Deshpande Symposium 2015

Entrepreneurial Universities: Culture and Ecosystems Track
Building the Regional Innovation Ecosystem

Christy Wyskiel
Senior Advisor to the President at Johns Hopkins University
6/9/2015
The Region – Central Maryland

- Unrivaled Research Assets -
- Unfulfilled Commercial Promise -
- 550+ BioHealth Companies -
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
Implementing a new Innovation Paradigm

- Willingness to deviate from traditional and parochial perspectives
- Encourage public investment and risk taking
- Developing trust through collaboration
- Ensuring the paradigm is responsive to partners’ missions
- Building consensus of all constituents through education, participation, and positive outcomes
- Move from technology-based economic development to Innovation-Based Economic Development
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
- Globally 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
<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Company</th>
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</thead>
<tbody>
<tr>
<td>Daniel J. Abdun-Nabi</td>
<td>CEO, Emergent BioSolutions</td>
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<tr>
<td>Judith Dunn</td>
<td>VP, Global Head of Clinical Dev. Roche</td>
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<tr>
<td>Douglas Liu</td>
<td>Senior VP of GO Qiagen</td>
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<tr>
<td>Michael J. Baader, Esq.</td>
<td>General Counsel, Greenspring Associates</td>
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<tr>
<td>Jens Eckstein</td>
<td>President, SR One (GSK)</td>
</tr>
<tr>
<td>Charles Morton</td>
<td>Partner, Venable LLP</td>
</tr>
<tr>
<td>Richard A. Bendis</td>
<td>President &amp; CEO, BioHealth Innovation, Inc.</td>
</tr>
<tr>
<td>David M. Gillece (Secretary)</td>
<td>Regional Managing Principal Cassidy Turley</td>
</tr>
<tr>
<td>David Mott</td>
<td>General Partner, New Enterprise Associates</td>
</tr>
<tr>
<td>Kenneth Carter</td>
<td>Chair, Noble Life Sciences</td>
</tr>
<tr>
<td>Rick Ivey</td>
<td>Vice President R&amp;D, BD Diagnostics</td>
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<tr>
<td>John A. Sackett</td>
<td>President, Shady Grove Adventist Hospital</td>
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<tr>
<td>Dave Lemus</td>
<td>CEO, Sigma-Tau Pharmaceuticals</td>
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<tr>
<td>Joel Marcus</td>
<td>CEO &amp; Founder, Alexandria Real Estate</td>
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<tr>
<td>J. Thomas Sadowski</td>
<td>President &amp; CEO, EAGB</td>
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<tr>
<td>Chris Callaghan</td>
<td>Group VP, Healthcare Banking, M&amp;T Bank</td>
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<tr>
<td>Beth Meagher</td>
<td>Principal, Deloitte Consulting LLP</td>
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<tr>
<td>Reginald Seeto</td>
<td>VP, Partnering and Strategy, MedImmune</td>
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<tr>
<td>Ronald J. Daniels</td>
<td>President, Johns Hopkins University</td>
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<tr>
<td>William E. Kirwan</td>
<td>Chancellor, University System of MD</td>
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<tr>
<td>Thomas Street</td>
<td>ACAO, MoCo Government</td>
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</table>
Johns Hopkins President Ron Daniels

- Founding BHI board and executive committee member
- On BHI Board since 2012
- Focused on building the relationship between Montgomery County and Baltimore

Christy Wyskiel

- Senior Advisor to the President at JHU
- JHU/BHI Liaison
- Rich Bendis Surrogate
Johns Hopkins Montgomery County Campus

- BHI headquartered in Montgomery County
- Partner on regional innovation and entrepreneurial initiatives
- For example: Perceptive Navigation, a Johns Hopkins spinout is a BHI portfolio company which has received significant EIR support and has offices at the Montgomery Count
## OUR PARTNERS

### Private Sector
- GSK
- AstraZeneca
- BD
- Adventist HealthCare
- SR-one
- Roche
- MedImmune
- emergent biosolutions
- Northrop Grumman
- VENABLE, LLP
- KACER PERMANENTE
- United Therapeutics Corporation
- Aronson
- GenVec
- ATCC
- Ernst & Young
- NEA
- Cassidy Turley
- Commercial Real Estate Services
- ALEXANDRIA
- sigma-tau Pharmaceuticals, Inc
- Noble Life Sciences
- Greenspring Associates

### Government
- Montgomery County Economic Development
- Invest Maryland
- National Heart, Lung, and Blood Institute
- National Institutes of Health
- SBA
- BIO MARYLAND
- EDA
- Maryland's Innovation Initiative
- Frederick County Government

### Academia
- University System of Maryland
- bwtech
- UM Ventures
- University of Maryland BioPark
- Johns Hopkins University
- Mtech
- FASTFORwARD

### NGOs
- EAGB
- Tech Council of MD
- Rockville Economic Development
- Maryland TEDCO
- SSTI
- Mbia

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$4,565,585
2015 Funding

9:1
Leverage Ratio to each County $
BHI is a private public partnership governed and managed by the private sector. Our mission as an innovation intermediary is to:

1. Advance Technologies
2. Accelerate Innovation
3. Globally Connect
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”
WHERE WE EXCEL

Entrepreneur-in-Residence Program

1. Experienced Entrepreneurs, Venture Capitalists and Industry business developers managing a commercially relevant biohealth portfolio.

Todd Chappell (NIH)  Ram Aiyar (NHLBI)  Ken Malone (USM)  Albine Martin (JHU)  Ethel Rubin (NHLBI)  Steve Wolpe (NHLBI)  Additional NIH EIRs

BHI Scouting Clients

Roche  MedImmune  BHI Partners

Replicable to ANY Region

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Entrepreneur-in-Residence with BHI since 2015

Working within Johns Hopkins University and Medical Center to find interesting science and technologies to commercialize

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.
Examples of Federal Funding Assistance to JHU

- **Perceptive Navigation**
  Submitted a Phase II STTR to the National Heart Lung & Blood Institute for an

- **Sonavex Surgical**
  Submitted a Phase I SBIR to the National Heart Lung & Blood Institute for an

- **Revolve Biotechnologies**
  Submitted a Phase I SBIR to the National Institute of Mental Health
Joint initiative between Johns Hopkins and BioHealth Innovation to create a startup Accelerator in Baltimore
Attract and retain promising high growth HIT entrepreneurs in MD
Two successful cohorts of 15 companies

Partners:
- BioHealth Innovation, Inc.
- Johns Hopkins University
- DreamIt Ventures
- Economic Alliance of Greater Baltimore
- Northrop Grumman
- Kaiser Permanente
- DBED
- The Abell Foundation
### Dreamit Cohorts

<table>
<thead>
<tr>
<th>JHU Affiliated</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td><strong>Aegle</strong></td>
<td>Wearable biometric devices</td>
<td><strong>Baton</strong></td>
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<td></td>
<td>Practicing smarter medicine</td>
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<td></td>
<td>Mobile Cognitive Rehabilitation</td>
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<td>Mobile Information Platform</td>
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<td></td>
<td>Protecting Patient Data</td>
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<td></td>
<td>Respiratory Medical Device</td>
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<td>Inpatient Care Collaboration</td>
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<td></td>
<td>Augmented Reality Treatment</td>
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<td></td>
<td>Digital Workflow Management</td>
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<tr>
<td><strong>Baltimore, MD</strong></td>
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<td><strong>Baltimore, MD</strong></td>
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<td><strong>Talinn, Estonia</strong></td>
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<td><strong>Grand Rapids, MI</strong></td>
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<tr>
<td><strong>Baltimore, MD</strong></td>
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<td><strong>San Francisco</strong></td>
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<td><strong>Athens, Greece</strong></td>
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<td><strong>Spain</strong></td>
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<tr>
<td><strong>Pittsburgh, PA</strong></td>
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<td><strong>Chicago, IL</strong></td>
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<tr>
<td><strong>Barcelona, Spain</strong></td>
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<td><strong>Baltimore, MD</strong></td>
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Innovation Capital Map

Capital Sources by Investment Stage

<table>
<thead>
<tr>
<th>Pre-Proof of Concept</th>
<th>Tranlational 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 - $500,000</td>
<td>$50,000 - $1,500,000</td>
<td>$200,000 - $2,500,000</td>
<td>$2,500,000+</td>
</tr>
</tbody>
</table>

- NIH R01
- NIH R03
- NIH R21
- Maryland Stem Cell Research Fund (MSCRF) - Various
- SBR/STTR Federal Funding Assistance Program
- SBR/STTR Grant Phase 1
- NGCTS Cures Acceleration Network (CANT)
- 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
- Maryland Industrial Partnerships (MIPS @ UMD)
- TEDCO Maryland Innovation Initiative - Phase 2
- TEDCO Technology Validation Program - Market Assessment
- SBIR/STTR Phase 2
- Maryland Stem Cell Research Fund (MSCRF) - Pre-Clinical
- TEDCO Technology Commercialization Fund
- Maryland Industrial Partnerships (MIPS @ UMD)
- TEDCO Veterans' Opportunity Fund
- TEDCO Maryland Innovation Initiative - Phase 3
- SBIR/STTR Phase 2
- BioHealth Gap Fund
- Dirigo Center Angels (UMD)
- BioMaryland Biotechnology Development Award - Translational Research
- TEDCO Maryland Innovation Initiative - Phase 2
- BioMaryland Biotechnology Development Award - Commercialization
- Maryland Venture Fund Authority
- Proprietary Ventures
- Maryland Venture Fund Authority
- Greenspring Associates
- Novak Biddle Venture Partners
- Sterling Venture Partners
- Harbert Venture Partners
- JM Equity
- New Enterprise Associates (NEA)
- BioHealth Innovation, Inc.
- Economic Development
- Federal
- Private Capital

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BHI Startup Package

Corporate Legal
- Venable LLP

Intellectual Property
- InHouse Patent Counsel
- DP Clinical

Clinical Services

Accounting
- Adamson

Laboratory Space
- University of Maryland BioPark
- BRI Biomedical Research Inst.

Incubation
- BioHealth Innovation

Banking
- M&T Bank
- Capital Bank

Payer Advisory Services
- ADVI

Scientific Data Management Services
- CMTP
- BioIT Solutions, Inc.

Grant Consulting
- BBC
- ScienceSherpa
Comprehensive Portfolio Slide - 31 Companies - 126 FTEs*

**3DBioWorks**
- UMB / UMCP
- 3
- Ken Malone
- 3DBioWorks grows cord stem cells in 3D printed bioreactors.

**Mimetas US**
- Netherlands
- 1
- Todd Chappell
- Mimetas is developing and marketing Organ-on-a-Chip solutions for the pharmaceutical industry.

**Tertius Analytics**
- UMD
- 1
- Ethan Byler
- Tertius Analytics provides analytical tools for network modeling of regional industry clusters.

**Asulon Pharma**
- UMD
- 2
- Ken Malone
- Asulon is developing small molecule therapeutics for rapid acting anti-depressants.

**Magnifygen**
- Montgomery County
- 1
- Todd Chappell
- Magnifygen is developing novel immunotoxins for the treatment of solid and liquid tumors.

**Intravenous Solutions**
- Stony Brook, NYC to MD
- 1
- Ram Aiyar
- IVS is a medical device company redefining infusion pump systems.

**MDLogix**
- Baltimore
- 20
- Ken Malone
- MD Logix has fully commercialized a mental health assessment tool.

**MockV Solutions**
- Montgomery County
- 1
- Todd Chappell
- MockV Solutions is developing novel kits to make biotherapeutic process development cost efficient.

**BWell America**
- Montgomery County
- 4
- Ken Malone
- BWell America, Inc. is a data analytics driven wellness company providing employer group, healthcare payers and exchanges with real time wellness analytics.

**Nanovir**
- Kalamazoo, MI
- 2
- Ram Aiyar
- Nanovir is developing small molecule anti-viral cures for Hepatitis and Human Pappiloma Virus.

**Paradigm Shift Therapeutics**
- UMB/NH
- 3
- Ram Aiyar
- Paradigm Shift Therapeutics is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Tissue Analytics**
- NIH
- 5
- Ken Malone
- Tissue Analytics is developing a sophisticated platform for remotely evaluating chronic wounds using a smartphone.

**VLP Therapeutics**
- Montgomery County
- 8
- Todd Chappell
- Developing a platform vaccine like particle technology that has the potential to be used for various diseases including cancer.

**Corvidia**
- Boston
- 1
- Ram Aiyar
- Corvidia is a large molecule therapeutics company focused on cardiovascular disorders that redefines the precision health for cardiology.

**Benevir**
- Montgomery County
- 5
- JHU
- Benevir is a data analytics driven wellness company providing employer group, healthcare payers and exchanges with real time wellness analytics.

**Perceptive Navigation**
- Montgomery County
- 2
- JHU
- Perceptive Navigation is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Appian Medical**
- Montgomery County
- 3
- JHU
- Appian Medical is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**NS Sensors**
- UMC & NIST
- 5
- Dreamit 1
- NS Sensors is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Avhana**
- Dreamit 1
- 7
- Avhana is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Cognuse**
- Dreamit 1
- 5
- Cognuse is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Emocha**
- Dreamit 1
- 6
- Emocha is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Protenus**
- Dreamit 1
- 6
- Protenus is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

**Quantified Care**
- Dreamit 1
- 4
- Quantified Care is developing small molecule therapeutics to support counter-terrorism and radiation oncology products.

* Numbers do not reflect BHI employees, company consultants and full-time equivalents at each of the portfolio companies.
OPPORTUNITIES FOR COLLABORATION

BHI Clients receive **FULL** Network Access

- Regional
- National
- Global
- Partners
- Board Members
- Collaborators
Public Private Partnership Best Practices, Common Attributes

- Longevity
- Bipartisan Support & Champions
- Independent Organizations
- Continuous Reinvention
- Private Sector Involvement
- Understand Return On Investment
- Sustainability In Funding
- Accountable
- Innovative
- Effective Leadership
“Somebody has to do something, and it’s just incredibly pathetic that it has to be US.”

-Jerry Garcia of the Grateful Dead