



DISCOVER • INVENT • COLLABORATE • PARTNER

IOHNS HOPKINS Technology

Transfer

Windows of innovation

ARIS MELISSARATOS Senior Advisor to the President Johns Hopkins Enterprise Development

> WESLEY D. BLAKESLEE Executive Director

GLEN L. STEINBACH Senior Director, Finance and Administration

KEITH BAKER Senior Director, Technology Licensing

> JILL UHL Director, Intellectual Property

JOHN FINI Director, Intellectual Property and Technology Commercialization, Homewood

> HEATHER A. BAKALYAR Portfolio Director

> > EUGENE YELDEN Portfolio Director

PETER BALL Director, Contracts

HELEN MONTAG Senior Director, Corporate Development Johns Hopkins School of Medicine

> ELIZABETH GOOD MAZHARI Director, Ventures

MONTSERRAT CAPDEVILA

Director, Sales, Marketing, and International Relations



TABLE OF CONTENTS

- **1** A Message From Aris Melissaratos
- 2 A Message From Wesley Blakeslee
- 3 Mission, Vision, and Goals
- 4 A Year in Review

JHTT Features FY 2012 At-A-Glance Startups Technology Transfer In the News Material Transfer Agreements Invention Disclosures Product Pipeline

5 Appendix

Financials JHTT Personnel

A MESSAGE FROM ARIS MELISSARATOS

2 10/81



Aris Melissaratos Senior Advisor to the President Johns Hopkins Enterprise Development

he operating results for the Johns Hopkins Technology Transfer Office (JHTT) have continued a rapid improvement path from our benchmark year of FY 2007. Every parameter has substantially improved, including more than doubling our revenue line, tripling the number of startups, and doubling the number of invention disclosures and patents.

With our current system, we believe that we have optimized the efficiencies of the office and the ability of our licensing team to appropriately maximize the revenue from our inventions. To get to the next plateau, however, we need to think radically different than we have in the past and put major top-down strategic emphasis on Translational Research. We need to be more aware of the 'customer pull' approach to managing our research function rather than the current 'technology push' approach. To maximize the benefits from the market pull approach, we need to better understand the drug pipelines of the major pharmaceutical and biotech companies. We also need to strive to fill the gaps in small biotech companies' pipelines by identifying technologies that fill a larger gap within the pharmaceutical pipeline and maximize the benefit of new drug development. To that end, the institution has made dramatic progress in adding drug development capability. In fact, Johns Hopkins is leading a consortium of institutions in a drug discovery program.

All of these longer term changes impact a change in our research strategy and drive us to consider longer term/larger scope corporate partnerships to maximize the benefit of research dollars expended and translation to the marketplace. We believe we understand all these factors and we look forward to working with new leadership, within both Johns Hopkins University and Johns Hopkins Medicine, to effect these changes so that we can substantially improve not only the revenue picture as a result of our research activity but accelerate the positioning of Johns Hopkins developed drugs, diagnostics, and devices in the effort to improve global health and reduce the cost of healthcare.

A MESSAGE FROM WESLEY BLAKESLEE

e are very pleased to report that we had another recordbreaking year at JHTT. Last year we achieved a record of \$15.2 million dollars in gross licensing revenues, due in part to a very large sublicensing fee. This year our licensing revenue hit nearly \$16 million dollars, with no single monumental event.

The number of invention disclosures submitted to our office has increased with each year. In FY 2012, 427 inventions were disclosed to our office, the largest ever recorded by Johns Hopkins Technology Transfer. Those disclosures are up from 244 just 6 years ago. This significant increase in invention disclosures has naturally led to a significant increase in patent expenses. We have for the past several years been actively managing patent costs because of the increase in disclosures and the increasing pressure from rising patent costs. We reduced the number of outside law firms, and aggressively negotiated a discounted fee structure. We also implemented an in-house patent attorney group 2 years ago to further decrease our patent expenses. That group has grown from one attorney to three.

However, despite all of our efforts, patent costs continued to rise faster than we wished. To address this growing concern, we completely reorganized our office in FY 2012. We believe this restructuring of our resources and staff will allow us to better approach the business of managing and licensing our intellectual property.

AMERICA INVENTS ACT

With the implementation of the America Invents Act, particularly the change to a 'first inventor to file' system, we had to change our patent filing practices. Filing costs will significantly increase as the simple and inexpensive provisional application is replaced by a much more substantial



Wesley D. Blakeslee Executive Director Johns Hopkins Technology Transfer

Message From Wesley Blakeslee

and costly filing system. JHTT will likely pursue and file far fewer cases, providing much earlier 'go-no-go' decisions.

INTELLECTUAL PROPERTY MANAGEMENT GROUP

To manage this new change, we created the Intellectual Property Management (IPM) Group. We hired Jill Uhl to manage the group, an experienced patent attorney and university technology transfer manager. We designated two individuals from our licensing group and one from our patent attorney group and hired two new individuals to create the new IPM Group. In addition, we reassigned our internal patent attorney group to the IPM Group so that we could have one seamless operation for managing patents. We believe that this has improved our ability to manage patent costs while minimizing the impact on the number and quality of inventions we invest in.

REVENUE

Thus far, this restructuring—which is still a work in progress—has produced very good results. Through the end of January our total revenue was \$6.2 million, our net patent expenses were \$2.4 million, and our net income was only \$45,000. At the end of the year, 5 months later, total revenues were \$15.9 million, net patent expenses were only \$3.09 million— lower than last year's—and our net revenue was a new JHTT record of \$6.5 million.

While we are very pleased with the top and bottom line revenue numbers achieved this year, we recognize and understand that these numbers remain constrained by the lack of substantial royalty income from products in the marketplace and that we remain a cost center for the schools. We are continuing to expand our pipeline of products in development, and are ever expanding our opportunities for a



Executive Director Wesley Blakeslee discusses Johns Hopkins Technology Transfer's mission and how the office connects industry to world-renowned scientists and researchers in a threepart interview series.

To watch the series, visit our YouTube Channel, http://www.youtube.com/user/JHUTechTransfer

WINDOWS OF INNOVATION

substantial royalty stream in the future.

For more on our revenue, visit the Appendix located at the end of this report.

STARTUPS

FY 2012 saw a decrease in the number of startups created with Johns Hopkins technologies (from 19 in FY 2011 to 8 in FY 2012). We are not concerned with this number. As a result of the continued funding issues resulting from the current economic climate, our goal was to focus more on achieving quality, well-funded startups and to not encourage the creation of a startup where there was little to no possibility of funding or obtaining an experienced management team. We would rather have fewer startups that are clearly fundable and valuable, than more startups without funding. This year, many of our startups have achieved significant funding, development milestones, and/or reached development agreements with major companies, and are making great progress in developing our technologies.

For more information about our FY 2012 startups, visit our Startup section in this report.

CONCLUSION

Looking forward, we are very enthusiastic about FY 2013. Despite the potential difficulties on the horizon, we believe we will continue to improve performance in the coming fiscal year. While we can't predict that FY 2013 will see such a rapid trajectory of growth, we do believe that the changes we made to our operations will produce substantial long-term gains for the University.

MISSION, VISION, AND GOALS

MISSION

Johns Hopkins Technology Transfer's mission is to 1) protect the intellectual property of Johns Hopkins faculty and to commercialize these inventions for the public good and 2) to bring the benefits of discovery to the world.

VISION

To be the premier intellectual property administration center for Johns Hopkins University (University, JHU) and its entities by:

- 1. Helping Johns Hopkins inventors fulfill their intellectual and commercial potential.
- 2. Protecting Johns Hopkins inventions through the filing of patent applications and the licensing of technologies for commercialization.
- 3. Developing partnerships between Johns Hopkins inventors and external parties interested in leveraging Johns Hopkins research or materials for academic or corporate endeavors.
- 4. Providing and coordinating licensing agreements, startups, core facilities, sponsored research, material transfer agreements, research collaborations, and clinical trial opportunities to those best able to bring Johns Hopkins technologies to market.
- 5. Promoting the availability of essential medicines for the world.

GOALS

- To strengthen partnerships with large pharmaceutical companies, entrepreneurs, venture capitalists, and academic and corporate entities that can partner with us to bring Johns Hopkins technologies to the marketplace for the public good.
- 2. To ensure the integrity of, and a respect for, the science and inventions that are produced at Johns Hopkins.
- 3. To identify the most efficient and effective ways to disseminate Johns Hopkins technologies to the public.



JHTT FEATURES

LICENSING DEALS

ImmunoCellular Therapeutics Licenses Mesothelin Cancer Antigen

ImmunoCellular Therapeutics, Ltd. licensed from Johns Hopkins University a tumor-associated antigen mesothelin, which is highly expressed in pancreatic cancer, ovarian cancer, and mesothelioma. ImmunoCellular Therapeutics plans to develop and commercialize ICT-140, a multivalent, dendritic cellbased vaccine for the treatment of ovarian cancer, one of multiple tumor types in which mesothelin is over-expressed. ICT-140 is designed to target cancer stem cells as well as daughter cells in ovarian cancer by targeting multiple different antigens including mesothelin, Her-2/neu, IL-13R α 2 and several other undisclosed antigens.

ImmunoCellular Therapeutics will continue to work with Johns Hopkins' Dr. Elizabeth Jaffee and her colleagues as they develop the vaccine.

MOBILE SOLUTIONS

Smart Device Applications

This fiscal year, Johns Hopkins Technology Transfer launched a series of medically-oriented applications developed by Johns Hopkins faculty in the Apple App Store. Some of the applications released included BurnMEd (Pro and Lite), iMixPics, HIV-DS, and IHIV-DS.

BurnMEd Pro and BurnMEd Lite

Created By: Harry Goldberg, Ph.D., Assistant Professor of Biomedical Engineering; and Stephen Milner, M.D., Director, Johns Hopkins Burn Center

The Burn Medical Education (BurnMEd) application utilizes a combination of pictures, video, and text to illustrate how to handle victims in the 8 hours following a burn-a period critical for survival. By highlighting burned areas on a rotatable three-dimensional figure of a man, woman, or child using an iPad or iPhone, the user can guickly calculate how much fluid to administer. The BurnMEd Pro application also teaches step-by-step instructions for other interventions, such as an escharotomy, a surgical procedure that some burn victims require to relieve pressure and restore blood flow.

iMixPics

Created By: René Vidal, Ph.D. Associate Professor of Biomedical Engineering

iMixPics is an application that allows



users to cut, mix, and edit photos in their smart phone gallery. Users can select a picture from their iPhone's image gallery and designate different areas of the image to keep or discard and can add this edited image to another photo.

HIV-DS and IHIV-DS

Created By: Justin McArthur, M.D., Director, Department of Neurology; Peter Dziedzic, M.S., Software Engineer and Research Data Systems Manager, Department of Neurology; and Ned Sacktor, M.D., Professor, Department of Neurology (IHIV-DS only)

HIV-DS is a smart device application version of the HIV Dementia Scale, developed by the Johns Hopkins HIV Neurosciences group as a simple screening tool for HIV-Associated Neurocognitive Disorders (HAND). The test used in the application

FY 2012 AT-A-GLANCE

\$15.9

Million Total Revenue

Invention

Disclosures

427

157

2,133

3,710

New Option and License Agreements

8

New Startup Companies

Active Patents

Materials Transfer Agreements

A Year in Review



Alain Labrique, Ph.D. M.H.S. M.S., Assistant Professor, Departments of International Health and Epidemiology at Johns Hopkins Bloomberg School of Public Health and the Director of the Johns Hopkins mHealth Initiative spoke at the annual mHealth Summit in Washington, DC.

To watch a video of Dr. Labrique speaking at the summit, visit <u>http://youtu.be/mQ7dnx6f8d0</u> provides a useful baseline for individuals without any cognitive symptoms. The test used in the application allows students and trainees to screen for cognitive dysfunction, especially in the areas of memory and timed mental processing, areas typically affected by HAND.

Similar to HIV-DS, IHIV-DS is a smart device application version of the HIV Dementia Scale that can be used in both the United States and in international settings, including resource-limited countries.

mHealth Initiative

In FY 2012, Johns Hopkins Technology Transfer was asked to be a committee member for the Johns Hopkins University Global mHealth Initiative (mHealth). The mHealth Initiative is a cross-disciplinary environment that connects faculty members from different schools within the Johns Hopkins network to collaborate and develop smart phone and tablet-based solutions that will improve patient health and care around the world. Led by Alain Labrique, Associate Professor at the Bloomberg School of Public Health (JHBSPH)and Elizabeth Jordan, Associate Professor at the School of Nursing, the mHealth Initiative has attracted more than 60 faculty members and 120 students, and has initiated 51 projects that are exploring the use of mobile technology in health. Johns Hopkins Technology Transfer aids the mHealth Initiative by assisting in the monetization of projects produced by the program. Together with the Office of the General Counsel and the University's Marketing and Communications' Department, JHTT advises the faculty and students

involved in the initiative on branding strategies and FDA policies and regulations.

INTERNATIONAL RELATIONS

Science Without Borders

In January 2012, Johns Hopkins Technology Transfer launched a new program called Science Without Borders. This program promotes international collaborations and increases Johns Hopkins faculty, researchers, and staff's awareness of international biotech and life science sectors. To date, the program has hosted representatives from Biocat-an organization that coordinates and promotes the biotechnology, biomedicine, and medical technology sector in Catalonia, Spain-and Lupin Pharmaceuticals-the U.S. wholly owned subsidiary of Lupin Limited, which is among the top five pharmaceutical companies in India.

Ireland

In October, Johns Hopkins Technology Transfer was visited by a representative from the Department of Translational Science at Trinity College in Dublin, Ireland. During the visit, JHTT and the representative discussed ways that Johns Hopkins and Trinity College could work together on upcoming research projects. JHTT also arranged for the representative to meet with Johns Hopkins faculty and researchers in an effort to promote further collaborations between our two institutions.

Germany

During the 2012 BIO International Convention in Boston. Massachusetts, Johns Hopkins Technology Transfer Executive **Director Wesley Blakeslee signed** a Memorandum of Understanding (MOU) with the Fraunhofer Heinrich Hertz Institute (HHI), a mobile and information technology development leader based in Berlin, Germany. Under the terms of this agreement, JHTT and HHI will work together to jointly research the innovative medical applications of integrated optical sensors: small, highly sensitive devices with diseaserecognition capabilities. Together, JHTT and HHI will study how the technology developed by HHI can be used in the detection, diagnosis, and treatment of medical conditions. Johns Hopkins University School of Medicine researchers with clinical expertise in a variety of specialty areas, including oncology and infectious diseases, will collaborate with HHI's scientists and engineers.

PARTNERING CONFERENCES

AstraZeneca/MedImmune Research and Development Day

In November, Johns Hopkins Technology Transfer attended the AstraZeneca/MedImmune Research and Development (R&D) Day in Waltham, Massachusetts. Senior R&D and Business Development leaders met with representatives from JHTT and other academic, biotech, and venture capital funds about the critical role that access to external scientific innovation plays in delivering new and valued medicines to all stakeholders including payers, investors and, most importantly, patients.

The event featured networking opportunities with representatives from AstraZeneca's Innovative Medicines Units (iMeds), including experts from their cardiovascular, gastrointestinal, oncology, infection, respiratory, inflammation, neuroscience, pain, personalized healthcare, and science technology departments. Through the event, JHTT connected with several critical contacts within AstraZeneca's organization and learned about opportunities for partnering. Since the event, JHTT has had several conversations with AstraZeneca and we are identifying projects for collaboration.

Drug Discoveries Conference

Johns Hopkins Technology Transfer partnered with the Johns Hopkins Brain Science Institute to produce the Drug Discovery in Academia: The New Paradigm for Drug Discovery Conference. This 2-day conference explored the new concept of drug discovery at academic institutions and best practices for working with industry representatives. The conference aimed to connect Johns Hopkins researchers to industry partners and to form a consortium



Wesley Blakeslee, Executive Director of Johns Hopkins Technology Transfer, and Professor Hans-Joachim Grallert, Executive Director of the Fraunhofer Heinrich Hertz Institute, signed a Memorandum of Understanding at the 2012 BIO International Convention in Boston, Massachusetts.

Read the press release about the signing: http://tinyurl.com/JHTT-HHI-MOU

Watch a video of the signing: http://youtu.be/2ibTPoP8i18

A Year in Review



Barbara Slusher, Ph.D., Director of the Brain Science Institute's NeuroTranslational Drug Discovery Program opened the Drug Discoveries Conference.

Montgomery County Executive Isiah Leggett spoke at JHTT's Montgomery County launch of Deals on Wheels.



of academic drug discovery centers (ADDC). The ADDC will facilitate collaborations and an exchange of knowledge between academic drug discovery researchers in order to accelerate the development of new therapeutics to enhance the lives of patients.

During the conference, more than 70 faculty members partnered with representatives from pharmaceutical companies and venture capitalists in one-on-one meetings to discuss research being conducted at Johns Hopkins. More than 220 partnering meetings took place between our researchers and representatives from Abbott Laboratories, AstraZeneca, Bayer Healthcare, Eisai, Eli Lilly, GlaxoSmithKline, Johnson and Johnson, Merck & Co, Novartis, Osage Capital Partners, Sanofi, and Takeda. These meetings established Johns Hopkins' commercial potential with industry partners and resulted in several industry return visits to Johns Hopkins and continued conversations about potential partnerships.

NETWORKING EVENTS

Deals on Wheels

In January 2012, Johns Hopkins Technology Transfer launched Deals on Wheels, a new initiative aimed at bridging the geographical gap between Johns Hopkins University's researchers in Baltimore and biotech companies and entrepreneurs in Montgomery County. Through Deals on Wheels, technology companies and entrepreneurs in Montgomery County have the opportunity to connect one-on-one with Johns Hopkins representatives to discover potential partnership opportunities that include licensing agreements, startups, core facilities, sponsored research, material transfer agreements, research collaborations, and clinical trials.

The program has been well received by the community, with more than 100 people turning out for the launch event, including Montgomery County Executive Isiah Leggett.

Entrepreneur's Boot Camp

Johns Hopkins Technology Transfer hosted an entrepreneurial 'boot camp' series to provide faculty, clinicians, students, and alumni with a step-by-step guide to starting a new company. The sessions covered legal considerations in starting a business, strategies for protecting intellectual property and commercialization, and funding and exit strategies.

Vine and Venture

Johns Hopkins Technology Transfer was visited by a representative from Shire Human Genetic Therapies (Shire) in February 2012. During this visit, Shire discussed their new partnership with Atlas Ventures and investment opportunities in orphan disorder therapeutics. The representative met individually with several faculty members including Dr. Gary Goldstein, CEO of the Kennedy Krieger Institute and discussed available Johns Hopkins early-stage rare disease therapeutics.

Shire also presented at Johns Hopkins Technology Transfer's Vine and Venture event. Vine and Venture is a networking event that is open to the life science community and Johns Hopkins researchers, faculty, staff, and students. The program focuses on how to partner with pharmaceutical, biotech, and medical technology companies. Attendees gain perspective on how large pharmaceutical and medical technology companies evaluate research, licensing, and collaboration opportunities from academic and research centers and early-stage biotech companies.

Johns Hopkins Alliance for Science and Technology Development

Each year, Johns Hopkins Alliance for Science and Technology Development, along with members from the University of Maryland's Baltimore Commercial Advisory Board, gather to review inventor presentations and reward the creator of the most commercial invention with a monetary award as well as a great deal of feedback. This year, Alliance members awarded Dr. Sara Sukumar, Co-director of the Breast Cancer Program at the Sidney **Kimmel Comprehensive Cancer** Center, with a \$50,000 prize to encourage the rapid translation of her basic research on biomarkers into a commercially available test that could predict the best treatment options for some women with breast cancer. The award was made possible thanks to contributions by the Maryland Biotechnology Center and Johns Hopkins School of Medicine.

Entrepreneur's Expo

Last year sparked the first Entrepreneur's Expo event in the State of Maryland. This inaugural event was attended by more than 500 entrepreneurs and discussed important topics such as funding and available state resources. Led by the Maryland Technology Development Corporation (TEDCO), representatives from Johns Hopkins Technology Transfer served on the event's planning committee and played an active role in the development of the program's agenda. Aris Melissaratos, Senior Advisor to the President for Johns Hopkins Enterprise Development, gave the keynote address and Wesley Blakeslee, Executive Director for Johns Hopkins Technology Transfer, participated in a panel discussion.

HUMANITARIAN LICENSING AND PRODUCT DEVELOPMENT

Johns Hopkins is committed to ensuring widespread dissemination of medical technologies, including to the developing world and neglected patient populations. The Johns Hopkins Bloomberg School of Public Health and JHPIEGO are substantially involved in this effort. This year, JHPIEGO partnered with the Center for Bioengineering Innovation and Design (CBID) to support the development of specific projects for the developing world. Many of these projects were displayed and presented at the CBID Design Day: an exciting day-long event that featured presentations by student design teams.

At JHTT, we are committed to maximizing the opportunities for new technologies to become available to all people. We created a new standard exclusive license form which not only provides the protections we have long used, but also includes additional humanitarian licensing provisions endorsed by the Association of University Technology Managers and other organizations devoted to this effort.



Sara Sukumar, Ph.D., Co-director of the Breast Cancer Program at the Sidney Kimmel Comprehensive Cancer Center, received the BioMaryland LIFE Award on October 25, 2011 at the joint meeting of the Johns Hopkins University Alliance for Science and Technology Development and the University of Maryland, Baltimore Commercial Advisory Board.

A Year in Review

Developing Nations Panel 1 Speakers: Ann Hammersla, Director of Policy in the Office of Technology Transfer at the National Institutes of Health; Alain Labrique, Assistant Professor, Departments of International Health and Epidemiology at JHBSPH; Peter Corless, Partner (Patents) at Edwards Wildman Palmer, LLP; and Henry Daley, Partner and Intellectual Property Attorney at Venable, LLP. Senior Advisor to the President for Johns Hopkins Enterprise Development Aris Melissaratos gives the opening remarks at the Developing Nations: The Challenges of Technology Commercialization Panel Discussion. Developing Nations Panel 2 Speakers: Gwynedd Warren, Assistant General Counsel (Patents) at GlaxoSmithKline; David Marks, Senior Commercialization Officer at PATH; Sam Dowding, Accelovate Program Administrator at JHPIEGO; and Eddy Agbo, Chairman and CEO of Fyodor Biotechnologies, Inc.



SCHOOL COLLABORATIONS

Developing Nations: The Challenges of Technology Commercialization

To encourage faculty at the **Bloomberg School of Public Health** to disclose more inventions, Johns Hopkins Technology Transfer worked with JHBSPH's Office of Research Administration (ORA) to organize the first Developing Nations: The Challenges of **Technology Commercialization** panel discussion. This two-panel event featured representatives from Edwards Wildman Palmer, LLP; Fyodor Biotechnologies, Inc.; GlaxoSmithKline: JHBSPH: JHPIEGO: NIH; PATH; and Venable, LLP. More than 100 people attended the event and discussed topics such as how to address issues related to intellectual property in developing countries and the role of non-governmental organizations in delivering and distributing new medical technologies. JHTT and ORA are in talks to make this an annual event.

Making a Quantum Leap in Technology Transfer

Johns Hopkins Technology Transfer joined with the Johns Hopkins University Carey Business School and the University at Albany Business School to present the Making a Quantum Leap in Technology Transfer conference this year. The conference, conceived by Phillip Phan, Professor and Executive Vice Dean at the Carey Business School, explored the opportunities for accelerating technology transfer at universities and consisted of academic presentations and practitioner presentations. JHTT **Executive Director Wesley Blakeslee** participated in two program sessions, the first as a speaker and the second as a moderator.

OFFICE UPDATES

This year, JHTT launched three new student internship programs: the Technology Transfer Analyst Program (TTAP), the Marketing Analyst Program (MAP), and the Agreement Monitoring Analyst Program. TTAP hires Johns Hopkins graduate students and post-doctoral fellows to review invention disclosures and evaluate invention IP, marketability, and commercialization potential. The students create invention assessment reports that describe their findings. Students involved in MAP perform targeted marketing campaigns by strategically identifying and contacting potential commercial partners who may be interested in specific Johns Hopkins technologies. The Agreement Monitoring Analyst Program monitors JHTT agreement activities. Analysts review how companies develop products and proceed through the regulatory process and identify licensee milestone achievements.

SCIENCE + TECHNOLOGY PARK AT JOHNS HOPKINS

The Science + Technology Park at Johns Hopkins (the Park) and surrounding neighborhood now comprises 88 acres of which the first 31 acres are in active development. The first of 5 life science building,

WINDOWS OF INNOVATION

the 280,000 square foot John G. Rangos, Sr. Building (Rangos), is now 85 percent occupied and plans for construction of a second building are underway. Meanwhile, the 22-story graduate student housing building (with 325 apartments and 550 beds) is now completed and is rapidly filling up. The new Maryland Department of Health and Mental Hygiene Public Health lab project is currently under construction. This project, a 234,000 square foot building which will house more than 270 employees and scientists, will be completed during 2014. The first restaurant in the Park, Cuban Revolution, will be inaugurated in the fall. A new 10 story parking garage is also being completed and will be in service by the end of 2012. The Park also includes a senior living center and several residential units and more housing will be started during the next 12 months. The addition of a hotel is also planned.

Rangos has been a hub of life science activity, housing several Johns Hopkins centers including the Institute for Basic Biomedical Sciences, the Brain Science Institute, and the Bloomberg School

of Public Health's International Vaccine Access Center (IVAC). These groups are complemented by major research foundations: the Lieber Institute for Brain Development and the Maltz Research Laboratories. and the Howard Hughes Medical Institute. A number of Johns Hopkins startup companies focused on the area of new cancer diagnostics and therapeutics are also housed in Rangos, including Champions Oncology, latrica, Personal Genome Diagnostics (PGDX), Biomarker Strategies, and Inostics. Other Hopkins spinout companies include CDI Labs (human proteome microarray technology) and Cureveda (new therapeutics for respiratory disorders). International companies have also established themselves at Rangos, including two German companies, Siemens Center for Applied Medical Imaging, and the previously mentioned diagnostics company Inostics. Finally, the Rangos building has two contract research organizations and lab service companies: Sobran and Spectrum Biosciences.

Rangos, as the first of several life science buildings, has also been

home to a number of life science community events in collaboration with Johns Hopkins, including Johns Hopkins Technology Transfer's Vine and Venture and Science Without Borders series. Rangos has also hosted several life science company visits, providing a place for Johns Hopkins faculty to meet one-on-one with company representatives and discuss their research.

The Park also launched its new website,

www.scienceparkjohnshopkins.net, which features video interviews with a number of Johns Hopkins startup companies and other key members of the life science community.



Inostic's Vice President of Operations, Dan Edelstein, is interviewed for a three-part video series available on the Science +Technology Park at Johns Hopkins' website and JHTT's YouTube channel.

Watch the video series at http://www.youtube.com/user/JHUTechTransfer

A Year in Review

STARTUPS

Companies Created With JHU Technologies

WINDOWS OF INNOVATION

his year saw a drop off in the number of startups to 8 (from 19 in 2011), although not far below the 10 that we had projected in our budget. Last year's number was exceptionally large, and at a level far greater than we anticipate year over year based upon the nature of our institution. Funding remains an issue in the current economic climate with many biotech companies unable to achieve significant funding.

The mix of companies this year included five medical device, two diagnostic, and one therapeutic startup. Two of the device companies are the result of clinician/biomedical engineering (BME) student projects sponsored through the Johns Hopkins University Center for Bioengineering Innovation and Design. The undergraduate project was licensed into a startup, LapSpace, funded by a high profile Israeli medical device accelerator program, Misgav Venture Accelerator. Meanwhile, a graduate CBID team decided to test their skills as entrepreneurs and launched their own company, BOSS Medical, to push their technology closer to market.

As seed and early stage funding is becoming scarcer, wouldbe entrepreneurs have to find alternative sources of capital to further develop nascent technologies. Johns Hopkins is actively pursuing multiple sources of translational funds so that our researchers can continue to advance the commercialization of their technologies. In FY 2012, two research teams tapped into translational funds available to JHU researchers through TEDCO, which funded key studies and enabled the teams to spinout this year as BOSS Medical and ClearGuide Medical. Likewise, JHU is a proud new recipient of a multiyear, multi-million dollar translational award established by the Wallace H. Coulter Foundation-the Johns Hopkins-Coulter Translational Partnership-to catalyze the commercialization of promising biomedical innovations. One of this year's startups, BOSS Medical, received one of the first awards. We expect the Coulter Partnership to enhance the quality, and possibly quantity, of our biomedical startups in the years to come.

Additional translational/ commercialization funding is now available to Maryland-based biotechnology startups through the State's Maryland Biotechnology Center. This year, we had two JHU startups from last year (NexImmune and GrayBug) successfully compete for seed-stage funds through this program.

TECHNOLOGY TRANSFER IN THE NEWS

his year, JHTT, JHU inventors, and JHU startups were featured in prominent newspapers and scientific magazines. Below are links to some of these press mentions.

JOHNS HOPKINS TECHNOLOGY TRANSFER

Tech Transfer: Open for Business Johns Hopkins Public Health Magazine March 2012 http://tinyurl.com/JHBSPH-Open

Mobilizing Technology to

Improve Global Health Change: Moving Hopkins Forward March 2012 http://tinyurl.com/7nh6jus

Taking Technology Out of the Lab and Into the World ASBMB Today March 2012 http://tinyurl.com/ASBMB-Rachel

INVENTORS

Breast Cancer Nipple Therapy

WUSA9 News December 13, 2011 Featuring JHU Inventor Sara Sukumar, Ph.D. http://tinyurl.com/WUSA9-Sukumar

Hydrogel Helps Grow New Scar-Free Skin Over Third Degree Burns Gizmag December 16, 2011

Featuring JHU Inventor Sharon Gerecht, Ph.D. http://tinyurl.com/gizmag-gerecht

Hopkins Researchers Aim to Uncover Which Mobile Health Applications Work

The Baltimore Sun March 14, 2012 Featuring JHU Inventor Alain Labrique, Ph.D. http://tinyurl.com/sun-labrique

High School Freshman Confounds Researchers, Invents New Pancreatic Cancer Test Daily Tech May 25, 2012 Featuring JHU Researcher

Anirban Maitra, M.B.B.S. http://tinyurl.com/dailytech-maitra

STARTUP COMPANIES

Apollo Endosurgery Secures \$47.6M to Launch Surgical Tools FierceMedical Devices February 6, 2012 http://tinyurl.com/8w49pbc

Kala Secures \$6.2M in Additional Equity Financing

The Boston Globe March 14, 2012 http://tinyurl.com/globe-kala

Cerecor, a Biotech Startup Headed by Blake Paterson, Raises \$22M Baltimore Business Journal April 4, 2012 http://tinyurl.com/bbj-cerecor



Harry Goldberg, Ph.D., and Stephen Milner, M.D., with BurnMEd, a mobile app that illustrates how to care for burn victims.

Image from the "Mobilizing Technology to Improve Global Health" article in Change Magazine.

MATERIAL TRANSFER AGREEMENTS

angible research materials embody tacit knowledge of enormous value. Sharing these materials with other academic institutions, nonprofit organizations, and commercial entities through material transfer agreements (MTAs) promotes Johns Hopkins University's research imperative.

Successfully negotiated MTAs also provide JHU investigators with essential proprietary materials and technologies at little or no expense. MTAs significantly reduce research costs, bolster grant applications, and enable scientific research and publication. The Johns Hopkins Technology Transfer Contracts team has continued to adapt to the everchanging market and regulatory landscape brought on by economic challenges and technological advances.

Our specific initiatives from the past year include:

- Implementation of an enhanced review process for the transfer of human tissues and cell lines derived from human tissues:
- Extended utilization of high ٠ volume repositories to allow for fast-track processing of popular research materials;
- ٠ Extension of the scope of the Contracts group to contribute to the review, drafting, and negotiation of a variety of contracts as needed including nondisclosure agreements, interand collaborative research agreements.

As shown in the table below, the overall transaction volume in the Contracts group increased more

than 13 percent from FY 2011 to FY 2012.

For MTAs, we reduced our average turnaround time from 9.1 to 8.2 days. More than 90 percent of our MTAs were completed in 30 days or less. In FY 2013, we will continue to build upon the progress we made in FY 2012 and continue to expand our role in support of other types of contracts in addition to MTAs.

We recognize that obtaining proprietary materials from commercial entities can often be problematic, and concluding such institutional agreements, licenses, agreements takes significantly more time than the average. We have however, continued to enhance the capability and skills of our MTA team and we work closely with the General Counsel's Office to make the process as efficient as possible.

STATISTICS

	FY 2009	FY 2010	FY 2011	FY 2012
Requests received	2,725	2,873	3,299	3,745
MTAs processed	2,821	2,896	3,283	3,710
Inbound	994	1,018	1,145	1,284
Outbound	1,825	1,868	2,131	2,407
Consortium	2	10	7	14
Bilateral	0	0	0	5
Total	2,821	2,896	3,283	3,710
Not for profit	2,588	2,694	3,062	3,535
For profit	233	202	221	175
Total	2,821	2,896	3,283	3,710

WINDOWS OF INNOVATION

INVENTION DISCLOSURES

SCHOOL OF MEDICINE 280 Disclosures 65.7%



WHITING SCHOOL OF ENGINEERING 84 Disclosures 19.5%

> KRIEGER SCHOOL OF ARTS AND SCIENCES 23 Disclosures 5.4%

BLOOMBERG SCHOOL OF PUBLIC HEALTH 15 Disclosures 3.5%

OTHER 25 Disclosures 5.9%

FY 2012 ANNUAL REPORT

PRODUCT PIPELINE

his fiscal year, we are pleased to report that our product pipeline has grown considerably as we have fine-tuned our agreement monitoring. Our product pipeline now includes 1,011 products that are either currently marketed or in various stages of development as of July 2012 (see Figure 1). We observed a steady increase in the total number of products that were introduced to the market over this fiscal year (with the exception of therapeutics) or into development in every classification of product development as well.

Of the 1,011 products in our product pipeline, 789 are currently on the market (see Figure 2). While research tools remain the majority of products brought to market by our licensees, the number of products on the market in other classifications has increased to 189 during this fiscal year (see Figure 2). The largest categorical increases in product releases were noted in devices and software. We noted a decrease in diagnostics that is attributable to the expiration of a patent that was widely licensed.

Of the products that are subject to the regulatory process, one therapeutic was approved by the FDA and launched into the market during FY 2012. During this fiscal year, 2 therapeutic products were in Phase 3 clinical trials, 27 products were in Phase 2 clinical trials, and 34 products were in Phase 1 clinical trials (see Figure 3). In addition, six devices received FDA clearance and the same number of device products are currently in clinical trials. We observed a doubling of preclinical activity over our last fiscal year as well. Collectively, these activities continue to reflect the commitment by industry to move JHU technologies through the regulatory process toward the market.

Oncology product development leads both the therapeutic and diagnostic product classifications. Ophthalmology product development leads the device product classification. This information is in Figures 4, 5, and 6.

The products in our product pipeline are tangible evidence of JHU's intellectual property and represent a measurable, direct benefit of the research conducted at JHU, efforts by Johns Hopkins Technology Transfer in marketing, licensing, and monitoring licensee activity and the product development and regulatory process in which our licensees engage.





Figure 1: Entire Product Pipeline by Product Classification (n=1,011)



Figure 4: Therapeutic Product Pipeline by Medical Area (n= 141)



⊯ Regenerative Medicine ■ Urology ■ Vascular ■ Veterinary

Genitourology

Hematology Inflammation

Metabolic
 Nephropathy
 Neglected Disease

A Neurology
 Offactory
 Other of the second sec

A Year in Review



Cardiology Genetic Infectious Disease Neglected Disease Neglected Disease

Figure 5: Diagnostic Product Pipeline by Medical Area (n = 76)

Figure 6: Device Product Pipeline by Medical Area (n=35)



Analgesia
Cardiology
Cardiology
Cardiovascular
Imaging
Inflammation
Metabolic
Neurology
Orthopedic
Ophthalmology
Oncology
Reproductive Health
Surgery
Vascular



FINANCIALS

he Johns Hopkins Technology Transfer Office achieved record results in FY 2012, increasing virtually all of our metrics during the year. Our total licensing revenue, at \$15.9 million, is 4 percent higher than FY 2011. We received and processed 427 new invention disclosures during the year and completed 157 new option and license agreements. Patent expenses increased based on our steadily increasing number of new invention disclosures. Overall, the office generated \$6.5 million net income on an operating basis, surpassing last year's record by \$1 million or nearly 19 percent.

Besides our financial results, the office achieved these operating results:

- Signed 157 new license and option agreements during the year. This is equal to 12.1 agreements per licensing associate, far better than the industry average of 8.
- Received and processed 427 new invention disclosures, another record for Johns Hopkins.
 We are now one of the leading universities in the country in this statistic.

- We distributed more than \$4 million in royalty income to inventors, \$1.2 million to their research accounts and obtained more than \$1.6 million in sponsored research through our licensing efforts.
- Our Contracts group completed 3,710 material transfer agreements during FY 2012, a 13 percent increase over last year, while decreasing the average completion time from 9.1 days in FY 2011 to 8.2 days this year.
- We completed 8 startup companies during the year. While this is lower than last year and lower than plan, we have focused on increasing the quality (and probability of success) of our startups this year.

Our financial results and operating metrics have improved steadily over the past 6 years. These trends can be seen in the table on the next page.

OPERATING STATISTICS

We received 427 invention disclosures during the course of the year—the highest number ever—bringing our total active disclosures to 2,473. This increase

Appendix

SIX YEAR TREND OF FINANCIAL RESULTS AND KEY METRICS

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
New Invention Disclosures	244	282	305	352	355	409	427
License/Option Agreements Signed	57	79	92	99	104	159	157
Agreements per licensing FTE	7.8	7.7	8.4	8.6	9	12.2	12.1
Patents							
Filings during the fiscal year	387	513	500	579	571	728	757
Issued in US during the fiscal year	33	43	40	46	44	49	68
Active patents at end of year	1,335	1,469	1,588	1,899	1,921	1,917	2,133
Patents pending at end of year	2,993	3,135	3,629	3,797	3,825	3,977	3,626
Financial (millions)							
Royalties and License Fee Income	\$7.7	\$9.7	\$11.2	\$12.2	\$12.0	\$15.2	\$15.9
Total income, equity, reimbursements	\$14.7	\$13.7	\$15.0	\$16.1	\$16.7	\$19.1	\$20.4
Net income produced by JHTT	\$1.7	\$2.1	\$3.6	\$4.1	\$3.8	\$5.5	\$6.5
Startups Based on JHU Technology	4	5	12	10	10	19	8
MTAs Completed	1,764	1,515	2,231	2,821	2,896	3,283	3,710

reflects a focus on commercialization in every school coupled with frequent interactions between researchers and our staff. We completed 757 patent filings during the year and 68 new patents were issued, a 39 percent increase over last year. As of June 30, we had 2,133 issued and 3,626 pending patents. We executed 157 new license agreements and 47 amendments during FY 2012 and had more than 700 active agreements at yearend. We were able to secure over \$1.6 million in sponsored research for faculty as a byproduct of our licensing activities. We completed 3,710 material transfer agreements during FY 2012, a 13 percent increase over last year. Our MTA's took an average of 8.2 days to complete, the best we have ever performed in this metric.

FINANCIAL TRENDS SINCE FY 2004

The chart to the right shows our financial trends from FY 2004

through FY 2012. As can be seen in the chart, we have been able to increase agreement and total income while keeping our net patent and office expenses fairly steady over this period. This has resulted in an increased "net income" produced by our office, especially over the past 5 years.

REVENUE

We collected \$15.9 million in

licensing revenue during FY 2012, nearly 20 percent higher than our \$13.3 million budget. As of June 30, we had received \$3.4 million from 95 of the 157 new agreements signed during FY 2012 and are still awaiting payment of an additional \$900,000 from these licenses. This total of \$4.3 million in upfront dollars from new agreements exceeded our \$3.3 million goal. Also, during FY 2012 we received \$12.5 million from 317 license agreements signed in prior years.



The table to the right shows our FY 2010–FY 2012 income trends. Our royalties and license fees are increasing steadily each year. Administrative fees are declining, as expected, because the office used to assess annual administrative fees in its licenses but ceased doing so more than 8 years ago for a variety of reasons. The administrative fees that we continue to collect are from older licenses and these fees will decline as the older licenses expire.

In addition to measuring upfront fees generated by new license agreements, we also measure the total contract value (TCV) of these agreements. TCV is defined as all scheduled and milestone payments, excluding the value of equity and anticipated product sale royalties. that have been or will be received from an agreement over its first 10 years. Of course, we may never see these payments should the licensee cease to pursue product development and terminate the license agreement. However, we believe that measuring TCV is useful as it indicates the potential future revenue that we expect to realize from our new agreements. The TCV of our 157 new FY 2012 agreements was \$21.5 million.

FY 2010–2012 TREND BY INCOME CATEGORY

	FY 2010	FY 2011	FY 2012
Royalties	\$6,777	\$7,870	\$8,273
License Fees	\$4,424	\$6,823	\$7,165
Administrative Fees	\$745	\$556	\$464
Total Revenue	\$11,946	\$15,249	\$15,902

PATENT EXPENSES AND REIMBURSEMENTS

Gross patent expenses totaled \$8.687 million for the year, \$341K higher than last year. This increase in cost is driven by the large and steady increase in invention disclosures over the past 5 years.

Our patent expense reimbursement rate has risen from 47 percent in FY 2011 to 51 percent in FY 2012.

We have analyzed our patent expenses on technology cases for which we are not receiving licensee reimbursement. As the table below shows, over the past 5 years, we have incurred only 3.7 percent of our patenting cost in the first year of a technology case's life. While we file many provisional patents, they cost us little. Cases between 1 and 3 years old, when we would typically be converting provisional patents, account for 46 percent of our total expense. Cases that are 4–6 years old account for 24 percent of our expenses and the remaining 27 percent is spent on cases that are more than 6 years old. This is especially interesting when compared with the age of the technology cases that are being licensed. Please see the section on Licensing on the next page.

OFFICE EXPENSES

FY 2012 office expenses totaled \$6.264 million (see table on the next page).

DISTRIBUTIONS

JHTT distributes income it receives each year in accordance with the University's Intellectual Property Policy. We distributed \$11.45 million during FY 2012, an increase of

ANALYSIS OF PATENT EXPENSES FOR UNLICENSED CASES BY AGE OF CASE*

	Total	< 1 year	1-3 years	4-6 years	7-10 years	>10 years		
FY 2012	\$4,483	\$251	\$2,383	\$684	\$716	\$449		
FY 2011	\$4,360	\$213	\$1,846	\$1,183	\$732	\$386		
FY 2010	\$3,173	\$151	\$1,236	\$769	\$749	\$268		
FY 2009	\$3,592	\$130	\$1,840	\$664	\$607	\$351		
FY 2008	\$2,661	\$21	\$1,373	\$674	\$433	\$160		
5-year Total	\$18,269	\$766	\$8,678	\$3,974	\$3,237	\$1,614		
Percent	100.00%	4.2%	47.5%	21.8%	17.7%	8.8%		
*Measured by the age of the case when the patent expense was paid.								

FY 2012 ANNUAL REPORT

Appendix

OPERATING EXPENSES FOR FY 2012 COMPARED TO PAST YEARS

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Salaries	\$3,272	\$3,488	\$3,825	\$4,068	\$3,941
Benefits	\$1,025	\$1,055	\$1,125	\$1,217	\$1,240
Other Office Expenses	\$1,115	\$830	\$876	\$1,186	\$1,361
UA Credits	(\$300)	(\$294)	(\$279)	(\$279)	(\$279)
Total Office Expenses	\$5,112	\$5,079	\$5,547	\$6,192	\$6,264

\$114,000 from FY 2011 (see table below).

DISCLOSURES

We received 427 invention disclosures in FY 2012, a 4 percent increase over last year (409), a 20 percent increase over FY 2010 (355) and, for the sixth year in a row, a record number for Johns Hopkins.

LICENSING

We executed 157 new license and option agreements (see chart to the right) as well as 47 amendments during FY 2012. These results reflect our investment in marketing, our increased engagement with both faculty and companies and our movement of patent activities away from the licensing staff into the new IP management group.

We have analyzed our new license agreements to study the age of the technology cases (inventions) that we are licensing. In this analysis, we calculated the time from initial disclosure of the invention to the execution date of the license agreement. Our analysis is located on the next page.

From this analysis, we can see that only about 17 percent of the cases licensed over the last 5 years were less than 1 year old. Often these licenses resulted from industry sponsored research where the

FY 2010–2012 INCOME DISTRIBUTIONS*

Distributed To:	FY 2010	FY 2011	FY 2012
Inter-Institutional (incl. HHMI)	\$919	\$948	\$1,239
Inventor	\$3,610	\$3,651	\$4,146
Inventor Research Accounts	\$1,409	\$1,451	\$1,176
Departments	\$1,424	\$1,485	\$1,372
Schools	\$3,358	\$3,205	\$2,993
University	\$540	\$597	\$523
TOTAL	\$11,260	\$11,337	\$11,451

*Income is generally distributed the quarter after it is received. Licensing costs, expense reimbursements, administrative fees, and other charges are not included in the amount distributed.

OPTION AGREEMENTS 19, 12 %

EXCLUSIVE AGREEMENTS 21, 13 %

NON-EXCLUSIVE AGREEMENTS 117, 75 %

ANALYSIS OF NEWLY LICENSED CASES BY AGE OF CASE

Fiscal Year	Agr	Cases	Average	<1*	1-3*	4-6 *	7-10*	>10*
FY 2012	157	252	1.61	19	118	27	42	46
FY 2011	159	316	1.99	78	106	48	51	33
FY 2010	104	144	1.38	34	36	27	30	17
FY 2009	99	172	1.74	21	62	40	28	21
FY 2008	92	153	1.66	22	61	34	16	20
TOTAL	611	1,037	1.70	174	383	176	167	137
PERCENT				16.8%	36.9%	17.0%	16.1%	13.2%
*Measured by the age of the case when it was licensed in years.								

sponsor took a license or where the IP is follow-on technology to cases previously licensed. We can also see that 29 percent of the cases that were licensed over the past 5 years were 7 or more years old at the time they were licensed. Our largest monetary license in FY 2012 was for older technologies, many licensed for the first time.

Appendix

JHTT PERSONNEL



ARIS MELISSARATOS

Senior Advisor to the President Johns Hopkins Enterprise Development <u>aris@jhu.edu</u>



WESLEY D. BLAKESLEE Executive Director starman@jhu.edu



GLEN L. STEINBACH Senior Director, Finance and Administration gsteinb1@jhmi.edu

Leigh A. Penfield Senior Licensing Associate, Compliance Ipenfield@jhmi.edu



KEITH BAKER Senior Director, Technology Licensing <u>kbaker@jhmi.edu</u>



HEATHER A. BAKALYAR Portfolio Director hbakaly1@jhmi.edu

Pauline A. Callinan Senior Licensing Associate pcallin1@ihu.edu

Daniel M. Potvin Senior Licensing Associate <u>dpotvin1@jhmi.edu</u>

Laura Mitchell Licensing Associate <u>llinzmc1@jhmi.edu</u>

Aditi Martin Licensing Associate amarti62@jhmi.edu

Nakisha Holder Licensing Associate, TTAP Program Leader <u>nickki@jhu.edu</u>

JOHNS HOPKINS SCHOOLS AND INSTITUTES

- Institutes for Basic Biomedical Sciences (Centers)
- Kennedy Krieger Institute

SPECIALTIES

- · Anesthesiology and Critical Care Medicine
- Biological Chemistry
- Biology
- Biomedical Engineering
- Cell Biology
- Chemistry
- Dermatology
- Medicine
- Molecular Biology and Genetics
- Molecular and Comparative Medicine
- Neurosciences, Neurosurgery, and Neurology
- Pediatrics
- · Pharmacology
- Psychiatry and Behavioral Sciences
- Oncology
- Otolaryngology

WINDOWS OF INNOVATION



EUGENE YELDEN Portfolio Director geney@jhu.edu

Rachel A. Cassidy Associate Director rcassid1@jhmi.edu

Ami D. Gadhia Senior Licensing Associate agadhia2@jhmi.edu

Jeffrey James Licensing Associate jjames26@jhmi.edu

Nestor Franco Licensing Associate <u>nfranco6@jhmi.edu</u>

JOHNS HOPKINS SCHOOLS AND INSTITUTES

- Bloomberg School of Public Health
- Paul H. Nitze, Carey Business School
- School of Advanced International Studies
- School of Nursing
- Wilmer Eye Institute

SPECIALTIES

- Biophysics and Biophysical Chemistry
- Chemical and Biomolecular Engineering
- Engineering
- Ob / Gyn
- Ophthalmology
- Orthopedic Surgery
- Pathology
- Physical Medicine and Rehabilitation
- Physics and Astronomy
- Physiology
- Radiology
- Surgery
- Urology



JILL UHL Director, Intellectual Property juhl2@jhmi.edu

Andrea E. Doering Senior Intellectual Property Manager adoerin1@jhmi.edu

Elaine Spector Senior Intellectual Property Manager <u>especto1@jhmi.edu</u>

Abanti Bhattacharyya Senior Intellectual Property Manager <u>abhatta9@jhmi.edu</u>

Alevtina Zhelonkina Intellectual Property Manager <u>alya@jhmi.edu</u> Guido Galvez Patent Counsel ggalvez2@jhmi.edu

Joseph Contrera Patent Counsel jcontre4@jhmi.edu

Louisa Ryan Patent Counsel Iryan16@jhmi.edu

Appendix



JOHN FINI

Director, Intellectual Property and Technology Commercialization, Homewood jfini@jhu.edu

Benjamin Gibbs Licensing Associate bgibbs@ihu.edu

Seth Zonies Technology Analyst zonies@jhu.edu



PETER BALL Director, Contracts pball2@jhmi.edu

Matthew Hartman Contracts Associate <u>mhartm13@jhmi.edu</u>

Mollie Wander Contracts Associate <u>mwander1@jhmi.edu</u>

Luz Lettiere Contracts Associate <u>llettie1@jhmi.edu</u>

Caroline Jelavich Contracts Associate cjelavi1@jhmi.edu

Nekeshia Maloney Contracts Associate nmalone2@jhmi.edu



HELEN MONTAG Senior Director, Corporate Development Johns Hopkins School of Medicine hmontag@jhmi.edu



ELIZABETH GOOD MAZHARI Director, Ventures egood3@jhmi.edu



MONTSERRAT CAPDEVILA Director, Sales, Marketing, and International Relations <u>mcapdev1@jhu.edu</u>

Lisa Broadhead Marketing Coordinator Ibroadh1@jhmi.edu

Ying-Li Chen Technology Marketing Analyst, MAP Program Leader <u>ychen139@jhmi.edu</u>



Photos of the Charlotte R. Bloomberg Children's Center and Sheikh Zayed Tower and the Neurology Department were taken by Keith Weller Commercial Photography for Johns Hopkins Medicine.

DISCOVER • INVENT • COLLABORATE • PARTNER

