Creating a Vibrant Regional Innovation Ecosystem

9/19/2012 Leuven & Genk, Belgium

Rich Bendis
President & CEO
BioHealth Innovation, Inc.
Innovation America
“Never before in history has innovation offered promise of so much to so many in so short a time.”
The World According to Friedman:
Hot, Flat, and Crowded
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
Growth of World Population and the History of Technology

Source: Milken Institute, Robert Fogel/University of Chicago
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, and services that meet market need……and interactions, entertainment forms, and ways of communicating and collaborating.
Open Innovation means that valuable ideas can come from inside or outside the company (industry) and can go to market from inside or outside the company (industry) as well\(^1\).

This approach places external ideas and external path to market on the same level of importance as that reserved for internal ideas and paths to market during the Closed Innovation era\(^2\).
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
The Six Driving Forces of Change

• Commoditization
• The Digital Revolution
• Social Mediaization throughout society
• Global Open Innovation
• The Turbulent World
• Acceleration (or running faster to stay in the same place)
What Is A Road Map.....Why Is It Needed?

• A roadmap answers the question “Where do we want to be and how to we get there?”

• A cluster roadmap provides strategies and action plans to best achieve a vision of the future shared by a critical mass of industry-related organizations.

• The strategies and action plans are developed according to the unique strengths of the cluster and region as compared to a global market opportunity.
Regional Innovation Clusters

Five Key Components to Consider When Defining Unique Regional Assets

- **ECONOMIC BASE**
  - What you make, including your existing & prospective industry clusters

- **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

- **Location, Infrastructure, Amenities, Factor Costs, Natural Resources**
  - The basic conditions defining the economic milieu of the region
The concept of the **Innovation Ecosystem** stresses that the flow of technology and information among people, enterprises and institutions is key to a vibrant innovation process.
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**
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!
Implementing a New Innovation Paradigm

• Deviate from traditional perspectives
• Encourage public investment and risk taking
• Develop trust through collaboration
• Ensuring responsiveness to partners’ missions
• Build consensus of all constituents through education, participation, and positive outcomes
• Move from Tech-Based Economic Development (TBED) to…..

**Innovation-Based Economic Development (IBED)**
Convergence of Traditional Eco Devo & IBED

**Traditional**

**Assets:**
- Physical
  - Natural resources
  - Highways / Rail
  - Proximity
  - Costs

**Competitive Basis:**

**Key values/offerings:**
- University Research
- Parks
- Incentives

**Lead Organization:**
- Chambers / EDCs

**Innovation**

**Knowledge:**
- Specialized talent
- Networks, Clusters,
- University research
- Industry partnerships
- Commercialization, Market
- Positioning Globalization

**Research Parks**
- Workforce competencies
- Lifestyle

**Economic developers**

**INNOVATION INTERMEDIARIES**
What is A Regional Innovation Intermediary?

- An organization at the Center of the region’s, state’s and country’s efforts
  - 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 Sectors, Industries, Communities, & Markets

Connects Private, Public and Academic Sectors

Connects Bio-Health Cluster Industries

Connects Central Maryland Communities

Connects Regional, National and Global Markets

BHI

BioHealth Innovation
Maryland’s Commercialization Collaborative

THE TECHNOPOLICY NETWORK
Global Community for Regional Innovation Policy
Intermediary Best Practices

- Longevity
- Bipartisan Support & Champions
- Independent Organizations
- Continuous Reinvention
- PRIVATE SECTOR LEADERSHIP
- Understand Return On Investment
- Sustainability In Funding
- Accountable
- Innovative
- Effective Leadership
US Regional IBED Intermediaries
Northeast Ohio IBED Intermediaries

NorTech, (the Northeast Ohio Technology Coalition) is a nonprofit Technology-Based Economic Development (TBED) organization that champions growth in Northeast Ohio's 21 county region. Foundation funded.

JumpStart is creating economic transformation in Northeast Ohio by providing resources to entrepreneurs to grow their high potential, early stage companies.

BioEnterprise is a business formation, recruitment, and acceleration initiative designed to grow health care companies and commercialize bioscience technologies.

Team NEO advances Northeast Ohio’s economy by attracting businesses worldwide to the 16-county Cleveland Plus region.

Cleveland Clinic Innovations advances commercial oriented innovation and transforms promising therapies, devices and diagnostics into products by creating spin-off companies, licensing to established companies and enabling equity partnerships.
Flexible electronics is a new science and manufacturing opportunity for printing electronic devices on flexible plastic materials. The flexible electronics industry is driven by the global demand for electronic products to get smaller, lighter and consume less power.
The Problem--A National Challenge

America is falling behind the world it invented because we are:

- Out-educated
- Out-built in infrastructure
- Out-invested in R&D

by countries in both Europe and Asia.

--- “That Used to Be Us” by Thomas Friedman, 2011

The Reverse Brain Drain


- American returnees to India cited as reasons for going “back” to where they came from:
  - Better Economic Opportunities
  - Family Ties
  - Better Access to Markets
Alignment of National, State, and Regional Policies

- Link Both State, County & City Strategies to Obama Administration Objectives
- Develop an integrated Regional BioHealth Economic Development and Transit Strategy
- Present the “Regional Job Generating BioHealth and Transit Plan” to the White House & partner with federal agencies and other stakeholder organizations as a “Showcase Model.”
- Develop structure & governance for the regional BioHealth innovation intermediary
- Obtain Priority Federal Funding for Region’s BioHealth Industry-Federal Labs-University Innovation Intermediary Pilot Plan
- Obtain Priority Federal Funding for the region’s Innovative “State of the Art” Comprehensive Rapid Transit Vehicle Plan (CCT et al)
- Develop a pilot BioHealth-Regional Innovation Cluster (H-RIC) program
Maryland

Population: 5.828 million people
“The Region”—Central Maryland
Unrivaled Research Assets
Unfulfilled Commercial Promise
State of Maryland: Federal Resources

- 59 Federal Laboratories, Centers, & Institutes in Maryland

- Maryland Federal R&D investment exceeding $12 billion annually
Health Regional Innovation Cluster (H-RIC)

- Regional, cluster-based economic development model
- Modeled after the Department of Energy’s Regional Innovation Cluster
- Connects innovation assets to related industries
- Advances human health and economic prosperity
A Region Rich with Research Institutions
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 a STEM Workforce

BHI Value Proposition

- Connects regional innovation assets
- Develops an entrepreneurial talent and support pipeline
- Attracts funding for technology commercialization
- Develops a continuum of innovation workforce
BHI Board of Directors

Michael J. Baader, Esq.
Managing Director, Venable LLP

Richard Bendis
President & CEO, BioHealth Innovation, Inc.

Scott Carmer (Chair)
Executive Vice President of Commercial Operations, MedImmune

Kenneth Carter
Chair, Noble Life Sciences

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Senior Vice President, M&T Bank

Ronald J. Daniels
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David M. Gillece (Secretary)
Regional Managing Principal, Cassidy Turley

William E. Kirwan
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Vice President, Corporate Communications and Public Policy, Human Genome Sciences

Jay Ridder
Office Managing Partner, Ernst & Young

William G. Robertson (Treasurer)
President & CEO, Adventist Healthcare

J. Thomas Sadowski
President & CEO, Economic Alliance of Greater Baltimore

Thomas Street
Assistant Chief Administrative Officer, Montgomery County Government
BHI/EIR Technology Focus

• Therapeutics
• Diagnostics
• Medical Devices
• Healthcare Services
• E-Health
• Mobile Health
• Electronic Medical Records
• Health Informatics
• BioHealth Cyber Security
### Innovation Capital Valley of Death

#### “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>
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<tr>
<td></td>
<td>Bootstrapping</td>
<td>Accelerator Seed Funds</td>
<td>M&amp;A, IPO</td>
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<td></td>
<td>Crowdfunding</td>
<td></td>
<td></td>
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<tr>
<td>Demand</td>
<td>$0K</td>
<td>$500K</td>
<td>$2.5M</td>
<td>$5.0M</td>
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#### BioHealth Innovation
Maryland’s Commercialization Collaborative

Global Community for Regional Innovation Policy
Innovation Paradigm Shift

PROOF OF CONCEPT
(Technological Feasibility)
“It Works!”

PROOF OF COMMERCIAL RELEVANCE
(Market Pull)
“I’ll Buy It!”

The Historic Garage

CASH IS KING!
<table>
<thead>
<tr>
<th>DREAM</th>
<th>CONCEPT</th>
<th>APPLIED</th>
<th>COMMERCIAL RELEVANCE</th>
<th>STARTUP</th>
<th>ROLL OUT</th>
<th>GROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founders FFF Bootstrapping Crowdfunding</td>
<td>Seed</td>
<td>Incubators/</td>
<td>IBED</td>
<td>Federal State Regional</td>
<td>ANGEL</td>
<td>VC</td>
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<td></td>
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<td>Accelerators</td>
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Innovation Funding Continuum
## Central Maryland Innovation Capital Map

### Capital Sources by Investment Stage

<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>$25K - $1.5M (over 5 years)</td>
<td>$15K - $2M</td>
<td>$50K - $500K</td>
<td>$50K - $1M</td>
<td>$250K - $2M</td>
<td>$2M+</td>
</tr>
</tbody>
</table>

- **NIH R01**
- **NIH R03**
- **NIH R21**
- **Small Business Technology Transfer Research Grant (STTR) Phase I**
- **Innovate Maryland**
- **NIH Center for Accelerated Innovations (CAI)**
- **NCATS Cures Acceleration Network (CAN)**
- **Small Business Innovation Research Grant (SBIR) Phase I**
- **Maryland Stem Cell Research Fund (MSCRF)**
- **TEDCO University Technology Development Fund (UTDF)**
- **TEDCO TechStart**
- **Maryland Biotechnology Center’s Translational Research Award**
- **Maryland Industrial Partnerships (MIPS @ UMD)**
- **Maryland Biotechnology Center’s Biotechnology Commercialization Awards**
- **TEDCO Maryland Technology Transfer and Commercialization Fund (MTTCF)**
- **BHI SBIR/STTR Commercial Relevance**
- **BHI Commercial Relevance Fund (CRF)**
- **Dingman Center Angels (UMD)**
- **TEDCO Johnson & Johnson Joint Investment Program**
- **Propel Baltimore Fund**
- **SBIR / STTR Phase II**
- **BHI Central Maryland Angel Fund**
- **National Association of Seed & Venture Funds (NASVF)**
- **Angel Capital Association (ACA)**

### Funding Type Key

- **Academic**
- **BioHealth Innovation, Inc.**
- **Innovation-based Economic Development (IBED)**
- **Associations**
- **State of Maryland**
- **Federal**
- **Venture Capital**

### Tax Credits

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

### Additional Resources

- **New Enterprise Associates (NEA)**
- **TDF**
- **Abell Venture Fund**
- **MMG Ventures LP**
- **Mid-Atlantic Venture Association (MAVA)**

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**BioHealth Innovation**

Maryland’s Commercialization Collaborative

**THE TECHNOPOLICY NETWORK**

Global Community for Regional Innovation Policy

37
Jobs! Jobs! Jobs!

Does Seed Investing REALLY Create Jobs?
## Public Investment In Job Creation

<table>
<thead>
<tr>
<th>Category</th>
<th>CDVCA*</th>
<th>State of PA</th>
<th>State of MI</th>
<th>State of UTAH</th>
<th>Stimulus Bill*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds Invested</td>
<td>$26M</td>
<td>$90M</td>
<td>$291M</td>
<td>$60M</td>
<td>$728.9B</td>
</tr>
<tr>
<td>Jobs Created</td>
<td>3.700</td>
<td>8,150</td>
<td>28,854</td>
<td>2,047</td>
<td>400,803</td>
</tr>
<tr>
<td>$ Per Job Invested</td>
<td>$7,100</td>
<td>$11,000</td>
<td>$11,728</td>
<td>$29,300</td>
<td>$1,818,000</td>
</tr>
</tbody>
</table>

*Community Development Venture Capital Alliance

** Source: Recovery.gov 2011
BHI Deal Goals

VC Regional History:
Last decade the region: **$79.8 million per year*** in biotechnology venture financing (2003-2010).

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Goal:

**150 prospective deals annually**

Fund:

**25% or 35 deals per year**

Avg. Investment:

**$4.3 million per start-up**

Targeted VC Annual Investment

**$150,000,000**

*This includes an estimated $57.7 million per year in Montgomery County, and $22.1 million per year in the rest of the state.*
Partnership Intermediary Agreements (PIA)

- **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.

- **PIA between BHI and the Telemedicine & Advanced Technology Research Center (TATRC)** to capture USAMRMC and TATRC research outcomes and promote further research, product development, commercialization, and economic development opportunities. TATRC has funded 241 MD based projects over the last 12 years.
Entrepreneur-in-Residence (EIR)

- 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

Progress (3 ½ months into Program)
- 55 Innovations identified and initially screened
- 7 Progressed to Secondary Analysis in BHI Pipeline (Safety & Efficacy Profiling, IP Diligence, Regulatory & Development Pathways)
- 26 No BHI Interest, 22 still Under Review
- Goal to fund the operation of more EIRs
How does BHI work?

Commercialization Pipeline

Sources and evaluates biohealth intellectual properties (IP)

Funds market-relevant IP

Grows and markets businesses and products
BHI News & Website

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
“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
BHI Innovation Capital

- **SBIR/STTR Assistance Program** - The BHI SBIR/STTR Assistance Program (in development) will provide assistance to biohealth-driven companies in the Central Maryland region in preparing for high-quality SBIR/STTR grant proposals for submission to federal funding agencies.

- **BHI Angel Fund** - The BHI Angel Fund (in development) will be a member-managed private equity investment fund that bridges the gap between pre-seed investments and institutional venture capital serving the Central Maryland region entrepreneurial needs.

- **BHI Commercial Relevance Investment Fund** - The BHI Commercial Relevance Investment Fund (in development) will be a pre-seed and early-stage, equity-based innovation capital fund to help grow, attract, retain and connect Central Maryland biohealth innovation-based companies that need financing to grow their enterprises.
## How is Success Measured?

### BHI Metrics – First 5 Years

<table>
<thead>
<tr>
<th>Metric</th>
<th>Now</th>
<th>In 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC Funding for Biotech</td>
<td>$79 Million</td>
<td>$150</td>
</tr>
<tr>
<td>Government Funding for Biotech</td>
<td>Increased SBIR proposals &amp; success</td>
<td>Improve Maryland’s ranking</td>
</tr>
<tr>
<td>Source Prospective Deals Annually</td>
<td>30</td>
<td>150</td>
</tr>
</tbody>
</table>

- **Improve return on R&D investment by leveraging equity investment**
- **Create and retain 1,300 jobs**
- **Recruit entrepreneurs, experienced managers and businesses**
- **Commercialize biohealth technologies and create biohealth companies**
BHI: The Triple Bottom Line

Grows high-paying jobs and businesses

Expands tax base; improves economic vitality

...and Benefits human health!
What Should We Do To Grow Our Region?

- Think Globally – Act Locally
- Targeted Cluster Innovation
- Practice Collaborative Capitalism
- Build Upon Assets & Fill Gaps
- Grow Private-Public Partnerships
- Fully Engage Private-Sector
- Support Startups Growth into SME’s & Mid-Size Companies
"Coming together is a beginning, staying together is progress, and working together is success." – Henry Ford
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