

MARYLAND LIFE SCIENCES ADVISORY BOARD (LSAB) MEETING

MINUTES

MEETING DATE: October 31, 2016

TIME: 12:30-4:15 P.M.

LOCATION: Montgomery College Germantown Campus,
Bioscience Education (BE) Building - Room 151
20200 Observation Drive, Germantown, MD 2087

Welcome

Chair Abdun-Nabi welcomed attendees to the fall meeting and thanked LSAB member Dr. Rai and his colleagues for hosting the meeting. Dr. Rai spoke briefly regarding Montgomery College, the students it serves and its role in the community. He also referenced the classes and mock GMP facility in the Bioscience Education building and its location in the Pinkney Innovation Complex for Science and Technology at Montgomery College (PIC MC). LSAB members were invited to tour the BE facility at the end of the meeting.

Call to Order

Chair Abdun-Nabi convened the meeting, and welcomed members and guests. He mentioned that former LSAB member Pat O'Shea had resigned from the LSAB due to his move to Ireland to become President of University College Cork, and acknowledged IBBR Director Tom Fuerst, Commerce Deputy Director Ben Wu, and MVR President Bob Storey as participants in the meeting. He also thanked members of the public in attendance who had contributed to the LSAB's Working Groups activities and final recommendations.

Chair Abdun-Nabi asked for feedback on the Minutes of the May 7, 2016 LSAB meeting. Hearing none, he asked for a Motion to Approve the Minutes which was made by Ms. Wyskiel and seconded by Mr. Bendis. The May meeting Minutes were approved unanimously.

Update from Commerce

Secretary Gill thanked the LSAB members for their work since May preparing recommendations to accelerate the growth of the BioHealth industry in Maryland and said he looked forward to listening and learning from their presentations today.

Desired Future State

Chair Abdun-Nabi reminded the LSAB members of their decision at the May meeting to make "Top 3 by 2023" the goal and vision statement for the LSAB. He asked members to consider what the

desired future state in 2023 might look like. LSAB members discussed different cluster rankings (JLL US Life Sciences Report, Milliken, New York Life Sciences reports) and how Maryland and others fair differently depending upon what activity is measured.

LSAB members discussed:

a) Elements of a thriving BioHealth ecosystem: Great academic research, capital, talent, lab space/ infrastructure, ecosystem leadership, thriving entrepreneurial culture with seasoned entrepreneurs, manufacturing and CRO capabilities.

b) What Maryland has: Great universities, federal institutions and labs, NIH funding & research, scientific talent, some capital, critical mass of small biohealth companies, some globally recognized brands.

c) What Maryland could use more of: Early-stage capital/VC, anchor companies, manufacturing/ CRO capabilities, experienced entrepreneurs, space/infrastructure, experienced entrepreneurial talent, better connectivity and collaboration, and more commercial companies.

Chair Abdun-Nabi asked the LSAB members to consider a specific description of how others might describe Maryland if the Top 3 U.S. BioHealth Innovation Hub by 2023 goal is achieved:

- Collaborations are numerous and easily accomplished
- Latest market relevant discoveries flow seamlessly to companies
- Frequent, impromptu interactions among key industry leaders are routine
- Experienced, serial entrepreneurs seek leadership opportunities in Maryland
- Commercially relevant talent recruitment is easy
- Challenging and rewarding career opportunities are abundant
- Capital is readily available to support company growth
- R&D lab space and GMP manufacturing facilities for Phase 1 studies are plentiful
- VC's routinely scout Maryland for investment opportunities
- Large pharma and medical device innovation centers are in Maryland.
- A BioHealth focused organization actively promotes and coordinates industry initiatives

A discussion regarding visits to other innovation centers which have some aspects of the 'desired future state' took place. Mr. Bendis spoke of a recent trip to New York and the Alexandria Properties accelerator next to Bellevue. Ms. Perrow, Mr. Borkat, Ms. Wyskiel and Mr. Austin spoke of the innovation taking place in Boston and the Cambridge, Massachusetts environment. Ms. Wieskel also spoke regarding Ohio and recent visits to Toronto and Pittsburgh. Mr. Storey spoke of his observations regarding JLABS in Houston. Dr. Austin remarked how academic missions are enhanced by related economic activity, and he and other members spoke about how a strong entrepreneurial ecosystem helps researchers to know their technologies will get advanced. Both Ms. Wieskel and Mr. Bendis recommended focusing on initiatives to grow the ecosystem over work to recruit large corporations stating enabling spin-outs and start-ups can grow and thrive is what will attract the large corporations. Boston was cited as an example of where the innovation and entrepreneurial community was developed before large companies moved to Massachusetts.

Dr. Rai stated Maryland is competing not only with innovation centers through the United States but also globally such as Hyderabad where Alexandria Real Estate also has a campus. Mr. Smith agreed and spoke about activity taking place not only in New Hampshire and Texas but also in Japan, Switzerland, and the UK.

Dr. Weichold suggested a plan focus on specific activities and referenced the opportunity for Maryland to match funding with projects involving the FDA, especially those involving Regulatory Science.

Dr. Fuerst asked that the group remember to include agbio in its industry description.

Mr. Borkat stated that to make a meaningful difference in the BioHealth economy, changes have to be made in more than one aspect of a thriving ecosystem and that a comprehensive plan integrating a variety of initiatives is required. Chair Abdun-Nabi, Mr. Bendis and Ms. Wyskiel stated they agreed.

The Chair then suggested Maryland's industry (public and private sector, NGOs and government) need to "ACCT" together to deliver on a strategy so that Maryland and its residents can reap the rewards of increased tax revenue, increased job growth, global recognition, new companies, greater investment in Maryland, economic growth and reduced dependency on government. Dr. Weichold and Mr. Bendis said they agreed with the statement and would add the academic sector to the description of industry.

Chair Abdun-Nabi acknowledged consensus on the need for a comprehensive plan integrating a variety of initiatives particularly those focused on growing young companies and the entrepreneurial ecosystem. He then invited the Working Group leaders to present their findings so the Board can determine next steps regarding a plan.

Working Group Presentations

Chair Abdun-Nabi thanked all seven Working Group Chairs and their members for the work they have been doing since May and asked them to share their group's top challenges and solutions per topic. He acknowledged non-LSAB member Bob Storey, Principal of the MVR group and thanked him for representing Medtech interests in this initiative. The Chair also reminded the members that these are preliminary working group findings and recommendations being presented for discussion. At this point, they do not represent formal recommendations of the LSAB and the information being shared during the meeting is being shared for background and discussion not as a formal, public report.

(1) Foundational Support Working Group - Mr. Borkat, Chair

Members:

Chris Austin, Director, NCATS

Jason Brooke, CEO, Vasoptic Medical

Bert M. Glaser, CEO, Ocular Proteomics

Deanne Kasim, Founding Partner, Santesys Solutions

Margaret Latimer, VP and Provost, Montgomery College

Jim Pannucci, Director, Southern Research

Karen Proudford, President, William E. Proudford Sickle Cell Fund

Martha Schoonmaker, Executive Director, PICMC

Sam Wang, Associate Director, Astra Zeneca
John Wasilisin, President and COO, TEDCO

Challenge #1: Pockets of BioHealth strength exist in Maryland, but are not well characterized and coordinated

Solutions:

- A. Support the creation of an advocacy group/leader for Maryland's life sciences industry
- B. Develop interactive asset map
- C. Connect patient advocacy groups to local companies

Challenge #2: Limited awareness of Maryland's BioHealth strengths within and outside of Maryland

Solutions:

- A. Promote the BioHealth industry in Maryland through use of a brand
- B. Define and promote areas of current and desired strength
- C. Attract a division of an anchor company

(2) Access to Capital Working Group – Ms. Perrow, Chair

Members:

Sean Denny – Investor/Entrepreneur
Jennifer Hammaker – Director, MII at TEDCO
Henrik Rasmussen, MD, PhD – Chairman, Rasmussen Pharma Consulting
Philip Goelet, PhD – Managing Member, Red Abbey Venture Partners and
CEO and Director, AgriMetis, LLC
David S. Rosen, Esquire, CPA – Director of Tax Services, RS&F
Ali Behbahani, MD, PhD – Partner, New Enterprise Associates
Elizabeth Good Mazhari – President, Transition Health Ventures
Kyp Sirinakis – Managing Partner, Epidarex Capital

Challenge: Lack of enough Funds and a Scalable Fund / Risk Capital located in Maryland that will invest in Early Maryland Life Science Companies

Solutions:

- A. Create a State funded Life Sciences MD Venture Capital Investment Fund which would be the anchor initiative for scalable risk capital targeting early stage life sciences companies in MD through a Public/Private partnership
- B. Create/Identify Private Funds
- C. Increase Funding for Existing Maryland State Funding Programs

Challenge: It is Difficult to Attract and Retain Executive Talent for Life Sciences Start-up Companies in Maryland

Solutions:

- A. Support Entrepreneur in Residence program financially in the Life Sciences MD Venture Capital Investment Fund and Private VC's to build a talent pool to lead life sciences companies in Maryland
- B. Subsidize or match retained search, relocation expenses to bring in C-Level/CEO entrepreneurial top talent or interim management to lead start-up companies
- C. Create incentive program to attract, retain, and support C-Level/CEO Entrepreneurs who will be credible for Venture Capital investment

(3) Convergence of Bio and IT Working Group – Mr. Bendis, Chair

Members:

Ethan Byler – Managing Director of Economic Development, BHI
Jane Fang – R&D Information Head for Clinical Biologics, MedImmune
Chris Ghion – CIO, Adventist Healthcare
Sam McCleery – VP, Commercialization Lab & Open Innovation, Under Armour
Matt Puglisi – CEO, Netrias
Martin Rosendale – Interim CEO, Tech Council of Maryland; CEO, Selnova
Michael Thomas – CEO Appian Partners
BHI Analyst Support: Kurt Herzog, Ashwin Kulkarni, Noah Pyles

First Need to Define “Convergence”

Short definition: Convergence is integrating knowledge, resources, tools, and ways of thinking across scientific, commercial, and social disciplines and industries to solve problems.

Full definition: Convergence is an approach to problem solving that intersects disciplinary boundaries, integrating knowledge, tools, and ways of thinking from life and health sciences, physical, mathematical, and computational sciences, engineering disciplines, and beyond to form a comprehensive synthetic framework for tackling scientific, societal, and commercial challenges that exist at the interfaces of multiple fields¹, i.e. Nanotechnology, Biotechnology, Cybersecurity, Information Technology and Cognitive Science.²

Convergence of Bio and IT Working Group

Challenge: BioHealth and IT/technology companies have an opportunity to integrate and collaborate; however, no clear pathway exists for their convergence

Solutions:

- A. Define convergence
- B. Support the creation of an asset map for Maryland.
- C. Create a needs and opportunities assessment and road map for those in Maryland to participate in convergence
- D. Policy planning
- E. Develop regional promotion and branding for Maryland as convergence leader

(4) Access to Talent Working Group—Dr. Rai, Chair

Members:

Samir Balala, Project Officer and Animal Facility Manager, NIH
Jennifer Colvin, VP of Education, MDBio Foundation
Chris Frew, VP Sales, Breezio and Founder, BioBuzz
Curtis Gallagher, Exec. Dir., MEETSprogram.org
Ellie Giles, CEO, WorkSource Montgomery
Michael Gove, Facilitator, BIOTrain
Angela Graham, President and CEO, Quality Biological, Inc.
Collins Jones, PhD, Biotechnology Coordinator, Montgomery College
Laurie Savona, Academic Affairs Operations Dir., Montgomery College
Mark Nardone, Director, Bio-Trac® Training Programs
Chioma Obi, Bioscience Industry Navigator, MD Tech Connection

James Pannucci, Senior Director, Southern Research
Michael Smith, Biotechnology Program Mgr, Montgomery College

Challenge #1: No central location for workforce information
(job and internship opportunities, training, education, career paths)

Solution:

- A. Develop a centralized, labor exchange with support to keep in current and include on it/linked to it all related workforce information: job and internship opportunities, training, education, career paths, etc.

Challenge #2: There is a need for training and support for experiential learning to keep pace with advancing technology

Solutions:

- A. Establishment of Maryland Internship Collaborative (MIC)
- B. Establish matching grants for early stage BioHealth companies hiring interns
- C. Support annual skills gap assessments and relevant training and career path promotion

Challenge: Growing and larger size companies are forced to recruit talent with commercially relevant experience from out of state and convincing recruits to move to Maryland can be a challenge

Solutions:

- A. Support other Working Group proposals to grow ecosystem
- B. Support other proposals of this Working Group

(5) Technology Transfer Working Group – Ms. Wyskiel, Chair

Members:

Chris Austin, M.D., Director, National Center for Advancing Translational Sciences - U.S. NIH
Martha J. Connolly, Director, Mtech Baltimore; Dir, Bio Entrepreneurship
Barry Datlof, Director, Medical Tech. Transfer, U.S. Army Medical Research and Materiel Command
Ellen Hemmerly, Executive Director at UMBC Research and Technology Park
Joseph Naft, Director, Maryland Industrial Partnerships (MIPS)
Ted Olsen, President and CEO, PathSensors, Inc.
Tom Sadowski, Vice Chancellor for Economic Development, University System of Maryland
Peter Sandborn, Director, MD Technology Enterprise Institute
Elizabeth Smyth, Sr. Director Strategic Initiatives, JHTV
Karl Steiner, PhD, VP for Research, UMBC

Challenges:

- Most products developed at federal labs and universities in our state are simply not ready for prime time.
- Many technologies/ideas developed in MD labs are very early stage with only intellectual property protection.
- Most need more development and validation in order attract strategic partners and/or corporate/venture capital investment

- MD lacks a coordinated strategy to grow and sustain an entrepreneurial ecosystem to provide early stage technologies with resources, funding and programs that enable the development of breakthrough products with commercial potential.
- Universities and federal labs don't necessarily support culture of commercialization historically rewarding publishing over patents. There is a misalignment of incentives/outcomes at some institutions.
- MD lacks depth of talent with commercialization experience or potential that other states such as CA and MA have.
- Many promising technologies are receiving funding and leaving the state.

Solutions:

Maryland needs a coordinated strategy to grow and sustain an entrepreneurial ecosystem to provide early stage technologies with resources, funding and programs that enable the development of breakthrough products with commercial potential such as: training programs, funding (from translational grants to VC), mentors, industry partnerships and /collaborations, accelerator programs, regulatory and reimbursement pathways clearly delineated, affordable, flexible and relevant spaces in which to work and grow.

- A. Funding: Provide robust support for funding for entrepreneurs in and around universities and other federal agencies in collaboration with tech transfer offices.
- B. Resources: Provide robust support for resources for entrepreneurs in and around universities and other agencies with tech transfer offices.
- C. Space: Life sciences companies need lab space to grow and thrive. Providing affordable, flexible lab space for companies coming out of "tech transfer" is a foundational need for the ecosystem. There is a need to provide robust support for spaces for entrepreneurs in and around universities and federal agencies in collaboration with tech transfer offices.
- D. Collaborations: Support and augment industry/academic collaborations with catalytic funding.
- E. Stimulate Market Activity at Federal Labs: Empower investigators at federal labs to move technology toward the market by removing barriers and examining incentives.

(6) BioManufacturing Working Group – Dr. Chacon, Chair

Members:

David Smith, VP, Global BD, Emerging Technologies, Lonza Walkersville

Bill Bentley, Distinguished Chair of Engineering & Inaugural Director,

Robert E. Fischell Inst. for Biomedical Devices

Helen Montag, Sr. Director, BD & Corp. Partnerships, Johns Hopkins Technology Ventures

Bob Storey, Managing Director, The MVR Company

Challenge #1: Limited global manufacturing capacity for Viral Vectors, Vaccines, Monoclonal Antibodies and Cell Therapies

Solutions:

- A. Incentivize developers and companies to build and to expand manufacturing facilities in Maryland.
- B. Provide manufacturing companies with an incentive to hire and train new employees

- C. Support for training of a qualified work force for Bioprocess, Manufacturing, Analytics and Regulatory Science will be needed for an industry that is expected to grow in double digits for years to come.
- D. Deploy biomanufacturing educational training centers (BETCs) to develop “manufacturing job-ready” staff.

Challenge #2: Maryland is not recognized for its manufacturing of specialty technologies e.g. Viral Vectors, Vaccines, and Cell Therapies.

Solution:

- A. Create a Maryland office and name a strong CEO or Director to represent the State’s biotechnology companies, pharmaceutical companies, contract manufacturers, medical device companies, and other health related institutions in the US and abroad. (Activities of the proposed new office will expand on more traditional organizations such as MA Bio, NY Bio, Bay Bio, VA Bio.)

Challenge #3: Lack of Support for Manufacturing Needs at Maryland’s academic institutions

Solution:

- A. Create a regional GMP Center of Excellence for the manufacture of cell therapies. The proposed COE would be organized as a consortium of academic, public and private sectors --including JHU, UMS, NCI, and Maryland Department of Commerce). Support a proposal to create an Advanced Therapy Manufacturing Center of Excellence in Baltimore involving private, public, academic partnership.

(7) Medical Device Manufacturing Working Group - Bob Storey, Chair

Members:

Bill Bentley, University of Maryland
 Brian Lipford, KeyTech/Cooltech
 David Wise, Pharos/Abell
 Steve Falk, GE Healthcare

Challenge: There are no Top 100 public medical device companies HQ’d in Maryland and there is only a limited presence of major firms in the State. That results a lack of experienced medtech management in Maryland to support and retain emerging growth and start-up companies that arise from the State’s considerable medical technology resources. This lack of resource is an impediment to both confidence by outside investors and regional retention of emerging growth companies.

Solutions:

- A. Attract Major Device Company involvement in Maryland via recruitment of Innovation & Dev. Centers
- B. Develop Executive Centers targeting major device company liaison offices that would co-locate in conjunction with the Institutional “Corridors of Excellence” around the State’s areas of core competence (Regulatory/Reimbursement Science, Target Technology Sectors)
- C. Expand support and investment for entities that develop and support Maryland based CEO/Executives
- D. Provide relocation assistance for companies recruiting out of state senior executives
- E. Fund programs to support experiential programs for biomedical & eng students w/in medical manufacturing
- F. Support manufacturing education and skills development

Challenge: There is a lack of local contract manufacturing and supply chain resources for Medical Device manufacturing in Maryland, and very poor networking among the supply chain that does exist in the State.

Solutions:

- A. Establish co-operative programs with experienced contract manufacturers, allowing importation of management & organizational expertise.
- B. Create incentive programs for medical device specific supply chain businesses to locate and expand in Maryland; targeting supply to both Maryland and surrounding regions.
- C. Organize and update a unique Medtech database that is readily accessible and actively maintained at Commerce.
- D. Create a Medtech specific network and communications community, leveraging the assistance (and proximity in DC) of the largest Medical Device trade organizations (Advamed, MDMA)

Next Steps

Chair Abdun-Nabi thanked the Working Group Chairs for the information they shared and stated that there seem to be four common themes with each of the presentations: Assets, Connectivity, Capital and Talent. He proposed model A C C T to guide the discussion regarding the challenges and solutions presented and next steps:

- | | | |
|---|--------------|---|
| A | Assets | Leverage and grow current ASSET base and accelerate commercialization |
| B | Connectivity | Increase CONNECTIVITY among and awareness of Maryland's Biohealth assets and resources |
| C | Capital | Increase availability and access to CAPITAL at each phase of the BioHealth life cycle. |
| T | Talent | Grow TALENT pool of experienced BioHealth entrepreneurs, business leaders, graduates and scientists with commercially relevant experience |

LSAB members discussed the Working Group recommendations using the A C C T themes and agreed to use it as the framework for next steps. The Board agreed that the Working Group Chairs would reconvene and prioritize the solutions outlined in the presentations.

Secretary Gill asked the group prioritize several proposals which he could be implemented relatively easily and make a significant difference with the understanding that he is not certain what budget might be available.

Chair Abdun-Nabi and the Board agreed to prioritize the recommendations and more fully develop their top recommendations for FY18 and present those to the Secretary at the next LSAB meeting scheduled for December 6, 2016.

Adjourn

Chair Abdun-Nabi thanked everyone for participating in the discussion and adjourned the meeting.

Board Members in Attendance:

Chair: Daniel J. Abdun-Nabi, President and CEO --Emergent BioSolutions
Vice Chair: Jay A. Perman, M.D., President – University of Maryland, Baltimore
Members: Christopher P. Austin, M.D., Director, NCATS, – U.S. National Institutes of Health
Richard A. Bendis, President and CEO – BioHealth Innovation Inc.
Jarrod Borkat, Head, External Collaborations, Biotech Hubs and Government Contracting– MedImmune
Marco A. Chacon, Ph.D., Founder and Chairman – Paragon Bioservices, Inc.
Douglas Jon Liu, SVP, Head of Global Operations – Qiagen Sciences Inc.
Theodore (Ted) J. Olsen, President and CEO – PathSensors, Inc.
Wendy Perrow, MBA, CEO – AsclepiX Therapeutics
Karen L. Proudford, Ph.D., President, William E. Proudford Sickle Cell Fund, Inc.;
Associate Prof. of Mgmt. and Dir., Graves Honor Program - Morgan State University
Sanjay K. Rai, Ph.D., Senior Vice President for Academic Affairs – Montgomery College
David W. Smith, Ph.D., VP, Global Business Dev., Emerging Tech. – Lonza Walkersville, Inc.
Frank F. Weichold, M.D., Ph.D., Director, Critical Path and Regulatory Science Initiatives, Office of the Commissioner – U.S. FDA
Christy Wyskiel, MBA, Senior Advisor to the President and Head of Johns Hopkins Technology Ventures, Johns Hopkins University
R. Michael Gill, Secretary – Maryland Department of Commerce
John M. Wasilisin, President and Chief Operating Officer – TEDCO

Board Members not in Attendance:

Col. Andrea Stahl, Ph.D., Director, MRMC CBRN Defense Medical Research Coordinating Office and JPC-Radiation Health Effects – USAMRMC

Speakers and Guests in Attendance:

Mary Clapsaddle, Director State Affairs, John Hopkins
Rachel Emeruwa, Administrative Assistant – Maryland Department of Commerce
Brad E. Fackler, Senior Director, BioHealth and Life Sciences, Maryland Department of Commerce
Chris Frew, VP – Breezio/ Biobuzz
Thomas R. Fuerst, Director, Institute for Bioscience and Biotechnology Research.
Joyce Fuhrmann, VP Operations and Partnerships – MCEPC
Steve Greenfield, Dean WDCE – Mountgomery College
Brian Gaines, CEO – Maryland Bio Foundation
Steve Pennington, Managing Director, Business and Industry Sector Development – Maryland Department of Commerce
Patrick Roddy, Esq., Rifkin Weiner Livingston LLC
Martha Schoonmaker, Executive Director at Pinkney Innov. Complex – Mountgomery College
Bret Schreiber, Director of Education R. Innovation – Maryland Department of Commerce
Bob Storey, Principal, MVR Company
Emily Tocknell, Assistant Director of Government Affairs – Maryland Department of Commerce
Julie Woepke, Executive Director – Maryland Department of Commerce
Benjamin H. Wu, Deputy Secretary, Maryland Department of Commerce

LSAB Staff:

Judy Costello, Director, BioHealth and Life Sciences, Maryland Department of Commerce