence?

Our EIRs are experienced entrepreneurs, venture capitalists and industry business developers managing a commercially relevant biohealth portfolio.

BHI’s EIRs specialize in:
- Product development
- Investment that encompasses technology diligence
- Fundraising
- Running companies
- Commercializing novel medical technologies
BHI Scouting

BHI Partners

Roche

MedImmune

NIH/Federal Labs

BHI Portfolio

Entrepreneurs

Existing Biohealth Companies

International Soft Landing

Accelerator Companies

Industry Spinouts

Universities

BHI EIR TEAM

BHI Partners

BHI Scouting

Roche

MedImmune

NIH/Federal Labs

BHI Portfolio

Entrepreneurs

Existing Biohealth Companies

International Soft Landing

Accelerator Companies

Industry Spinouts

Universities

BHI EIR TEAM
• $2.5 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 Concept Review
Ensure Appropriateness for the Federal Agency

Application Technical Support
Guidance through Federal Registration Process

Proposal Development
In-Kind Guidance on Proposal Best Practices

Funding for High-Quality Proposals
Intensive Support with Professional Consultant

Funding Agencies

$13.5 M Funding awarded | 38 wins of 94 submissions since Jan. 2014 | 40% success rate
BHI Startup Package

- Incubation: BioHealth Innovation, Incubators
- Consulting: Deloitte
- Clinical Services: DP Clinical
- Accounting: Aronson
- Intellectual Property: InHouse Patent Counsel, VLP Law Group LLP
- Corporate Legal: VENABLE LLP
- Preclinical Services: NEKUS
- Banking: M&T Bank
- Reimbursement: JGS Group, CMTP, LARA
- Scientific Data Management Services: BioIT Solutions, Inc.
- Grant Writing: SoMax Consulting, ScienceSherpa
Alexandria LaunchLabs

FEATURES
• Five laboratory/office modules; each approximately 1,200 Rentable Square Feet (RSF)
• Laboratory space includes casework, sink, fume hood, equipment storage, emergency generator capacity, etc.
• Office space includes one furnished office, two workstations and common lobby, pantry, conference rooms, IT closet, autoclave, and glass wash so business can immediately commence

LEASE TERMS
• 12 month lease terms with potential for a six (6) month extension
• Base Rent is $3,925 per month to account for rent and operating expenses inclusive of utilities
• Security deposit is equivalent to one (1) month of Base Rent

Resident Companies include 3i Diagnostics & Antidote Therapeutics.
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
- Cohort of 7 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
- Program Duration: October 2015 – March 2016

- Agewell are developing a data analytics tool which can use the accelerometers in modern devices (cell phones, wearables etc) to determine risk of falling among seniors.
- CheeksUp are developing a system to support speech children receiving speech and language support.
- Ergonometrix are developing a wearable device which can determine the risk of back injury.
- Gastro Girl is a name of a popular blog focused on the community of patients living with GI conditions such as Crohn's, IBS etc. The founders are developing a technology platform focused on delivering health coaching and support to the GI community.
- Lazy are developing a product to automate and streamline the collection and submission of key quality metrics by hospitals and other health providers.
- The team at Neopenda are developing a monitor to measure neonatal vitals with engineered hats for use in the developing world.
- The team at Werbie are developing a mobile and web application focused on the dietary needs of women managing high risk pregnancies.
- Health IT accelerator
- Intensive 16 week program for companies and entrepreneurs.
- Participants receive access to a network of business, marketing and product development mentors.
- Retain promising high growth in Maryland

Portfolios:

D1
- Avhanahealth
- Quantified CARE
- Protensus

D2
- Decisive Health
- Baton
- InsightMedi
- RD Dietitian
- REDOX
- Sisu Global Health

Partners:
- BioHealth Innovation
- Johns Hopkins University
- Kaiser Permanente
- Northrop Grumman
- The Abell Foundation
Rockville Innovation Center

Class A office space located in the heart of the bustling Rockville Town Center

- Focused on biohealth convergence, the connection between disciplines in the healthcare market, including Health Technology, Bioinformatics, Health Information, Health Cybersecurity and other enabling technologies.

- Access to BHI’s business resources including Entrepreneurs-in-Residence (EIRs), MITRE technologists, key-opinion-leader sessions, tactical workshops on technology development, and entrepreneurship support from various corporate, strategic and investment partners. 23,000 sqft of flexible office space

- 36 offices and office suites

- Support in both hardware and software development.

- Flexible one year lease agreements with 60-day notice terms.

- Shared conference rooms

- Shared kitchenette/lunch room

- Steps away from restaurants, nightlife, community events and fitness facilities
Germantown Innovation Center

Montgomery County’s premier space for life sciences companies

- Located in the heart of the BioHealth Capital Region, featuring unmatched assets and resources.

- 32,000 sqft, 45 offices, 2 huddle areas, 2 conference rooms and 1 large multi-purpose room

- 11 wet labs averaging 500 sqft and 2 modular clean rooms (Class 100) for life sciences companies

- Green-design elements, including Lab floors of rapidly renewable materials and efficient mechanical systems

- Free parking

- Access to BHI’s business resources including Entrepreneurs-in-Residence (EIRs), preclinical services, legal services and more.
Germantown Innovation Center Portfolio

23 Companies | 115 Jobs

Diagnostics
- BRISA BIOTECH
- epigenomics
- Adera Labs

Therapeutics
- ARCCELLX
- Zalgen Labs
- Biologics Resources
- Medytox
- Neuraly Inc.
- Leads Biolabs
- orgenesis™

Health IT
- ClinicMax
- KITCHOLOGY®
- Four Gates LLC

Technology
- LEVEREGE
- KINETIC
- DSPlogic
- MACHfu
BHI International Soft Landing

BHI offers international companies the perfect starting point to create US-based subsidiaries. Soft landing companies are given access to BHI’s extensive business resources including Business Development & Sales, Entrepreneurs-in-Residence (EIR), Financial, Grant Writing/SBIR Federal Funding Assistance, Human Resources, Incubation/Site Location, Legal - Corporate & Intellectual Property, Marketing & Promotion, Market Research, Network & Connections, Regulatory & Preclinical /Clinical, and Reimbursement.
2018 BioHealth Capital Region Forum

Join us as we showcase accomplishments and discuss opportunities for the future of the BioHealth Capital Region

www.bhcrforum.com

April 23 + 24, 2018
One MedImmune Way, Gaithersburg, MD 20878
Websites, News and More

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

[www.biohealthinnovation.org](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.

[www.biohealthinnovation.org/news](http://www.biohealthinnovation.org/news)

**BioHealth Capital Region**
The BHCR website highlights the region’s biohealth news, stories, trends and events.

[www.biohealthcapital.com](http://www.biohealthcapital.com)

**BHCR News**
BHCR News is a monthly publication that highlights industry news throughout the region.

**BioTalk**
Rich Bendis, hosts BioTalk — conversations with some of the most accomplished and exciting business, academic, and government leaders in the biohealth industry.
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. BHI has supported Node activity at the NIH, Johns Hopkins U, and University System of Maryland.

**BHI**

BHI participates in the office hour training of Entrepreneurial startups and faculty members in conjunction with the Maryland Technology Enterprise Institute at the Institute for Marine & Environmental Technology of the University of Maryland Baltimore County.

**NIH Centers for Accelerated Innovations**

**Research Evaluation and Commercialization Hubs**

Designed to accelerate translation of scientific discovery into commercial products that improve health for patients in the areas of Heart, Lung, Blood, and Sleep technology, BHI EIRs strategically work with the commercial evaluation. With these two programs, the NIH has created a nationwide network of six Centers and Hubs to develop best practices in translating academic innovations.

The NCAI Centers are at the Boston Biomedical Innovation Center, the Cleveland Clinic, and the UC-CAI in Los Angeles.

The REACH Hubs operate at the Long Island Bioscience Hub, the University of Louisville, ExCITE HUB, and the University of Minnesota-REACH.
Change Is Inevitable

“It is not the strongest of species that survive, nor the most intelligent, but the ones most responsive to change.”

Charles Darwin
"Coming together is a beginning, staying together is progress, and working together is success."

Henry Ford
BHI: The Triple Bottom Line

Grows high-paying jobs and businesses

Expands tax base; improves economic vitality

...and benefits human health!
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