BOARD OF REGENTS

Summary of Item for Action,
Information or Discussion

TOPIC: Progress Report on the Re-Structuring of the University of Maryland Biotechnology Institute: IBBR and IMET (Information)

COMMITTEE: Committee of Whole

DATE OF COMMITTEE MEETING: February 17, 2012

SUMMARY: On June 19, 2009, the Board of Regents adopted recommendations of its Ad Hoc UMBI Review Committee to fundamentally restructure the University of Maryland Biotechnology Institute (UMBI). With the goal of developing an organizational structure that would best enable the USM "to utilize the UMBI resources to achieve the USM and State goals in biotechnology and the life sciences," the Committee recommended that UMBI's research centers be reorganized and their resources allocated among the USM's research institutions. The most ambitious aspect of the re-structuring plan adopted by the Board was the creation of two joint research centers involving multiple USM institutions: the Institute for Bioscience and Biotechnology Research (IBBR) and the Institute for Marine and Environmental Research (IMET). Over the course of the next year, memoranda of understanding were developed among the joint centers' partner institutions and the USM for collaborative research programs and operations and approved by the Board.

IBBR: The Board's action established a joint USM research center at the former UMBI Center for Advanced Research in Biotechnology facilities on the Shady Grove campus, now known as IBBR. The University of Maryland College Park (UMCP) and the University of Maryland Baltimore (UMB) are the institute's partner institutions. In addition, the Board allocated UMBI's Center for Biosystems Research (CBR) to UMCP, and UMCP has merged CBR's resources into IBBR as well. UMCP has administrative responsibilities for IBBR. The institute is led by IBBR Director, Donald L. Nuss, who provided the attached report regarding IBBR's progress to date.

IMET: The Board established a second joint USM research center at the Columbus Center which was allocated the resources of UMBI's Center of Marine Biotechnology. The partner institutions for IMET are UMB, the University of Maryland Baltimore County (UMBC) and the University of Maryland Center For Environmental Science. UMBC has administrative responsibility for IMET, and it is led by Interim Director Russell Hill, who submitted the attached report.

The attached reports document the experience since July 1, 2010 of IBBR and IMET in implementing their respective MOUs and in progressing toward the Board's goals, particularly those related to enhanced research collaboration and capacity to increase technology transfer and commercialization of the centers' intellectual property. Drs. Nuss and Hill will summarize their respective institutes' considerable progress to date at the Board meeting.

ALTERNATIVE(S): n/a

FISCAL IMPACT: n/a

CHANCELLOR'S RECOMMENDATION: n/a

BOARD ACTION: DATE:

SUBMITTED BY: William E. Kirwan (301) 445-1901

IBBR INSTITUTE FOR BIOSCIENCE & BIOTECHNOLOGY RESEARCH

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IBBR Report to the Board of Regents
July1, 2010 to December 31, 2011

The Institute for Bioscience and Biotechnology Research (IBBR) is a USM joint research enterprise created to enhance collaboration among the UMCP, UMB, and the National Institute of Standards and Technology (NIST). IBBR's mission is to leverage collective research strengths of the partnering institutions in medicine, biosciences, technology, quantitative sciences and engineering; to foster integrated, cross-disciplinary team approaches to scientific discovery and education; and to serve the expanding bio-economy of Maryland and the Nation.

During its first eighteen months, IBBR has developed an integrated administrative structure and has grown substantially, in number of people and more importantly in significant and deepening collaborations spanning USM and NIST. Research and technology transfer capabilities have been greatly enhanced. IBBR has significantly increased student engagement at the graduate, undergraduate, and high school levels. The tremendous support offered by the leadership of each partnering institution has been critical in progress to date. Progress highlights are indicated below and additional details are included in the Accountability Framework submitted to the IBBR Oversight Board December 1, 2011 **(Appendix A).**

IBBR Organization and People

IBBR's management follows the form prescribed by the MOU. Donald Nuss (UMCP) serves as IBBR Founding Director. Dr. Nuss is an internationally recognized virologist and Professor in the Department of Cell Biology and Molecular Genetics.

David Weber (UMB) was appointed Associate Director in May 2011. Dr. Weber is an internationally recognized structural biologist, Professor in the Department of Biochemistry and Molecular Biology and Director of the Center for Biomolecular Therapeutics (CBT).

Through formal monthly meetings, we have institutionalized a strong working relationship among the partner institutions. IBBR has implemented an integrated support structure that provides common administrative, IT, and facilities support to UMCP, UMB, and NIST staff. This support has been essential for the arrival of the UMB group and the expansion of NIST activities (discussed below).

The original MOU did not include NIST representation on the IBBR Oversight Board and in the IBBR management structure. Two MOU amendments are proposed to recognize NIST's role in the IBBR partnership. *The first amendment would appoint the NIST Associate Director, Dr. Willie May, to the IBBR Oversight Board and proposes appointment of an IBBR Associate Director from NIST, Dr. John Marino.* Dr. Marino is the Group Leader for NIST's Macromolecular Structure and Function Group and leads the NIST effort at IBBR. *The second amendment would replace the internal Scientific Council with an executive committee consisting of IBBR faculty representing the three partnering institution.* Both amendments have been discussed and endorsed by the IBBR Oversight Board.

Total current IBBR personnel number 253 faculty, staff, and students, up from 194 on July 1, 2010 (**Appendix B**). The increase is driven by UMB and NIST program expansion and an increase in students. Key scientific recruitments include Dr. Danna Zimmer and Dr. Vincent Njar (UMB), and Dr. Robert

Brinson and Dr. Prasad Reddy (NIST). Dr. Debra Weinstein has been recruited as Research Development Specialist to foster the development of multi-investigator grant proposals and initiatives.

Expanded Research Capabilities and Collaborations

The Center for Biomolecular Therapeutics (CBT), led by Dr. Weber, is developing a USM-wide network of research and clinical faculty interested in translating basic biological discoveries into commercial diagnostic and therapeutic products. To date, more than 40 investigators from USM institutions have enrolled in the network. A network of linked capabilities to support drug discovery and development is being created (**Appendix C**).

The NIST Biomolecular Labeling Laboratory (BL2) is a new national resource located at IBBR-Shady Grove that is designed to produce heavy isotope-labeled proteins for neutron scattering measurements including the ability to evaluate different batches of the same biological therapeutic or to compare brand-name and generic drugs. Investigators may utilize the BL2 in conjunction with the NIST National Center for Neutron Research in Gaithersburg. The BL2 is supported by a $1.7M/year NIST cooperative agreement.

A 900Mhz Nuclear Magnetic Resonance (NMR) spectrometer was recently installed and tested at IBBR-Shady Grove. The exceptionally high resolution NMR instrument was purchased by NIST ($5M) and positions the IBBR structural biology group at the forefront of international efforts to elucidate structure and molecular interactions within biomolecules. A 950 Mhz NMR, funded by NIH ($8M), is being installed at UMB and will be used in coordination with the IBBR instrument.

In collaboration with the Clark School of Engineering, IBBR has created the Laboratory for Microscale Biofabrication at IBBR-College Park to provide state-of-the-art facilities for biology-based hierarchical assembly methods that complement traditional microfabrication methods and enable the integration of biology with electronics. The initial facility investment is supported by an ONR Grant ($2.1M) awarded to UMCP and UMB for personalized medicine

In collaboration with the College of Mathematical and Natural Sciences, IBBR has established a Next Generation Sequencing Core at IBBR-College Park to provide high-throughput sequencing services to the bioscience community.

IBBR has launched the NIST/UMCP/UMB Partnership for the Advancement of Complex Therapeutics. An initial workshop "Challenges and Opportunities in Discovery, Translation, and Regulation of Biological Therapeutics" involving all partners and industry was held on December 1, 2011 (130 attendees). A new IBBR seed grant program to catalyze development of new research teams and establish research foci capable of resulting in preliminary data relevant to future improvements of patient outcomes and reducing health care costs of biologic drugs is a principal component of the newly-announced **University of Maryland Strategic Alliance** Research and Innovation Seed Program. This program should position IBBR researchers to compete successfully for federal and industry funding including the newly created NIH National Center for Advancing Translational Sciences.

New Technology Transfer Capabilities

In partnership with IBBR, MTECH has opened the Biopharmaceutical Advancement Facility (BAF) at Shady Grove. Two staff members, John Kerwin and Jahmal Rich, support the BAF and maintain a close working relationship with MTECH's Bioprocess Scale-up Facility, located in College Park. The BAF provides local companies with advanced cell culture and fermentation services and training. Together

with industry experts, the BAF will offer a three-day, laboratory workshop on cell culture technology in March 2012 at IBBR, the first of a series of planned events.

A novel drug delivery nanocarrier, invented by Dr. Silvia Muro and graduate student Rasa Ghaffarian (IBBR/UMCP Fischell Department of Bioengineering), was selected as Invention of the Year in 2011 by the UMCP Office of Technology Commercialization.

The CBT has announced an industrial postdoctoral fellowship program to recruit new fellows, jointly advised by CBT and industrial collaborators, with several companies including Paragon Biosciences (Baltimore), GlaxoSmithKline.

Canon U.S. Life Sciences, Inc. and the Fischell Department of Bioengineering initiated a research collaboration, centered at IBBR-College Park, to develop a highly automated system providing rapid infectious disease diagnosis. Utilizing Canon U.S. Life Sciences' proprietary genetic analysis system, the project aims to expedite the delivery of infectious disease test results while also simplifying the test process to allow a variety of clinical staff to perform automated disease diagnosis.

Creating a Vibrant Educational Community

Each of the IBBR faculty holds a joint appointment with an academic department (UMCP or UMB). As a consequence, the number of graduate students in IBBR has increased from 22 to 37, and further growth is anticipated as faculty begin their teaching assignments. The IBBR Journal Club is now a weekly feature of the IBBR graduate experience with topics tied to weekly seminar speakers. Two IBBR graduate students in the Muro Lab, Daniel Serrano and Rasa Ghaffarian (Fischell Department of Bioengineering) have received prestigious NSF Graduate Fellowships.

The MCPS-IBBR High School Research Internship program hosted 12 high students last summer from Montgomery County and is facilitated by the ongoing presence of Lesli Adler, MCPS DNA Resource Center Director, on-site. An ongoing undergraduate research internship program involving the USG Bioscience program currently involves 8 undergraduate students and is being expanded to include CBT mentors.

CBT participates in a Towson University NSF STEM grant that provides summer research experience for high school biology teachers and hosted its first teacher last summer with a second teacher scheduled for next summer. CBT is discussing an internship program with McDaniel College.

John Moult (IBBR, UMCP) and Sridhar Hannenhalli (UMCP) are organizing a meeting, scheduled for May 22, 20112 at IBBR Shady Grove to assess the state of "Omics" research across UMB, UMCP, and Shady Grove. Speakers from each site will represent the range of current research with the intent of informing the community about ongoing research and creating new research collaborations. Organizers expect 150 attendees representing the range of omics research.

The foundation of the UMCP/UMB/NIST research partnership at IBBR has been firmly established. The Board of Regents deserves credit for having the vision to create IBBR as essentially a prototype of the strategic alliance envisioned in the recent Board of Regents Merger Study Report. It is now time to recruit a talented Executive Director to lead IBBR. This would not only ensure the successful future development of the IBBR, but also send a clear message that the partnering institutions are effectively building on existing partnerships to achieve the **University of Maryland Strategic Alliance**.

UNIVERSITY OF MARYLAND

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APPENDIX A

November 30, 2011

Dear Chancellor Kirwan,

I am pleased to submit a draft of the IBBR accountability framework for your review and comment. The framework is intended to address the requirements of Section XII.B of the IBBR MOU and will guide IBBR in its efforts to meet the ambitious goals envisioned by the Board of Regents. In formulating this report, we received substantial input from each of the partnering institutions.

Since IBBR is still evolving as an organization, our report emphasizes progress to date and is organized around the three elements of our mission which is to

- leverage the collective research strengths of our partnering institutions, UMCP, UMB and NIST in the biological and quantitative sciences, medicine, and engineering.
- develop integrated, cross-disciplinary team approaches to scientific challenges, technology development and education,
- serve the expanding bio-economy of Maryland and the Nation.

Specific objectives are detailed in the subheadings. The framework provides qualitative and quantitative measures as appropriate for IBBR's current stage of development. In subsequent reports, scheduled for the close of each fiscal year, we will provide additional quantitative measures as our accomplishments grow. I have tried to provide adequate information to convey a sense of the significant and growing collaborations among IBBR partners.

I would be happy to provide any additional information that you deem appropriate and welcome your comments.

Sincerely,

Donald L. Nuss
Founding Director

Cc: Wallace Loh, President, University of Maryland
Jay Perman, President, University of Maryland, Baltimore
Ann Wylie, Senior vice President and Provost, University of Maryland
Bruce Jarrell, Executive Vice Dean, University of Maryland School of Medicine
Willie May, Associate Director for Laboratory Programs, NIST.

Appendix A
Leveraging the Collective Research Strengths of UMCP, UMB, and NIST

	Partners	Comments
Creating Opportunities		
Hired Research Development Specialist (Debra Weinstein)		Key staff position to identify opportunities and catalyze multi-institutional efforts
Created IBBR Seed Grant Program to foster increased collaboration among partnering institution scientists	Provost and VP for Research (UMCP), Executive Vice Dean, SOM (UMB)	Proposals will be solicited in January, 2012 with anticipated initial awards in April
Created Partnership for Advanced and Complex Therapeutics (PACT) and hosted first workshop	School of Medicine (UMB), College of Computer, Mathematical and nCMNS (UMCP), Biochemical Sciences (NIST)	Workshop held December 1, 2012, 130 attendees
Launched Center for Biomolecular Therapeutics to accelerate small molecule drug discovery efforts	School of Medicine, UM Cancer Center (UMB), School of Public Health, College of Mathematical and Natural Sciences, College of Engineering (UMCP), College of Mathematical and Natural Sciences (UMBC)	CBT has already enrolled 41 investigators and created seven research groups-in Vivo Biology and Testing, Target Validation and Screening, Medicinal Chemistry, Protein Production and Biophysics, Structural Biology, Genomics and Bioinformatics, and Ccmputer Aided Drug Design
Recruiting Talent		
Medicinal Chemistry (Vincent Njar)	School of Medicine (UMB)	
in Vivo Biology and Testing (Danna Zimmer)	School of Medicine (UMB)	
Center for Biomolecular Therapeutics Technical Staff (Yan Zhang, Racquel Godoy, Kristen Varney)	School of Medicine (UMB)	
NMR (Robert Brinson)	Biochemical Sciences (NIST)	
Biochemistry (Prasad Reddy)	Biochemical Sciences (NIST)	
NMR Facilitiy Core Technical Staff (Amanda Altieri)	Biochemical Sciences Division (NIST)	
Biopharmaceutical Advancement Facility Core Technical Staff (John Kerwin, Jahmal Rich)	MTECH, Clark School of Engineering (UMCP)	
Adding Research Capabilities		
Opened Biomolecular Labeling Laboratory	Biochemical Sciences and National Center for Neutron Research (NIST)	Operational details will be provided in next report
Reconfigured IBBR Shady Grove Animal Core and Negotiated MOU for UMB Investigators working at IBBR Shady Grove	Division of Research (UMCP), School of Medicine (UMB)	
Acquisition of 900 Mhz NMR Instrument to enable state-of-the-art biomolecular measurements	Biochemical Sciences (NIST)	Instrument delivered 11/22/11-installation during next 2-3 months
Launched Illumina Next Generation Sequencing Core	College of Mathematical and Natural Sciences, College of Agriculture and Natural Resources, School of Public Health (UMCP)	Operational details will be provided in next report
Created Laboratory for Microscale Biofabrication	Clark School of Engineering (UMCP)	Laboratory will support development of bio-inspired devices created by researchers from IBBR and Engineering

Develop Integrated, Cross-Disciplinary Team Approaches to Scientific Challenges

	Partners	Comments
Creating Opportunities		see Leveraging
Recruiting Talent		see Leveraging
Adding Research Capabilities		see Leveraging
Develop New Infrastructure to Enable Scientific Collaboration		
Established Biopharmaceutical Advancement Facility, redeployed IBBR instrumentation to augment BAF capabilities	MTECH, Clark School of Engineering (UMCP)	Adds eukaryotic expression capabilities to IBBR
Established Biomolecular Labeling Laboratory, redeployed IBBR instrumentation to augment BL2 capabilities	Biochemical Sciences Division, National Center for Neutron Research (NIST)	National resource for producing isotopically labeled biomolecules
Completed Major Renovation to Accommodate 900 Mhz NMR Instrument	Biochemical Sciences Division (NIST)	Provides state-of-the-art NMR capabilities at IBBR Shady Grove
Prepared Laboratories for Center for Biomolecular Therapeutics, Redeployed IBBR instrumentation to augment CBT capabilities	School of Medicine (UMB)	Provides space at IBBR Shady Grove per MOU
Developed New IBBR Website		
Created the Partnership for the Advancement of Complex Therapeutics	IBBR/NIST/UMCP/UMB	12/1/11 workshop will launch partnership
Implement project assessment process to evaluate potential CBT projects	School of Medicine, Office of Research and Development (UMB)	Rating tool to assign priotity based on scientific merit, urgency, and commercial interest in project
Develop review process for proposals to utilize Biomolecular Labeling Laboratory	Biochemical Sciences Division, National Center for Neutron Research (NIST)	Assessment process that will be applied to applicants who wish to use the Biomolecular Labeling Laboratory
Collaborative Proposals		
NSF-Engineering Frontiers Research Initiative-Self-Contained Conformable Systems for Pathogen Detection Using Active Nanopaper (Ian White, Liangbing Hu, Zhihong Nie, Gregory Payne, William Bentley)	Clark School of Engineering, College of Computer, Mathematical and Natural Sciences (UMCP)	
DoD Defense University Research Instrumentation Program-Acquisition of Caliper Lumina XR in vivo Animal Imaging System (Daniel Nelson and 11 other investigators)	College of Agriculture and Natural Resources, Clark School of Engineering, College of Computer, Mathematical and Natural Sciences UMCP), School of Medicine (UMB)	
DARPA Living Foundries-Enlisting Electric Stimuli to Align Biology-(William Bentley and Gregory Payne)		
US-Israel BARD-Characterization of the moth sex peptide ligand and its regulatory role in mating behavior (David O'Brochta, Ada Rafaeli)	The Volcani Center, Israel	
NSF-Basic Research to Enable Agricultural Development-Functional Genomics of Coffee Bearer Borer (David O'Brochta, Pablo Machado)	Centro Nacionale De Investigaciones De Café, Colombia	
DOD-Multiparametric Analysis of Infection Signatures (Daniel Nelson, Shuwei Li, James Edwards)		
W.M. Keck Foundation-Developing a Protease Chain Reaction Technology (ProCR) that will Enable Ultra-Sensitive Molecular Detection (Philip Bryan, John Orban)		
Collaborative Grants Funded		
Office of Naval Research-Personalized Medicine Initiative (William Bentley, Mihai Pop, Debra Weinstein, Alan Shuldiner, Claire Fraser, Steven Liggett)	Clark School of Engineering, College of Computer, Mathematical and Natural Sciences (UMCP), School of Medicine (UMB)	
NIST-IBBR: A Joint Program in Bioscience Measurements	Analytical Chemistry, Biochemical Sciences, National Center for Neutron Research (NIST)	
NSF Nanomanufacturing-Nanofabrication Using Viral Biotemplates for MEMS Applications (James Culver, Reza Ghodssi)	Clark School of Engineering (UMCP)	

Develop Integrated, Cross-Disciplinary Team Approaches to Scientific Challenges

	Partners	Comments
SAIC-Preclinical Studies for the Development of a Compound for the Treatment of Giardia Disease (Osnat Herzberg)	NIH National Center for Chemical Genomics	
FDA-University of Maryland Center of Excellence in Regulatory Science and Innovation (William Bentley, James Polli)	Clark School of Engineering (UMCP, School of Pharmacy (UMB), FDA	
Raising IBBR's Profile as a System Research Center		
Funding Level		**will be reported annually for fiscal year in subsequent reports**
Conference/Invited Speakers		**will be reported annually for fiscal year in subsequent reports**
Special Recognition Awards		
Regent's Faculty Award for Scholarship and Collaboration (William Bentley and Gregory Payne)		
UMCP Office of Technology Licensing-2010 Inventor of the Year-Life Sciences, (Rasa Ghaffarian and Silvia Muro)		
Distinguished Teaching Assistant Recognition Award, UMCP Center for Teaching Excellence, (Harley King)		
Noteworthy Papers		
Controlled Release Society Outstanding Paper-Consumer and Diversified Products (Tridib Bhowmick)		
Faculty 1000 Designation for publication entitled "Affinity maturation of human CD4 by yeast surface display and crystal structure of a CD4–HLA-DR1 complex" (Roy Mariuzza)		

Serve the Expanding Bioeconomy of Maryland and the Nation

Provide Infrastructure to Support Maryland Biotechnology	Partners	Comments
Opened Biopharmaceutical Advancement Facility to provide cell culture process development services and training to Maryland's biotechnology companies	MTECH, Clark School of Engineering (UMCP)	Fox Chase Cancer Center (Phila) subcontract for clonal cell selection and scale up for collaboration with Russian Scientists under ARCA progam. Contract with UMB on hollow fiber cell culture reactor for large scale production of growth factor - Bioproduction (40L total) of recombinant proteins from E. coli (service contract) - Contract with MD company developing scale up protocols for purificaition of small proteins for cancer treatment - Training programs under development for large MD biotech company and with MD Biotechnology Center for state-wide workforce training initiative
Launched Center for Biomolecular Therapeutics to catalyze a USM network for small molecule drug discovery and development	School of Medicine (UMB)	Efforts underway to engage biotechnology commercial partnerships and to develop an industrial postdoctoral program
Initiated Partnership for Advancement of Complex Therapeutics to address issues related to the discovery and development of complex, protein-based therapeutics	UM, UMB, NIST	
Enable Industrial Collaborative Research		
Phase II SBIR-Improving Production of Attenuated Malaria Sporozoite Vaccines through Genetic Modification (David O'Broctha, Stephen Hoffman)	Sanaria	
Provide Laboratory to Enable Research Collaboration with Canon U.S. Life Sciences to Develop Automated System for Infectious Disease Diagnostics (William Bentley, Keith Herold, Ian White)	Fischell Department of Bioengineering (UM)	
Addition of a Shady Grove Location for the Bio-Process Scale Up Facilty	MTECH, Clark School of Engineering	Grant from Maryland Biotechnology Center to help equip Biopharmaceutical Advancement Facility
Conduct Technology Transfer		
UMCP Office of Technology Licensing-2010 Inventor of the Year-Life Sciences, (Rasa Ghaffarian and Silvia Muro)	Clark School of Engineering (UMCP)	
Additional Disclosures/Patents		will be reported annually for fiscal year in subsequent reports
Hired Licensing Specialist to support IBBR researchers	Office of Technology Commercialization (UMCP)	

Serve the Expanding Bioeconomy of Maryland and the Nation

Develop IBBR Educational Initiatives and Improve Ties to Partner Academic Programs	Partners	Comments
UMCP IBBR faculty engage with academic home departments and begin teaching assignments	College of Agriculture and Natural Resources, College of Computer, Mathematical and Natural Sciences, Clark School of Engineering (UMCP)	
Summer research experience for high school teacher	School of Medicine (UMB), Towson University, Montgomery County Public Schools	Supported by Towson NSF BEST grant
High School Research Internship Program with DNA Resource Center	Montgomery County Public Schools	Provides summer and academic year internships on a competitive basis
Graduate Student Journal Club		Began weekly journal club at IBBR Shady Grove tied to ongoing external seminar program
Biological Sciences Undergraduate Internship Program	Universities at Shady Grove, College of Mathematical and Natural Sciences (UMCP)	Provides research experience for USG undergraduates enrolled in the Biological Sciences Program
Establish IBBR Shady Grove as a Hub for the Bioscience Community		
Host Departmental Retreat	Department of Cell Biology and Molecular Genetics (UMCP)	
NIST Meetings	Biochemical Sciences Division (NIST)	
Host MTECH Training and Workshops	MTECH, Clark School of Engineering (UMCP)	
Host IBBR External Seminar Program		

Appendix B

IBBR Personnel by Category

Category	On 7/1/10	On 12/31/11	Change
Tenured or Tenure Track Faculty/NIST Principal Scientists	24	26	2
Research Scientists, Research Assistant Professors, Postdoctoral, and Visiting	46	76	30
Technical Staff	51	52	1
Support Staff	25	29	4
Graduate Students	22	37	15
Undergraduate Students and High School Students	18	25	7
Other	8	8	0
Total	**194**	**253**	**59**

Institutional Affiliation of Personnel-12-31-11

Category	UMCP	UMB	NIST	Other	Total
Tenured or Tenure Track Faculty/NIST Principal Scientists	20	2	4		**26**
Research Scientists, Research Assistant Professors, Postdoctoral, and Visiting	46	7	17	6	**76**
Technical Staff	35	3	12	2	**52**
Support Staff	28		1		**29**
Graduate Students	37				**37**
Undergraduate Students and High School Students	24			1	**25**
Other				8	**8**
Total	**190**	**12**	**34**	**17**	**253**

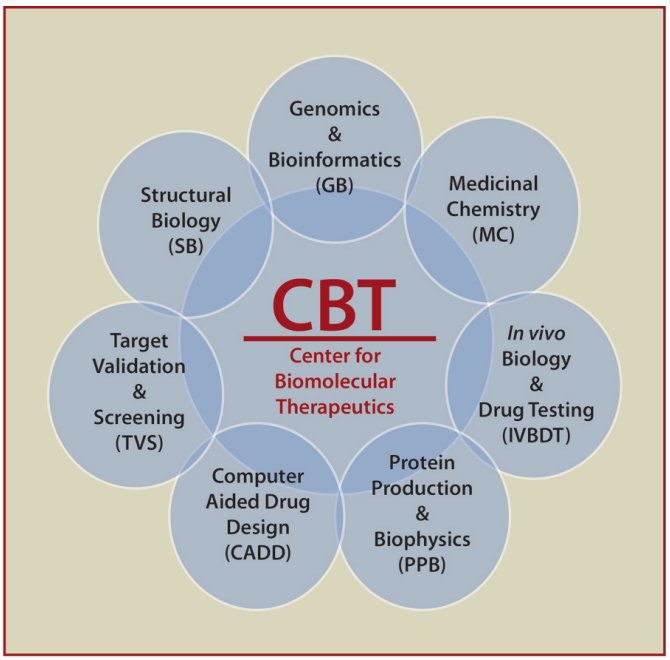
APPENDIX C

The Center for Biomolecular Therapeutics (CBT) – "The First 6 Months"

Vision: As part of the creation of IBBR, the Board of Regents expected UMCP and UMB to develop a program at IBBR that stimulates economic development of Maryland's biotechnology industry. Responsive to this vision, the emerging collaborative Center for Biomolecular Therapeutics (CBT) at IBBR will take important scientific observations, and from them, develop commercial diagnostic and therapeutic products that benefit human health. CBT will (a) consider important biological molecules, pathways and processes that USM faculty members and others have discovered, (b) determine which of these to aggressively target with chemical or biological molecules that faculty can develop and produce, and then (c) perform and organize the work necessary to translate these molecules into intellectual property and commercial products for valuable use as diagnostics (for humans and other species) and human therapeutics (i.e. drugs, biologics).

Keys to CBT's Success:

1. Promote a top-quality entrepreneurial scientific environment and contribute to the development of diagnostics and therapeutics at IBBR with sufficient seed funding, equipment and facilities.
2. Collaborate with research and clinical faculty across all USM campuses to identify important biological targets.
3. Develop a parallel educational process to raise the level of expertise across USM concerning the discovery-to-commercialization "pipeline", including regulatory and business expertise, and creation of an active visiting faculty scientist and postdoctoral fellow program.
4. Interact with the biotechnology and pharmaceutical industries to help maintain CBT's focus on the most biomedically and commercially important targets, diagnostics, and therapeutics.



Cutting Edge Science: CBT will continue to develop and perform state-of-the-art science in protein production & characterization (PPB), structural biology (SB), target validation & screening (TVS), computer-aided drug design (CADD), medicinal chemistry (MC), genomics & bioinformatics (GB), and *in vivo* biology & drug testing (IVBDT; **Fig. 1**). Many of these activities are performed at the IBBR, but others are at locations inside or outside USM where the expertise already exists (e.g. genomics and bioinformatics, manufacturing capabilities (GMP), and efficacy and toxicology testing). CBT also engages federal partners important for moving discoveries to commercial use, including the NIH, NIST, and the FDA.

Fig. 1. Diagram illustrating groups in the Center for Biomolecular Therapeutics (CBT).

Organizational Leadership: The CBT Director, David J. Weber, serves as Associate Director of the IBBR and works closely with the IBBR Director, Donald Nuss, to provide a high quality entrepreneurial and scientific environment. The CBT Director provides leadership for UMB scientists assigned geographically to IBBR, while working collaboratively with the IBBR Director to identify and engage scientific expertise in critical "just-in-time" pipeline processes involving biomolecular therapeutics. A Collaboration Committee (CC) was formed (Chair: Richard Eckert) consisting of leaders in the Schools of Medicine and Pharmacy to assist the Director in accessing resources on the UMB campus as well as University of Maryland Medical System (UMMS). A Business and Academic Advisory Committee (BAAC) is also being coordinated with James Hughes (UMB, Office of Research & Development; ORD), and will have members with expertise in biomedical research, legal, and regulatory communities, including the Biotech and Pharmaceutical industry, NIH, NIST, FDA, and other universities. This committee will provide advice regarding the commercial potential of specific targets, diagnostics and therapeutics. In 2012, the CBT will convene an Institutional Scientific Advisory Committee composed of faculty from IBBR, UMB, UMCP and USM institutions, to ensure the continuing development of relationships across USM and to provide advice to the CBT Director regarding the potential for development of specific targets, diagnostics, and therapeutics from laboratories within USM.

Personnel in the Center for Biomolecular Therapeutics (CBT)

Personnel	***Office & Laboratory Location(s)***
Director: Dr. David J. Weber, PhD	Rockville & Baltimore
Groups	
Genomics & Bioinformatics (GB)	
Group leader: Scott Devine, PhD	Baltimore
Post Doctoral Fellow (recruiting)	Rockville
Computer Aided Drug Design (CADD)	
Group leader: Alex MacKerell, PhD	Baltimore
Post Doctoral Fellow or Academic Scientist (recruiting)[1]	Rockville
Protein Production & Biophysics (PPB)	
Interim Group leader: David J. Weber	Rockville & Baltimore
Post Doctoral Fellow (recruiting with Paragon Inc.)	Rockville
Structural Biology (SB)	
Co-Group leader: Kristen Varney, PhD (NMR)	Baltimore
Co-Group leader: Eric Toth, PhD (X-ray)	Baltimore
Post Doctoral Fellow: Raquel Gadoy, PhD	Rockville
Target Validation & Screening (TVS)	
Group leader: Paul Wilder, PhD	Baltimore & Rockville
Academic Scientist: Deborah Green, PhD	Baltimore
Post Doctoral Fellow (recruiting with GlaxoSmithKline)	Rockville
Medicinal Chemistry (MC)	
Group leader: Vincent Njar, PhD	Rockville & Baltimore
Academic Scientist: Purushottamachar Puranick, PhD	Rockville
Academic Scientist: Abhijit Gadpole, PhD	Rockville
Post Doctoral Fellow: Lalji K. Gediya, PhD	Baltimore
Technician: Marlena S. Martin, BS	Baltimore
In vivo Biology and Drug Testing (IVBDT)	
Group leader: Danna Zimmer, PhD	Rockville
Academic Scientist: Yan Zhang, PhD	Rockville
Technician: Chau Nguyen ("Jo")	Rockville
Internship Personnel	
1. Cary Campbell (7/2011-present; McDaniel College)	Rockville - IVBDT
2. Theresa Price (1/2012-present; USG)	Rockville - IVBDT
3. Shelly Malik (6/2011 – 8/2011; NSF STEM program)	Rockville - IVBDT

[1]An Academic Scientist is a permanent position within the Center for Biomolecular NMR for a person who contributes 100% effort towards bench science.

Table. 1. Table illustrating the personnel in the Center for Biomolecular Therapeutics (CBT).

CBT Groups and personnel: Four of the seven CBT groups in Figure 1 were established in the first 6 months including: (1) *In vivo* biology and drug testing (IVBDT; Group Leader: Dr. Danna Zimmer, recruited from Texas A&M); (2) Medicinal chemistry (MC; Group leader: Dr. Vincent Njar, Recruited from Thomas Jefferson University); (3) structural biology (SB; Co-leaders: Dr. Kristen Varney, NMR; and Dr. Eric Toth, X-ray crystallography); (4) Target validation and screening (TVS; Group leader: Dr. Paul Wilder). Academic Scientist hired within these groups include Dr. Zhang, Ms. Chau Nguyen (IVBDT), Drs. Puranik, Martin, Gediya, Godbole (MC), Dr. Gadoy (SB), and Dr. Deborah Green (TVS). The three remaining groups in the CBT include: (5) protein production and biophysics (PPB), (6) genomics and bioinformatics (GB), and (7) computer aided drug design (CADD), which will be the focus of new recruiting efforts in the next 6 months (**Figs. 1**). In this regard, the CBT is partnering with the School of Pharmacy (SOP) to initiate a CADD program in Rockville. This will be achieved by hiring an Academic Scientist

who will be located in Rockville, but who will be a member of an internationally recognized CADD group in the SOP. In a similar model, the genomics & bioinformatics group (GB) will be established as a partnership between the CBT and the Institute for Genomic Science (IGS); whereby, a CBT Scientist will be hired and located in Rockville, but who will also work directly with the IGS in Baltimore. An industrial postdoctoral fellows program was initiated and two searches are underway for positions in the PPB group in partnership with Paragon Sciences (Dr. Marco Chacon at Paragon) and for the TVS group in partnership with GlaxoSmithKline (Dr. Kurt Bachman at GSK). In FY012, the CBT will support four postdoctoral fellows (GB, CADD, TVS, SB), six academic scientists, the MC group leader (Dr. Njar), the co-leaders of the SB group (Drs. Toth & Varney), and the Director, David Weber (Total=14; **Table 1**).

Partnerships and joint ventures: In addition to partnering with the Institute of Genome Sciences (IGS) and the School of Pharmacy (SOP) with the Genomics and Bioinformatics (GB) and Computer Aided Drug Design (CADD) groups, the CBT has several other important partnerships and joint ventures. These include:

1. *Expand the CBT chemical library:* Efforts to expand the number of compounds in the CBT chemical library are in place. The larger libraries will include small molecules and natural products newly prepared and/or isolated by chemists throughout the USM. To advance collaborative drug development projects in the future, this effort is also organized to introduce the chemists (from the NIH, UMB, UMCP, UMBC, Towson University) who prepared/isolated these compounds to the PI's testing them in screens within the CBT.

2. *CBT & Complex Therapeutics (IBBR)*: A key component of this partnership is a seed grant program to support collaborative projects involving the IBBR, The National Institutes of Standards and Technology (NIST), UMB, and/or other UM collaborators. This program will support work involving the development and testing of complex therapeutics with expectations that it will generate (i) scientific advances and (ii) external support (e.g. NIH, FDA, DOD).

3. *The CBT Industrial Post Doctoral Program*: In addition to academic postdoctoral fellowships, we have initiated a "CBT industrial Post Doctoral Fellowship" program. This was done in coordination with the Graduate Program in Life Sciences (GPILS; Tom McHugh, Dudley Strickland) and offices within the School of Medicine (Wendy Sanders, Derek Haseltine, and Nancy Lowitt (SOM). Recruiting is now underway to hire three new CBT fellows in 2012 who will be co-advised by personnel within the CBT and industrial partners including Paragon Inc. (in the PPB group), GlaxoSmithKline (GSK; in the TVS group), MERCK, Pfizer, and/or others.

4. *The CBT visiting faculty, fellows, and/or students program*: The CBT is now prepared to receive faculty for mini-sabbaticals and/or students or postdoctoral fellows from throughout the USM to do research at the CBT. The program will allow such personnel to quickly obtain the skills necessary to develop and/or progress their biomedical therapeutics projects in collaboration with the CBT. Such a program will also allow for the transfer of such technologies/expertise back to the home institution. This program

will be done in parallel with a similar intiative ongoing within the IBBR. For students, the CBT will also work with the home institution to provide the student with academic credit as a formal *Student Internship*. Such an internship has already been put in place with the Universities at Shady Grove (USG) with our first USG intern, Beth Parent, selected from several competitive applications (she is starting in 01/2012). Similarly, an Internship program with McDaniel College is under discussion. It is anticipated that a student, Cary Campbell, who has worked at the CBT since its inception, will receive the first McDaniel College/CBT Internship. Lastly, the CBT sponsored research efforts of a High School teacher, Shelly Malik (Seneca Valley High School), as part of an NSF-sponsored STEM grant program awarded to Towson University. The CBT will take a second teacher in the summer of 2012 as part of this same NSF-sponsored program.

5. *Multi-Investigator Grants*: An important component of the CBT is to promote and participate in multi-investigator projects. Two PIs in the CBT hold such multi-PI NIH grants (Weber, Njar), and two new applications were submitted in the past 6 months (Devine *et al*.; Bentley *et al*.). The Devine grant (under review) involves studies of head/neck cancer in a collaboration between the Institute for Genomes Sciences, The Greenebaum Cancer Center (GCC), the CBT, and the University of Pittsburg Cancer Center. The CBT also participated with Dr. William Bentley (IBBR) and Donald Nuss (IBBR) with their efforts to partner with the FDA to receive a Center for Excellence in Regulatory Science and Innovation Award (CERSI). A third effort is to submit a P01 application this Spring (PI: Angela Brodie) in a collaboration between the GCC and the SB, IVBDT, TVS, and the MC groups of the CBT. Several other multi-PI R01 applications were also submitted (Weber, Zimmer, Njar) to the NIH. The submission of several multi-PI grants is one of the highest priorities of the CBT in the coming year.

6. *Clinical Trials*: A phase II clinical trial is underway studying the ability of an S100B inhibitor to treat malignant melanoma. This was funded by an NIH grant (PI: Sausville; Co-I: Weber) and is ongoing in the University of Maryland Medical System (UMMS). More recently, a separate clinical trial was recently funded by the AKC Canine Health foundation to test this same compound in dogs in collaboration with Texas A&M University School of Vetinary Medicine (PI: Zimmer). A third clinical trial (Phase II) is also underway for a drug synthesized by Vincent Njar (**VN/124-1**), which was liscensed to Tokai Pharmaceutical Inc. Cambridge; MA. This drug is a novel CYP17 inhibitor/androgen receptor modulator (**VN/124-1** now named **TOK-001**), and the phase II trial was funded this past fall with $20M venture.

Project Management: In addition to developing new methods and doing basic research, members of the seven groups have a set of "scientific deliverables" in place. These deliverables are established state-of-the-art scientific methods and/or experiments that can be included in the plans/goals for ongoing and planned projects within the CBT. Over 100 such deliverables are now established in the CBT and coded within our project management system (see below). In addition to projects of CBT personnel, the CBT supports over 20 funded projects from more than 35 other faculty members throughout the University System of Maryland including UMB, UMBC, Towson University, and UMCP (**Table 2**). The projects are classified based on the therapeutic target under study and are evaluated using a system that considers (1) the potential impact a project may have on scientific knowledge (Project score; PS) and (2) for its ability to generate interest in the private sector (Industry score; IS). The priority for completing specific experiments within a project is set by a third score, an urgency score (US), and considers the potential impact that an experiment may have for generating new grants and/or intellectual

property (IP) within a specific project. Importantly, a team science approach is in place, so that experiments for any given project can be planned, executed, and evaluated by multiple CBT groups simultaneously using a project & data management system. The project management system is near completion, and it will be fully operational in 2012.

Intellectual property (IP) development: A major goal of the CBT is to generate intellectual property that can be further developed into a biomolecular therapeutic and/or liscensed to industry. In this regard, IP development is proceeding for five projects within the CBT including:

PROJECTS IN THE CENTER FOR BIOMOLECULAR THERAPEUTICS

Target Class	Funded Projects[1]	Total Projects
1. Calcium Signaling Proteins (CAS)	3	8
2. Radiation Sensitizers & Protectors (RAD)	1	2
3. Metabolism (MET)	1	2
4. Receptors (REC)	1	2
5. Enzymes (ENZ)	4	7
6. Nucleic Acids & binding proteins (NUC)	3	5
7. Protein-Protein Interactions (PPI)	4	6
8. Metastatic factors in cancer (MTF)	0	2
9. Coagulation & Thrombosis (COAG)	0	1
10. Respiratory & Asthma factors (AST)	0	1
11. Toxins, viral, and bacterial targets (TOX)	4	6
12. Diagnostics (DIA)	0	0
13. Complex Therapeutics (CXT)	0	0
14. Equipment & methods development (EQM)	2	4
Totals	**23**	**48**

[1]Funded by either federal agencies (NIH, NSF, DOD) or by other private foundations and/or industry.

Table. 2. Table illustrating ongoing projects in the Center for Biomolecular Therapeutics (CBT).

1. *Development of a melanoma and/or astrocytoma drug for humans* (1 issued patent; 10 liscensing and active provisional patents; Project manager – David Weber).

2. *Development of a melanoma and/or astrocytoma drug for canines* (1 issued patent; 10 liscensing and active provisional patents; Project manager – Danna Zimmer).

3. Development of a prostate cancer drug for humans (10 issued patents; 41 liscensing and active provisional patents; Project Manager – Vincent Njar).

4. Development of a drug to improve cognition in patients with schizophrenia (3 provisional patents; Project Manager – Eric Toth/Kristen Varney).

5. Isogenic cells for two major tumor suppressors (+/- p53) and (+/- PTEN) (2 liscensing deals; Project Manager – Paul Wilder).

Institute of Marine and Environmental Technology

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6th February, 2012

Dear Chancellor Kirwan,

I am pleased to enclose for your review a draft IMET accountability report for the period from 1st July 2010 to 31st January 2012. This report addresses the Accountability Measures in Section XIIB of the IMET MOU and highlights the accomplishments of our Institute since its creation.

The report comprises sections on:

- maximizing collaborative, translational research
- achieving IMET Program objectives
- supporting Maryland's economic development with effective technology transfer, commercialization and business development
- and raising IMET's profile.

The notable achievements at IMET during this period include:

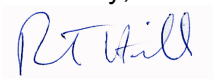
- 46 proposals awarded totaling more than $9.5-this augurs well for the future financial sustainability of IMET.
- IMET faculty members submit 99 proposals with more than 30 partner institutions.
- Several major collaborative, translational proposals funded.
- Searches underway for IMET Director and Assistant Professor positions.
- 29 patent applications in process and 3 patents issued.
- Media coverage featuring IMET faculty and collaborators, including by the BBC, Wall Street Journal, Baltimore Sun, and MSNBC.
- Signing of a MOU with the Korean Oceanographic Research and Development Institute.

I consider key long-term goals for IMET to include:

- diversifying the funding base to maintain and grow the financial resources of IMET.
- growth of our faculty with outstanding recruits that are ideal fits with programmatic goals to make the most of the opportunities provided by Presidents Boesch, Hrabowski and Perman to hire new faculty.

It has been an exciting and productive period for IMET and I'm pleased to report that the IMET faculty members are working together with considerable energy to make our Institute a great success and a credit to the three partner Institutions. The IMET faculty and partner institutions have contributed to this report. We have established a solid foundation on which to build IMET into the internationally preeminent center for marine and environmental technology envisioned by you, the Presidents and the Board of Regents.

Sincerely,



Russell T. Hill
Professor and Interim Director

cc: Donald F. Boesch, President, University of Maryland Center for Environmental Science
Freeman A. Hrabowski III, President, University of Maryland Baltimore County
Jay A. Perman, President, University of Maryland, the Founding Campus
Bruce E. Jarrell, Senior Vice President, University of Maryland, the Founding Campus
Philip J. Rous, Interim Provost, University of Maryland Baltimore County

IMET Progress July 2010 to January 2012

Maximizing collaborative, translational research	Partners	Comments
IMET faculty members submit 99 proposals with more than 30 partner institutions. 57 proposal submitted since July, 2011.	Include Johns Hopkins, UMES, Hampton University, Smithsonian, UC Berkeley, Tel Aviv University	
46 proposals awarded for total of more than $9.5 million.		
Notable collaborative, translational proposals funded	IMET/UMCES UMBC IMET/UMBC Sediment Solutions LLC Medical University of South Carolina IMET/UMBC, Mote Marine Laboratory IMET/UMB-UC Berkeley	Place (IMET) and Ghosh (UMBC) NIEHS grant: Combining bioavailability assays with modeling to predict PCBs in fish after remediation. Sowers (IMET), Ghosh (Sediment Solutions) and May (MUSC) DOD-ESTCP grant: Evaluating the efficacy of bioaugmentation for *in-situ* treatment of PCB impacted sediments. Zohar (IMET): Developing sustainable year-round captive spawning technologies for a new aquaculture species, *Seriola dumerili*. Focus on developing industry-ready technologies. Robb (IMET): Bioprospecting for high-temperature conversion of lignocellulose. Subaward through UC Berkeley Energy Biosciences Institute from BP $500 million award.
Major Program Grant submitted: NIH PO1 for Oceans and Human Health	UMB, UMBC, UMCES	Excellent example of IMET-led initiative triggered by new alignment and partner institutions. G. Vasta (IMET)(PI): Emerging public health risks in the Chesapeake Bay: Development of evidence-based predictive models for the interplay of anthropogenic pollutants, harmful algal blooms and climate change.

IMET Progress July 2010 to January 2012

Achieving IMET Program objectives	Partners	Comments
IMET focus areas developed in consultative process	UMB, UMBC, UMCES	IMET faculty, Program Committee and Governing Council refine IMET focus areas (Appendix 1)
New Initiatives: Marine Bioenergy	UMB, UMBC, UMCES	IMET faculty work collaboratively on marine microalgae and biofuels, MIPS funding, pilot plant at Back River Sewage Treatment Facility in collaboration with Hy-Tek Bio and City of Baltimore.
New Initiatives: Environmental Toxicology and Bioremediation	UMB, UMBC, UMCES	New funding for bioremediation-related projects (Sowers) Major new grant initiative (Vasta)
New Initiatives: Sustainable urban ports and ecosystems	UMCES	EPA proposal on "Source tracking in Baltimore City to reduce nutrient and bacterial contamination" (Schott)
Recruiting new Faculty: Director Recruiting new Faculty: Assistant Professor	UMB, UMBC, UMCES UMB, UMBC, UMCES	Search underway to recruit Permanent Director with outstanding research credentials, in an area suitable to lead the institute. Search underway for Assistant Professor in phototrophic molecular microbiology (Bioenergy, Sustainable ports and ecosystems).
New Research Capabilities	UMBC, GE Healthcare UMB, UMBC, UMCES, Maryland Sea Grant	Biacore T200 ($350,000) on site, available to IMET researchers through collaboration with GE Health-care, supports developmental biology, bio-medicine and molecular and cellular systems programs. Flow cytometer and cell sorter provide new capabilities to all IMET scientists.
Maritime Environmental Resource Center (MERC) personnel located at Columbus Center	IMET MERC UMCES	Aim to stimulate interactions between MERC and IMET faculty on sustainable urban ports issues
Shared Services Center (SSC) and IMET administrators co-located	SSC UMB UMBC UMCES	Administrative offices moved to new location to foster close interaction between all IMET administrators.
MOU waiving indirect between IMET partners	UMB, UMBC, UMCES	No indirect costs are charged on sub-contracts between IMET partner institutions.

IMET Progress July 2010 to January 2012

Supporting Maryland's economic development with effective technology transfer, commercialization and business development	Partners	Comments
Agreement on IP between UMCES and UMBC	UMCES UMBC Office of Tech. Development (OTD)	UMBC OTD contracted to deal with IMET-UMCES faculty IP
29 patent applications in process 14 applications filed since 07/01/2010	UM Office of Research and Development (ORD) UMBC OTD	IMET faculty members have 29 patent applications in process, including those transferred on transition.
3 patents issued since 07/01/2010: Dissimilatory Sulfate Reduction as a Process to Promote Denitrification in Marine Recirculating Aquaculture Systems Biosynthetic Pathway and Genes Requires for Tropodithietic Acid Biosynthesis in *Silicibacter* TM1040 Thermostabilization of DNA Polymerase by Protein Folding Pathway from a Hyperthermophile Archaeon		 Inventors: H. Schreier and Y. Tal Australia: 2005210477 Inventors: R. Belas, H. Geng, R. Powell US: 8,058,417 Inventor: F. Robb Canada: 2,662,024
2 of 24 presentations selected from all UMB and Johns Hopkins were by IMET faculty.	Joint Meeting of the Johns Hopkins Alliance for Science and Tech. Development and the UMB Commercial Advisory Board	Robb: *Chaperones from Extremophiles: Industrial Applications* Pancer: *High Affinity Recombinant Sea Lamprey Antibodies*

IMET Progress July 2010 to January 2012

Supporting Maryland's economic development with effective technology transfer, commercialization and business development (contd.)	Partners	Comments
Funding from industry and related grants	Fidelity Systems/National Institute of General Medical Science STTR MD TEDCO New Horizons Diagnostics/National Cancer Institute Hy-Tek Bio Maryland Industrial Partnerships (MIPS) Hy-Tek Bio Maryland Industrial Partnerships (MIPS)	Robb: New chaperones for folding and assembly of proteins Du: Reprogramming of satellite cells and human mesenchymal stem cells for muscle repair Ahmed: Early detection of prostate cancer in urine Chen and Hill: Selection of algal strains for CO2 sequestration and biofuel production in a novel closed photobioreactor system Chen and Hill: Optimizing the performance of selected microalgae in the HY-TEK Bio CO2 scrubber pilot system (Phase II project)
Commercialization of sustainable recirculating aquaculture	To be announced	Zohar involved in active discussions with industrial partners for large-scale aquaculture system in Maryland.

IMET Progress July 2010 to January 2012

Raising IMET's profile	Partners	Comments
Noteworthy Papers	Emory, Harvard, Rush University UC Berkeley	"A Voltage-Gated Proton Channel in a Dinoflagellate". PNAS, (A. Place). Extensive press coverage. "Identification and characterization of a multidomain hyperthermophilic cellulose from an archaeal enrichment". (F. Robb). Nature Communications.
Public outreach and communication	UMB, UMBC, UMCES	Extensive press coverage of IMET faculty work e.g. BBC (DasSarma on life on Mars), Wall Street Journal (Place, turning fish into vegetarians), Baltimore Sun front page picture (Schott, a new crab virus), MSNBC (Robb, novel hyperstable cellulases).
International visitors and MOUs	UM Maryland China Initiative SOA KORDI	Hosted visit by Vice-president, Directors and Deans delegation of 20 from South China Agricultural University. Hosted visit by 24 top administrators and scientists from China's State Oceanographic Institution (SOA), equivalent to NOAA. Signed MOU with the Korea Oceanographic Research and Development Institute (KORDI) to enhance collaboration in marine biotechnology and biodiversity compound research and technological development in oceanography.
Planning of USM Symposium on Chesapeake Bay, Human Health and Ecotoxicology	UMB, UMBC, UMCES, UMES, UM, MSU	Initiates new strategic alliances for future research collaboration. Planned for Spring 2012.
IMET website launched	UMB, UMBC, UMCES	Single IMET website with url www.imet.usmd.edu, Linked to websites of IMET faculty at partner institutions.