Massachusetts Life Sciences Center
FY 2009 Annual Report

Submitted September 2009

To the Governor, Senate President, Clerk of the Senate and Clerk of the House of Representatives:

The Massachusetts Life Sciences Center (the "Center") respectfully submits the following report detailing its operations and accomplishments during fiscal year 2009. This report and the accompanying FY '09 audit report are submitted in fulfillment of the requirements mandated by the General Court pursuant to the Center's enabling statute at Mass. Gen. Laws ch. 23I (formerly section 7, now section 15) as amended by Chapter 130 of the Acts of 2009.

The Massachusetts Life Sciences Center is the hub of our state's thriving life sciences Supercluster. We serve as stewards of the $1 billion Massachusetts Life Sciences Initiative, which was signed into law in June of 2008. FY '09 was a year of enormous progress and measurable impact here at the Life Sciences Center. The following annual report details the Center's successes to date and the returns on investment that we are already generating for the Commonwealth.

At the Life Sciences Center, our goals are to create jobs, drive innovation, and support good science that will improve the human condition. We do this by investing public funds in strategic opportunities that create jobs, leverage private investment, and promote scientific discovery. From the Center's creation via the Economic Stimulus Act of 2006 through June 30, 2009, the Life Sciences Center has committed $53.8 million toward the fulfillment of this mission.

At the Life Sciences Center, we are already well on our way to a productive year two in implementing the Massachusetts Life Sciences Initiative. As always, thank you for your ongoing interest and support.

Sincerely,

SWBannister

Susan Windham Bannister, Ph.D.
President & CEO

Massachusetts Life Sciences Center
President & CEO, Dr. Susan Windham-Bannister

Return on Investment:

June 16th, 2009, marked the one-year anniversary of Governor Deval Patrick's signing of the Massachusetts Life Sciences Initiative. It was a year of enormous progress and measurable impact here at the Life Sciences Center. The Center hired a top-tier staff, located its offices in Waltham, and pursued an investment strategy that focused on workforce development, encouraging innovation, accelerating the growth of promising young companies, and strengthening the life sciences infrastructure across the state. We also maintained a laser focus on our mission to drive economic development and create jobs for the Commonwealth in today's challenging economy.

Ramping Up:

The Center's first tasks were to ramp up operations and develop programming. During FY '09 the Center recruited an exceptional staff that now includes nine employees, and opened up the Center's first permanent offices at 1000 Winter Street in Waltham, an accessible location to many of the state's leading life sciences companies and investors. Infrastructure was put in place for information technology, human resources and accounting.

Hired by the Center's Board of Directors in June, 2008, incoming President and CEO, Dr. Windham-Bannister engaged in an "active listening" tour across the state, meeting with stakeholders in industry, government, academia, disease advocacy groups, and the investment community. The Center's FY '09 programming was greatly informed by the feedback received from these stakeholders. Strategic priorities established through this process included:

- Funding of early-stage companies and technology transfer;
- Promoting workforce development;
- Strengthening the competitive position of academic and medical institutions; and
- Serving as a convener and coordinator for the state's life sciences community.

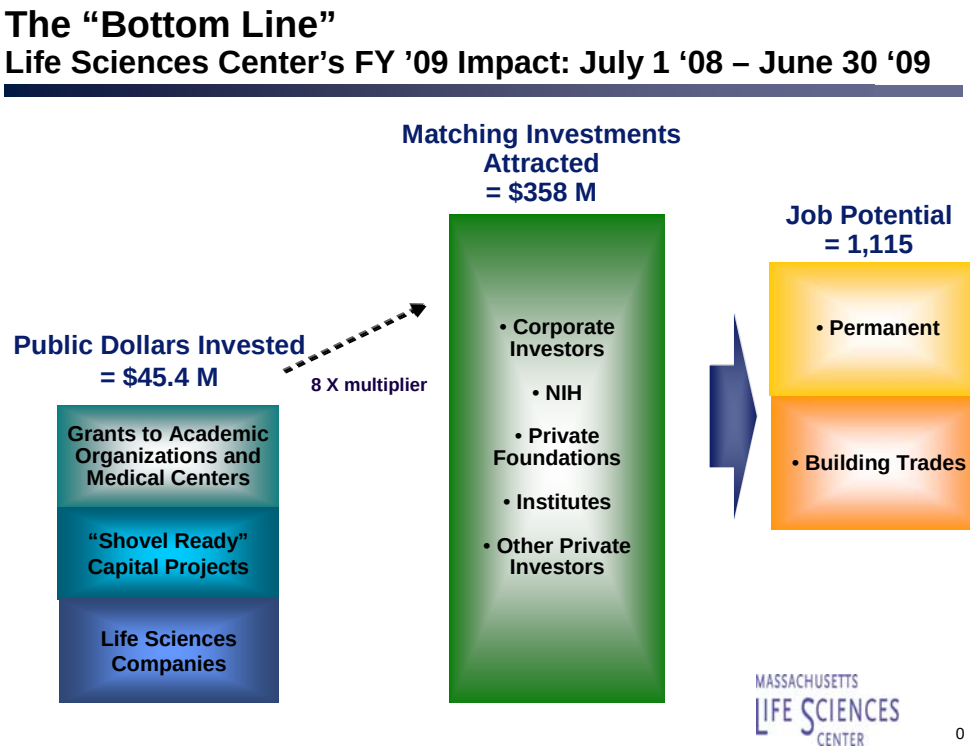
The Center was successful in hitting all ramp-up milestones contained in the Life Sciences Act, including the establishment of the Life Sciences Tax Incentive Program by January 1, 2009.

FY '09 also brought changes to the Center's governing and advisory bodies. Secretary Gregory Bialecki became Co-Chair of the Center's Board of Directors upon his appointment as Secretary of Housing and Economic Development by Governor Deval Patrick. He joined Co-Chair Leslie Kirwan, Secretary of Administration and

Finance. In addition, the Board of Directors added five new members to its Scientific Advisory Board, including several with expertise in venture funding for life sciences companies.

Leverage and Job Creation:

Through all of our investments, the Center has been successful in highly leveraging the public dollars that have been entrusted to us. During FY'09, we committed $45.4 million in state funding and leveraged more than $358 million in private and federal investment, helping to create a projected 1,115 jobs across the Commonwealth. In other words, for every $1 of taxpayer money that the Center invested, the Center has attracted nearly $8 in additional outside investment – creating a public-private investment fund of nearly $400 million for the state's life sciences Supercluster.



Note: From the Life Sciences Center's creation via the Economic Stimulus Act of 2006 through June 30, 2009, the Center has committed $53.8 million for both capital projects and programming.

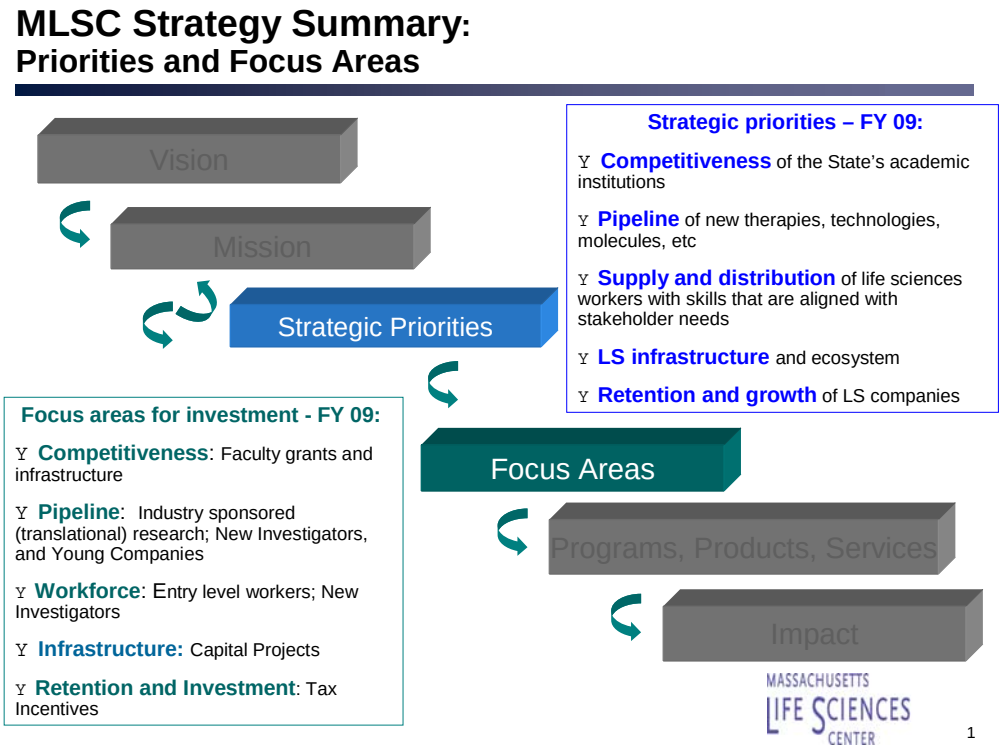
Investment Portfolio:

Our investments during FY '09 focused on five strategic priorities: 1) strengthening the life sciences infrastructure across the state; 2) accelerating the growth and retention of promising young companies in Massachusetts; 3) encouraging the innovation pipeline; 4) workforce supply and distribution, and 5) sustaining the competitiveness of the state's academic and medical research institutions.

Consistent with this strategy the Center's investments included three job-creating capital projects, twenty-nine matching grants to support innovative scientific

research at academic institutions, seven loans to provide working capital for early stage companies through the Center's Accelerator Program, and financial support for a major company expansion in the town of Canton. The Center also continued funding for the International Stem Cell Registry at the University of Massachusetts Medical School in Worcester. This investment, combined with an initial Fiscal Year 2008 investment of $8.2 million to establish the Registry and the affiliated Massachusetts Stem Cell Bank, has positioned Massachusetts to compete even more effectively for new NIH dollars that will be available for embryonic stem cell research under the Obama Administration.

The Center also launched the Life Sciences Internship Challenge this past summer to grow and retain a new generation of life sciences workers in the Commonwealth. This wildly successful effort created more than 100 paid internship opportunities at 59 life sciences companies and research institutions throughout the state. Our interns gained real-world experience working in the life sciences, and several of those who had finished school secured permanent jobs with their host companies.



Sustaining Momentum:

A report released this spring by the Milken Institute affirms that the Boston area remains the leading life sciences cluster in the country. However, the report also finds that the life sciences environment is highly competitive, and that other regions are catching up. Competitors, both nationally and internationally, are making major investments to build life sciences clusters and attract Massachusetts' talent, technology and companies. We cannot take our leadership position in the life sciences for granted. It is vital that we stay the course on implementation of the Life Sciences Initiative and commit to the funding necessary to make ongoing investments in the growth of our life sciences "Supercluster."

(To view the Milken Institute's Report, go to:
http://www.milkeninstitute.org/pdf/PhillyLifeSciencesRprt.pdf)

Investing in Infrastructure:

The Center's grants for public infrastructure projects are designed to promote significant long-term job creation throughout the Commonwealth. The grants are funded through the Life Sciences Act's 10-year, $500 million capital fund, and are directed to municipalities and institutions for infrastructure improvements that support growth in the life sciences sectors. The Center's Board of Directors approved $24.7 million in capital programs and expended $10 million in FY '09.

Partnering With Massachusetts Cities and Towns:

On October 31, 2008, the Center's Board voted to provide a $5.2 million grant to the Town of Framingham for construction of a new wastewater facility to support the Framingham Technology Park. This funding was part of a $12.9 million targeted investment contained in the Life Sciences Initiative. The Framingham wastewater project will allow Genzyme Corporation to build a new $250 million facility and create 300 new manufacturing jobs within the next year, while attracting new prospective employers to the Park. The Genzyme facility is currently under construction and scheduled for completion in 2010. The company estimates that the project will create 125 full-time equivalent construction jobs. The Framingham wastewater pumping station is scheduled for completion in November 2009. The Town forecasts that the project will create 40 construction jobs. This investment demonstrates the extraordinary results that can be obtained through state, municipal and industry partnerships.

One If by Land, Two If by Sea:

On November 17, 2008, the Center joined with Governor Patrick and Senate President Therese Murray to announce a $10 million grant to renovate the Loeb Lab at the Marine Biological Laboratory (MBL) in Woods Hole. The state's commitment of $10 million was leveraged by MBL to secure an additional $15 million from the Howard Hughes Medical Institute (HHMI).

Governor Deval Patrick with nobel-winning scientist Dr. Osamu Shimomura at the Marine Biological Laboratory

According to Dr. Gary Borisy, Director and CEO of the MBL, the Center's commitment of $10 million helped secure the HHMI grant. MBL is a leading international, independent, nonprofit institution dedicated to discovery and to improving the human condition through creative research and education in the biological, biomedical and environmental sciences.

At its peak, the project will create 200 jobs in the building trades and up to 50 permanent jobs in the life sciences. The Loeb Laboratory renovation project broke ground on September 21st, 2009.

Nobel Committee Takes Notice: Fifty-six scientists affiliated with the MBL have received the Nobel Prize since MBL's founding in 1888, including last year's Nobel Prize in Chemistry. Dr. Osamu Shimomura, a senior scientist emeritus and Corporation member at the MBL, was awarded the Nobel Prize in Chemistry in 2008 for his discovery of green fluorescent protein (GFP) in jellyfish, one of the most important tools in contemporary science and medicine for illuminating life at the microscopic level.

Biosafety for the Commonwealth

In March 2009, the Center's Board approved a $9.5 million grant to support completion of the New England Regional Biosafety Laboratory (NE-RBL) at Tufts University's Cummings School of Veterinary Medicine in Grafton. The grant will bolster existing grant funding from the National Institute of Allergy and Infectious Diseases (NIAID), as well as additional matching funds from Tufts University. The $33.7 million project created 56 full-time equivalent jobs in design, development and construction of the facility, and approximately 29 long-term positions for scientists, research technicians, and additional facility staff are anticipated. Construction is now 100% complete, and the facility will be ready for occupancy by mid-October 2009.

Investing in the Growth of Young Companies:

The Life Sciences Investment Fund allows the Center to make grants, loans and investments to encourage growth in Massachusetts' life sciences Supercluster. During FY '09 the Center committed $3.4 million to provide working capital to seven early-stage life sciences companies, $12 million in matching grants to support vital scientific research, $695,000 in continued funding for the International Stem Cell Registry at the University of Massachusetts at Worcester, $500,000 for workforce development, and $7.4 million to support the expansion efforts of Organogenesis, a key employer in the town of Canton.

Accelerating the Growth of Early-Stage Companies:

The Center's Accelerator Program is designed to provide working capital to early-stage life sciences companies at a critical stage of their development. The program seeks to de-risk these companies in order to encourage private investment and help commercialize scientific research into jobs, products and therapies. The Center developed the program with input from the business community and a roundtable of investors.

The investment vehicle for the Accelerator Program is an unsecured 5 year loan in the $100,000-$500,000 range with a 10% interest rate. The interest is paid in full at the end of 5 years or the accrued interest is paid upon a financing event of $5 million or more. The program has preference for matching other sources of capital such as federal grant programs like SBIR/STTR, angel financing or owner's equity.

To ensure that all applicants were evaluated on the basis of the merits of their proposals, the Center developed a novel and rigorous peer review process that is modeled, in part, on the approach used by the National Institutes of Health (generally considered as the "gold standard"), Venture Capital Firms and Corporate Investors.

The review process included:

- An evaluation scorecard that reviewed the merits of the application from a scientific, business, and economic development perspective, as well as strategic fit with the mission and vision of MLSC;
- A peer review process, in which over 60 reviewers participated. Reviewers represented Technology Licensing Offices (TLO's), Venture Capital Firms, Angel investors, and research institutions that specialize in life sciences, academic institutions and medical centers. Each application had multiple reviewers, who were assigned based on expertise related to the applicant company's technology;
- Review of applications by members of the Center's Scientific Advisory Board (SAB). The SAB made recommendations to the Center's Investment Committee;
- Group discussion of applications by the SAB and identification of "finalists"; and
- In-person meetings with the finalists recommended by the SAB.

The Center received a total of 88 Accelerator applications before the solicitation period closed. While the bulk of the companies were located in Cambridge and around the 128 corridor, we also received applications from companies in cities and towns around the state, including Fall River, Holliston, Newburyport, Norwood, Salem and Worcester.

Of these 88 applications, 73 applicants, or 84% of the pool were categorized as follows, with the remaining 16% coming from other life sciences categories:

- ... 46% (40) were in the Device & Diagnostic and Medical Imaging categories;
- ... 24% (21) were in Drug Discovery, including Genomics, HTS, Combinatorial Chemistry, etc.
- ... 14% (12) were in Life Science Technology Categories.

In April 2009, the Board of Directors approved the funding of seven (7) Accelerator Loans for a total investment of $3.4M. These seven companies were designated by the Center as certified life sciences companies as required by the Life Sciences Act.

Company	Location	Area of Development	Loan Amount
Eutropics Pharmaceuticals	Dorchester	Developing drugs for treating aggressive forms of cancer	$500,000
Good Start Genetics	Boston	Developing a low-cost pre-pregnancy test for 50 genetic disorders	$500,000
InVivo Therapeutics	Cambridge	Developing technology to treat traumatic spinal cord injuries	$500,000
PluroMed	Woburn	Pioneering injectable plugs that occlude blood flow to provide surgeons with bloodless fields	$500,000
Spectra Analysis	Marlborough	Developing instrumentation to analyze the molecular structure of each compound in a complex mixture	$500,000
Wadsworth Medical	Westborough	Developing a painless, needleless wound closure system without anesthesia or sutures	$400,000
Wolfe Laboratories	Watertown	Provides quality assay, formulation, and process development for biotech and pharmaceutical co's	$500,000

Private Partnerships:

An important part of the Center's mission is to attract additional investment dollars to the life sciences sectors in addition to the state funds that flow through the Center's portfolio. In FY '09, the Center launched the Corporate Consortium Program, which enables each dollar funded by the Center to be potentially matched by a corporate investor. Corporate Consortium members, in exchange, are provided with a non-voting seat on the Investment Sub-Committee of the Center's Board of Directors and the opportunity to have a view of the window of innovation in the Commonwealth.

In January 2009, the Center announced the Charter Member of the Consortium, Johnson & Johnson (JNJ). To date, JNJ has committed $500K to the Center's Accelerator Loan Program over two fiscal years. In addition to the early-stage companies that received Accelerator loans from the Center, JNJ requested permission to approach eleven (11) additional applicant companies for evaluation by JNJ for potential operational collaboration or funding from one of the JNJ family of companies. Due to scarce resources, the Center was not able to provide direct financial support to these 11 companies. Through the Corporate Consortium Program, however, the Center can provide promising early-stage companies with access to private capital, even during these challenging economic times.

The Center's Consortium Program is a unique funding vehicle which is attracting interest across the country as a model for public-private investment. Encouraged by its success, we plan to expand the Consortium Program to include more private, public and foundation participants in Fiscal Year 2010.

Supporting Innovation and Job Creation:

The Innovation Fund is designed to ensure that the Center can respond to opportunities that hold promise for great economic and/or scientific impact, but do not fit into the Center's existing program categories. Through this fund, the Center can invest in growth opportunities with potential for substantial returns in job creation, revenue enhancement and scientific advancement.

In January 2009 the MLSC Board of Directors approved a $7.4 million grant from the Innovation Fund, to be paid over two fiscal years, that will facilitate the expansion of Organogenesis, a Canton-based regenerative medicine company. The Board also certified Organogenesis as a Certified Life Sciences Company under the provisions of the Life Sciences Act.

Organogenesis was the first company to successfully commercialize and mass produce a living cell product, and it's locally manufactured regenerative medicine products are now shipped around the world. Regenerative medicine is a revolutionary and rapidly developing field of medicine that applies living cells as therapies to restore the structure and function of damaged tissues and organs in order to treat multiple diseases.

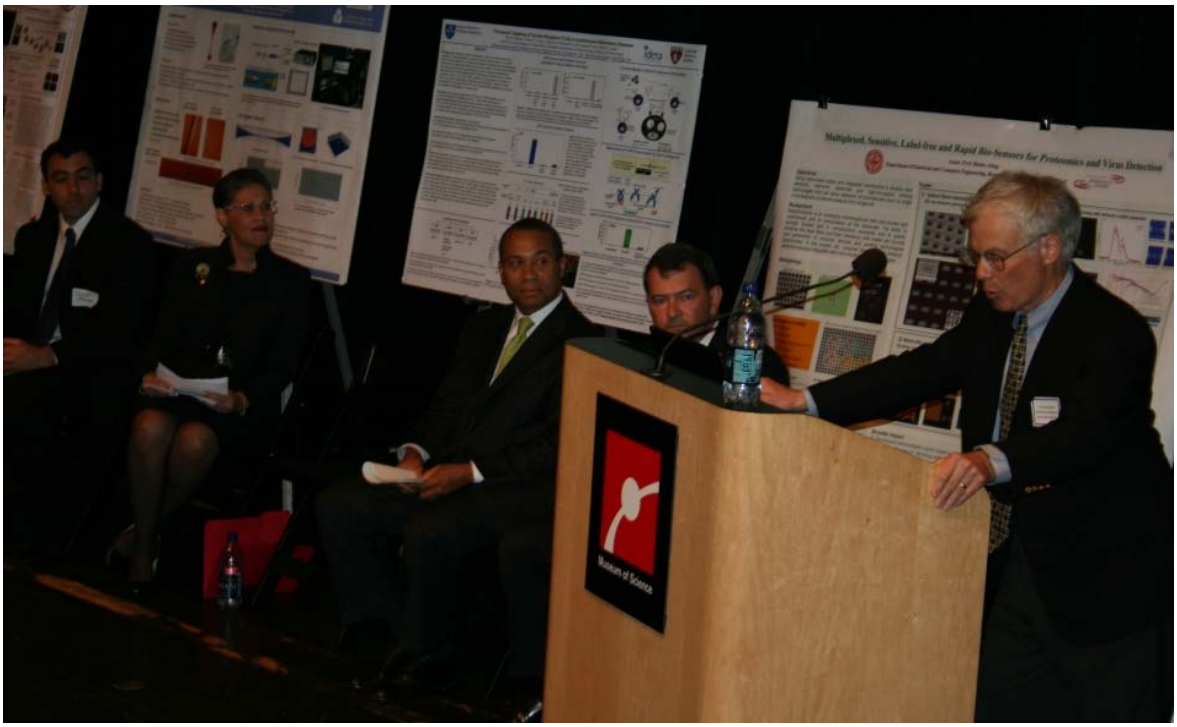
The company has invested millions of dollars locally to meet its long-term growth plans, including the purchase of two buildings near its headquarters to develop a campus to support Organogenesis' forecasted growth across all departments. The expansion's first major milestone is expected to be completed in 2009, with the opening of Organogenesis' new headquarters offices. The company's expansion plans include the construction of a highly advanced, state of the art regenerative medicine research and development and manufacturing plant that is expected to be the largest cell therapy manufacturing facility in the world. The company forecasts that the Center's investment will bring a return for the Commonwealth of approximately $6 million in annual tax revenue by 2013 and a leveraging of more than $50 million in private investment. Organogenesis also expects that the grant will lead to a greater than twofold increase in the company's workforce including the creation of approximately 280 new jobs by 2013.

Filling the Innovation Pipeline:

The Center's Research Matching Grant Program is designed to support research in the life sciences, promote technology transfer, and support the competitive position of Massachusetts academic institutions and medical centers. To accomplish these objectives, the Center released three matching grant solicitations: the New Investigator Research Grants, the New Faculty Startup Grants, and the Cooperative Research Grants. The New Investigator grant is designed to spur innovative research and advance the careers of new investigators working in the life sciences at

research institutions in the Commonwealth. The New Faculty Startup grant was intended to increase the number of nationally prominent faculty working in the life sciences at Massachusetts colleges and universities. The Cooperative Research grant is designed to encourage industry-sponsored research at research institutions and facilitate the commercialization of scientific discoveries and inventions with beneficial medical applications.

To ensure that all applicants were evaluated on the basis of the merits of their proposals, the Center developed a rigorous peer review process that is modeled on the approach used by the National Institutes of Health, generally considered as the "gold standard." For each solicitation, the Center's Scientific Advisory Board reviewed applications and made recommendations to the Center's Board of Directors which rendered the ultimate decisions for successful grant awardees.



Massachusetts Life Sciences Center Scientific Advisory Board Chairman Dr. Harvey Lodish addresses a gathering held to recognize the Centers research matching grant recipients at the Boston Museum of Science.

For each research dollar invested by the Center, a dollar-for-dollar match must be provided by either the research institution or the industry sponsor (in the case of the Cooperative Research awards). On July 23, 2008, the Board of Directors approved the funding of eleven (11) New Investigator grants from a pool of thirty-five applicants, and five (5) Faculty Startup grants from a pool of twelve applicants. On December 16, 2008, the Board of Directors approved funding for six (6) Cooperative Research grants from a pool of twenty-seven applicants. The second round of the New Investigator solicitation was launched in February of 2009, with seven (7) New Investigator grants being awarded at the Board's June 24, 2009 meeting from a pool of fifty-seven applicants. The diversity of awards across public and private institutions, as well as across regions of the state, is a hallmark of the Center's matching grant programs.

The grantees are as follows:

MA LIFE SCIENCES CENTER – RESEARCH MATCHING GRANT AWARDS		
NEW INVESTIGATOR AWARDS AUTHORIZED JULY 2008		
PRINCIPAL INVESTIGATOR	**INSTITUTION**	**RESEARCH**
Wenyi Wei	Beth Israel	Dissection of the signaling pathways controlling the destruction of the Mdm2 oncoprotein
Hatice Altug	Boston University	Development of multiplexed, ultra-sensitive, label-free and rapid biosensing technologies for proteomics and virus detection applications.
Thomas Bernhardt	Harvard Medical	New strategies for identifying antibiotic targets
Alexander Meissner	Harvard University	Characterizing the Pluripotent State through Integrative Genomic Analysis
Jorge Mora	Massachusetts General Hospital	The role of the SIRT6 chromatin factor in DNA repair and in metabolic homeostasis
Laurie Boyer	Massachusetts Institute of Technology	Investigating how chromatin organization in embryonic stem cells influences cell fate specification
Jeroen Saeij	Massachusetts Institute of Technology	Molecular Characterization of Toxoplasma Kinases In Virulence
Christopher Schonhoff	Tufts Veterinary School	A Novel Vaccination Strategy to Prevent Clostridium difficile-Associated Diarrhea (CDAD)
Jesse Mager	UMass Amherst	High-Throughput Generation of Improved Antibiotics
Xingwei Wang	UMass Lowell	Miniature Label-free Biosensing Probes for Rapid Detection of Virus, Bacteria, and Cells
Iain Cheeseman	Whitehead Institute	A Molecular Toolkit for Analysis of the Human Kinetochore

FACULTY START-UP AWARDS AUTHORIZED JULY 2008	
INSTITUTION	**AREA OF EXPERTISE**
Boston University	Bioengineering
Brandeis University	In Vivo Imaging of Brain Function
University of Massachusetts Amherst	Systems Biology
University of Massachusetts Boston	Biomedical Sciences
University of Massachusetts Lowell	Biomanufacturing Science and Engineering

COOPERATIVE RESEARCH AWARDS AUTHORIZED DECEMBER 2008		
PRINCIPAL INVESTIGATOR & INSTITUTION	**INDUSTRY SPONSOR**	**RESEARCH**
Richard Lee, Brigham & Women's Hospital	Biomeasure, Milford	Design and Testing of New Regenerative Protein for Local Delivery
David Weitz, Harvard University, School of Engineering & Applied Science	Raindance Technologies, Lexington	Cooperative Development of a Functional Fluorescent-Activated Cell Sorter
Judy Lieberman, Immune Disease Institute	Baxter Healthcare Corporation	An siRNA-based Microbicide
Andrew Luster, Massachusetts General Hospital	Idera Pharmaceuticals, Cambridge	Therapeutic Targeting of Toll-like Receptors in Auto-Immune Inflammatory Diseases

Rudolf Faust, UMass Lowell	Boston Scientific, Natick	Novel Polymer Biomaterials
Michael Czech and Gary Ostroff, UMass Medical School	RXI Pharmaceutical, Worcester	Development of Orally-Delivered RNAi Therapeutics

NEW INVESTIGATOR AWARDS AUTHORIZED JUNE 2009		
PRINCIPAL INVESTIGATOR	**INSTITUTION**	**RESEARCH**
Christopher Gabel	Boston University Medical Center	The study of neural regeneration in *C. Elegans* using femtosecond laser surgery and advanced optical neurophysiology
Satoshi Yoshida	Brandeis University	How cells respond to stress
Sun Hur	Immune Disease Institute, Children's Hospital	Structural and kinetic investigations of the mechanism for self vs non-self RNA discrimination by RIG-I
Konstantina Stankovic	Massachusetts Eye and Ear Infirmary	Functional role and therapeutic implications of osteprotegerin secretion by the auditory nerve
Raul Mostolovsky	Massachusetts General Hospital	The chromatin factor SIRT6 is a master regulator of glucose homeostasis
Mark Niedre	Northeastern University	Optical tomographic sensing and enumeration of rare circulating cells in vivo
Jeffrey Bailey	University of Massachusetts Medical School	Dissecting the role of human copy number variation in severe malaria

Harnessing the Potential of Stem Cell Research:

Embryonic stem cell research holds the potential for development of new, more effective treatments -- and even cures -- for serious human ailments, such as juvenile diabetes, Parkinson's disease, cancer and spinal cord injuries. Embryonic stem cells are important because they can develop into any cell type in the body. Research into these cells can help us understand inherited diseases by allowing scientists to study human cells bearing the exact genetic defects that cause disease in patients.

In October 2007, the Center's Board of Directors authorized $570,000 for the creation of the International Stem Cell Registry and approximately $7.7 million for the creation of the Massachusetts Stem Cell Bank, both at the University of Massachusetts Medical School in Worcester. The Registry and Bank are a joint initiative between the Center and the University of Massachusetts Medical School that serves as a primary resource interface for the global stem cell research community. The Bank and Registry opened and began full operation in 2008. In June of 2009, the MLSC Board of Directors approved $695,000 in continued funding for the International Stem Cell Registry.

With the Obama Administration's lifting of federal restrictions on embryonic stem cell research, these important and timely investments have helped position Massachusetts to compete for new federal research dollars, as well as provide stem cell lines to national and international academic and commercial organizations.

Developing and Distributing Talent:

The Center is committed to supporting the ongoing development and regional distribution of a well-trained workforce to sustain and strengthen the Commonwealth's life sciences sectors. As part of this mission, the Center recognizes that advancing STEM education in Massachusetts must be at the core of our workforce development goals. Broad access to STEM education is essential to strengthening our workforce, and to addressing racial, ethnic and gender disparities in the life sciences workforce in Massachusetts. Providing such opportunities will help to retain talent as young people graduate from Massachusetts colleges and universities, while opening up career paths in the life sciences, where jobs pay on average substantially more than jobs in other sectors of the economy. For example, jobs in biotechnology pay on average 89% more than the annual average wage in Massachusetts.

The Center began its workforce development investments in FY '09 with the Life Sciences Talent Initiative and the Life Sciences Internship Challenge.

Life Sciences Talent Initiative Report

The Life Sciences Talent Initiative (LSTI) study was a year-long project, co-sponsored by the Center and the Massachusetts Biotechnology Council, and conducted by the UMass Donahue Institute. The Executive Report for the LSTI was published in September 2008 with the full technical report available in November 2008. Hundreds of business and academic leaders were engaged in the LSTI study. As a result, this initiative provides a comprehensive assessment of the higher education and workforce challenges facing the Massachusetts life sciences Supercluster.

The study's findings include:

... Employment growth in life sciences occupations is expected to grow nearly twice as fast as total employment in Massachusetts. While overall employment is expected to grow 5.9 percent between 2006 and 2014, employment in life sciences occupations is expected to grow 11.2 percent in that same period, even in the absence of state policy changes and investment.

- The Life Sciences sectors have been creating very good jobs, a great many of which require advanced levels of education and training. The study estimates that over 80% of the jobs that will be created in the sectors will require a Bachelor's degree or better.

- Life Sciences employers surveyed for the study emphasized the need for more collaboration between industry and higher education institutions on programs, curriculum, and practical training opportunities such as internships and cooperative education.

- Industry executives interviewed also expressed concern about the pipeline of Massachusetts students prepared to enter careers in the life sciences, and emphasized the importance of K-12 education in science, technology, engineering and math fields.

In addition to funding the LSTI report, staff from the Center met with representatives of large and small companies, research institutions, vocational and technical high schools, community colleges, public and private higher education institutions, and workforce experts at sister governmental agencies, all of whom provided valuable additional insights regarding the imperative of a skilled workforce.

On December 12, 2008, the Center hosted a Workforce Development Roundtable with representatives from the Executive Offices of Education and Labor and Workforce Development, the MassBioEd Foundation, members of the Life Sciences Collaborative's Human Capital Task Force, the Massachusetts Technology Leadership Council, the Museum of Science, community and state colleges, and public and private higher education institutions. Following a plenary discussion, breakout groups explored and developed recommended action steps regarding three areas of universal concern:

- STEM education at the elementary and secondary levels
- Internships and cooperative programs
- Sourcing partnerships to address skill shortages.

Based on recommendations from the Roundtable, LSTI report, other studies of workforce needs in Massachusetts and input from our outreach activities we determined that the Center's limited resources in FY '09 could best be used to focus on a critical short-term need – providing undergraduate students and recent graduates studying STEM subjects with an opportunity to explore a career path in the life sciences through the internship program described below.

Life Sciences Internship Challenge

As part of the Center's efforts to support workforce development, the Center designed the Internship Challenge to provide 2009 summer internships to more than 100 undergraduate Science, Technology, Engineering and Mathematics (STEM) majors interested in exploring career opportunities in the Commonwealth's life

sciences companies and research institutions. The total cost of the program was approximately $500,000.

Students who were selected for the Internship Challenge program received a stipend of $4,800 for 8 weeks of work ($15 per hour maximum) and host companies committed to providing a dedicated mentor and meaningful internship opportunity to eligible students. The Center provided the web-based interface for students and companies to match skills to demand. Host companies were able to review on-line resumes, contact and interview candidates, select interns for their programs, and notify the Center of their desire to provide an internship to a qualified student.

Andrew Kenoian and Kelly Johnson of Worcester Polytechnic Institute with their new mentors at Clinton-based NP Medical, President Boris Levin (left) and Sr. Director of Operations Larry Dube (right)

Host companies were challenged to provide meaningful internships to qualified undergraduates, to match Center funds, where feasible, and to expand existing internship programs to accommodate more students. Four-year colleges and universities and community colleges with specialized programs in the life sciences were challenged to inform and recruit qualified students to submit their credentials via the Center's website.

The objectives of the Internship Challenge are to:

- Provide the life sciences community with a talented pool of young scientists;
- Enable more students to explore career opportunities in a challenging economic environment;
- Encourage more life science companies to mentor students and provide internship opportunities across a broader spectrum (e.g., early-stage companies);

- Recognize, support, and publicize the internship opportunities that presently exist for students;
- Increase awareness and meet a need identified by multiple talent reports;
- Provide a peer network of young scientists and students interested in working in the life sciences through educational and networking events, as well as online networking websites such as Facebook;

- Minimize the administrative burden on participating companies

The importance of providing internship opportunities to undergraduate STEM majors has been documented extensively in multiple talent reports, and reinforced through discussions with members of the Life Sciences Talent Initiative (LSTI) Steering Committee and expert participants in the workforce development roundtable hosted by the Center in December 2008. Five talent reports prepared within the past year recommended internships for undergraduate students including the LSTI study, a McKinsey report, a comprehensive state-wide study conducted for CommCorp by Northeastern University's Center for Urban and Regional Policy, the Massachusetts Business Alliance for Education, and a report prepared by MIT's Industrial Performance Center on bio-manufacturing in Massachusetts.

The Internship Challenge was designed to provide students and companies with the tools to connect with one another. With that in mind, the Center conducted an extensive outreach campaign to students and companies to participate in the Internship Challenge, and then supported companies in finding the best match of skills for their needs.

Based on our consultations with members of the SAB and human resource managers at life sciences companies across the state, the Center limited the eligibility of students to upperclassmen and recent graduates, or community college students with at least one year of specialized training, who would have more specialized knowledge and therefore provide greater value to companies. The Center also learned that smaller life sciences companies often did not have the financial resources or capacity to launch an internship program, but would be eager to mentor an intern if the administrative burdens to the company were minimal. The Center accepted matching funds from host companies that could afford to pay, however this was not a pre-requisite to participation.

Feedback from the Internship Challenge

"This experience has been an awesome opportunity to learn about the biotech industry that I otherwise would not have experienced without the Center's program. I hope the Internship Challenge Program will give me a leg-up when applying to graduate school, and in my career, because I will have had actual lab experience."

- Andrew Bartley, a senior from Worcester Polytechnic Institute who worked as a research associate this summer at Worcester-based EpigenDx, Inc

"We've been extremely pleased with the Internship Challenge program. Our two interns, both Chemistry majors at WPI, have been big assets in the lab, and we're thrilled that the Center facilitated the entire process. We found suitable resumes immediately, interviewed six candidates and chose two very rapidly, and they started work the next week. This is probably the best organized and most transparent state program I've ever seen. Best of all, it gives good students useful work experience and good companies, especially small ones like mine, a boost. What a great use of funds!"

- Dr. Jeffrey Kiplinger, President of Worcester-based Averica Discovery Services, Inc.

More than 500 students and recent college graduates submitted applications on the Center's web site. One hundred and four (104) interns were placed with a total of fifty seven (57) life sciences companies and research institutions. Of the 57 intern sponsors, 83% were life science companies and 17% were research institutions. Students who received placements are studying at, or have graduated from, 29 public and private academic institutions distributed geographically across the Commonwealth. Sponsors that participated in the program are representative of the state's life sciences cluster: 25% of the sponsors were bio-pharma companies, 24% medical device and diagnostics companies, 17% providers and universities, and 12% tools and technologies companies. Several of the interns secured full-time paid positions with their host companies at the conclusion of their internships.

See Appendix B for a map indicating the locations of the intern sponsors and the academic institutions of the student interns.

Investing in Industry and Job Creation:

The Life Sciences Tax Incentive Program:

The Center's Life Sciences Tax Incentive Program includes incentives that are relevant to companies at every stage of development. Nine different tax incentives are available to foster growth and expansion, with a cumulative annual cap of $25 million. To qualify, companies must receive certification from the Center and must demonstrate both the economic and scientific merits of their expansion plans.

The solicitation for the first round of applications to the Tax Incentive Program was posted on January 1, 2009 and the application period closed on May 15, 2009. The Center received a total of 84 applications. The first round of awards will be determined by the end of December 2009.

While the Life Sciences Act imposes an annual cap of $25 million on our tax incentives, applicants applied for approximately $241 million in 2009 alone and more than $1 billion over the next five years. The applicants represent a diverse array of companies by size, region, and industry segment. As with the Accelerator Loan Program, the Center must select a relatively small number of awardees from an impressive field of applicants with meritorious applications.

Applicants for the Center's tax incentives were required to include in their application the following information:

- **Specific tax incentives** for which they were applying
- **Amount of the tax incentives for which they were applying** – for 2009 and over the next five years
- **Supporting analysis** demonstrating that the company would qualify for the tax incentive(s) being requested

To assist in developing a selection process and criteria, the Center's staff invited input from the marketplace for this first-ever round of Life Sciences Center tax incentive awards. On June 22, 2009 the Center convened a roundtable of economic development and tax experts from industry, academia and government. Roundtable participants also included representatives from key stakeholder organizations, including the Massachusetts Biotechnology Council (MBC), the Executive Office of Administration and Finance (ANF), and the Massachusetts Office of Business Development (MOBD. We also solicited input from experts in academia, including:

- Dr. Clyde Barrow from the University of Massachusetts;
- Dr. Karl Seidman from MIT; and
- Dr. Richard Tresch from Boston College.

The roundtable discussion validated the Center's approach, namely that the key driver in selecting the tax award recipients should ***be economic development, primarily in the form of job and revenue generation.***

The Center developed the application review approach with three major objectives in mind: First, the importance of the Center's economic development mission, i.e., job creation and regional growth. Our second objective was to develop an inclusive approach where all applicants had a fair opportunity to be considered. Finally, we wanted to develop a process that is consistent with the Center's commitment to maintain replicability and transparency in our decision making processes.

Staying Connected:

The Center's communications program is designed to accomplish three objectives: 1) keep our stakeholders and the general public informed about the Center's investments of public dollars; 2) promote public accountability for the Center's progress in accomplishing our mission and 3) provide ongoing updates and information exchange with the life sciences community.

Electronic Communications:

During FY '09 the Center expanded its web site, adding a section about Center programs and including the addition of web-based forms to facilitate applications. The application processes for the Accelerator, Tax Incentive and Internship Challenge Programs were handled primarily on-line through the Center's web site. (The Center also accepts hard copy applications so as not to disadvantage applicants without access to a computer.)

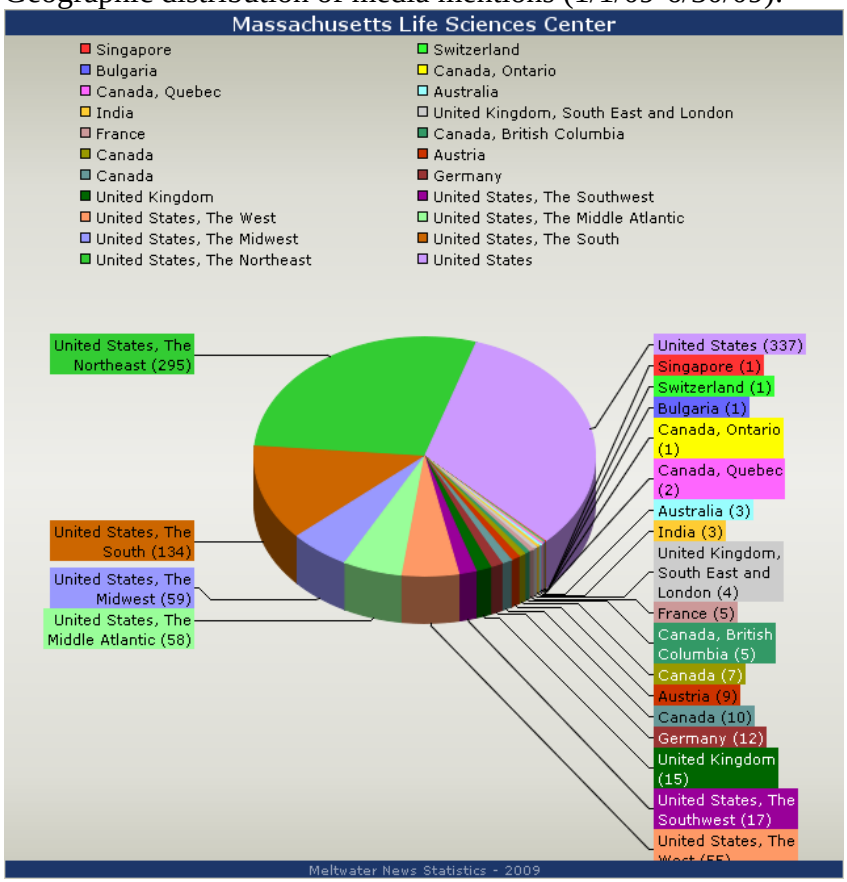
Keeping Stakeholders Informed:

During FY '09 the Center's email database of life sciences stakeholders grew to more than 1,500 individuals, demonstrating the sustained interest in the Life Sciences Initiative. Interested individuals can sign up for inclusion in the Center's database on our web site, or at Center-sponsored events. In FY 09 we also launched the Center's first electronic newsletter, the *Life Sciences Accelerator.*

Media Outreach:

The Center had more than 600 media mentions since formal tracking begin in January of 2009. Center activities were covered by publications across the nation and around the world. The chart below shows the distribution of the Center's media coverage during the final two quarters of FY '09 by region. Periods of greater coverage tended to coincide with announcements of new programs or investments.

Geographic distribution of media mentions (1/1/09-6/30/09):



Public Appearances:

During FY '09 Center staff participated as presenters, speakers or panelists at more than 100 public events.

The Big Bang – Bio International 2009:

The Bio 2009 conference in Atlanta, Georgia was a highly successful one for the Center and the Massachusetts delegation. The Life Sciences Center took the lead in coordinating a 3,000 square foot pavilion on the show floor – which one Massachusetts company representative deemed "best in show." The Center was joined by twenty Massachusetts-based exhibitors. The pavilion's theme was "The Big Bang – the Massachusetts Life Sciences Supercluster." Featured events included a Tuesday evening pavilion reception with Governor Deval Patrick, a Massachusetts CEO breakfast sponsored by Center Board Member Josh Boger, an international breakfast sponsored by the Massachusetts Office of International Trade and Investment (MOITI) and a Town Hall Forum with Governor Patrick and Massachusetts business leaders on "Financing in the New Economy."

Traffic at the Massachusetts pavilion was consistently heavy throughout the show, and all of the events that the Center sponsored or co-sponsored were well attended. Business development meetings took place with numerous companies and with international delegations from Australia, Japan, Israel, the Netherlands, Canada, the United Kingdom, France, Brazil, Italy, and Germany. Center staff came home with dozens of new leads and business relationships that are being followed up on diligently.

MLSC Coordinates Massachusetts Pavilion at 2009 BIO International Convention

"The Big Bang" - the Massachusetts Pavilion at Bio 2009

Massachusetts Biotechnology Council President Robert Coughlin, former President & CEO of Vertex Pharmaceuticals Josh Boger, CEO of InVivo Therapeutics Frank Reynolds, and Governor Deval Patrick at Bio 2009

BIO 2009 in Atlanta – A big success for Massachusetts

Governor Deval Patrick, President & CEO of RainDance Technologies Chris McNary, Massachusetts Life Sciences Center President & CEO Susan Windham-Bannister, and Bio International Chairman Josh Boger speak at a town hall meeting in the Massachusetts Pavilion at Bio 2009

MASSACHUSETTS LIFE SCIENCES CENTER

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At Bio 2009 the Center introduced a new brochure to better convey the Center's mission and programming. The brochure can be viewed at the Center's web site at www.masslifesciences.com.

Looking Ahead:

Fiscal Year 2009 was a fast-paced and productive year for the Massachusetts Life Sciences Center, with substantial progress made in implementing the Massachusetts Life Sciences Initiative. Through a strategy of seeding, accelerating and matching, the Center made carefully considered and targeted investments in the growth of the Massachusetts Supercluster, leveraging significant private investment and creating jobs at a critical time for our state's economy.

From inception through June 30, 2009, the Life Sciences Investment Fund has received appropriations from the Commonwealth of Massachusetts of $40 million. In addition, the Center has received investment income of approximately $1.8 million during the corresponding period for total inflows of approximately $41.8 million. The Center reserves all of the funds required for a grant or loan commitment at the time of Board of Directors' authorization. From inception through June 30, 2009, the Center has disbursed or reserved approximately $37.3 million, resulting in approximately $4.5 million of available funds as of June 30, 2009 to make future awards and support operating expenses.

Since the close of the fiscal year, the Life Sciences Center Board of Directors has committed $600,000 to fund three additional New Investigator grants, and $2.675 million in operating expenses for FY '10, resulting in $1.2 million in uncommitted funds. In addition, the Board has authorized $90 million in capital spending over the next several fiscal years to finance the construction of the Albert Sherman Center at the University of Massachusetts at Worcester. The Sherman Center will be a state-of-the-art research and education facility designed to maximize collaboration among researchers, educators and learners across disciplines. The new facility will be home to the Advanced Therapeutics Cluster (ATC), comprising the RNA Therapeutics Institute, Center for Stem Cell Biology and Regenerative Medicine and the Gene Therapy Center, and contain wet research space for more than 100 investigators.

During the month of September 2009, two of the Center's seven Accelerator portfolio companies received FDA approval for innovative medical technologies. Wadsworth Technologies announced in September 2009 that their DermaLOC wound closure system had been approved by the FDA. Pluromed announced shortly thereafter that they had

received FDA approval for Backstop, a device used in ureteroscopic kidney stone management procedures. This "hit rate" is a tremendous validation of the expertise of the Center's scientific and business advisors, and the rigor and sophistication of the Accelerator review process that the Center developed and implemented.

During the coming year the Center will be awarding the first round of $25 million in Life Sciences Tax Incentive awards, making new capital investments, and serving as a convener for the life sciences community. Other programming remains dependent on the level of appropriation received in FY '10 for the Life Sciences Investment Fund. With continued support and resources from the Legislature, the Center will be able to continue its record of providing a solid return on investment for the taxpayers of the Commonwealth.

Note: Financial statements are contained in the accompanying Fiscal Year 2009 Audit Report by PricewaterhouseCoopers.

Appendix A

The Board of Directors of the Massachusetts Life Sciences Center as of June 30, 2009
(Denotes New FY 09 Member)***

- **Greg Bialecki, Co-Chair ***
  Secretary, Executive Office of Housing and Economic Development
- **Leslie A. Kirwan, Co-Chair**
  Secretary, Executive Office for Administration and Finance
- **Jack Wilson, Ph.D.**
  President, University of Massachusetts
- **Marc D. Beer**
  Former President & CEO, ViaCell, Inc
- **Josh Boger, Ph.D.**
  Former President & CEO, Vertex Pharmaceuticals
- **Peter L. Slavin, M.D.**
  President, Massachusetts General Hospital
- **Lydia Villa-Komaroff, Ph.D.**
  Board Member and Chief Scientific Officer, Cytonome/ST

Massachusetts Life Sciences Center Scientific Advisory Board Members as of June 30, 2009
(Denotes New FY 09 Member)***

- **Harvey Lodish, Ph.D. , Chair**
  Whitehead Institute, and Professor of Biology and of Bioengineering, MIT
- **James Barry, Ph.D.**
  Senior Vice President, Corporate Research and Advanced Technology Development, Boston Scientific Corporation
- **Doug Cole, M.D. ***
  General Partner, Flagship Ventures
- **James J. Collins, Ph.D.**
  Professor of Biomedical Engineering, Boston University
- **George Q. Daley, M.D., Ph.D.**
  Children's Hospital Boston, Harvard Medical School, Harvard Stem Cell Institute
- **Patricia K. Donahoe, M.D.**
  Director Pediatric Surgical Research Laboratories and Chief Emerita Pediatric Surgical Services at Massachusetts General Hospital, and the Marshall K. Bartlett Professor of Surgery, Harvard Medical School
- **Jonathan Fleming, M.P.A.***
  Managing General Partner, Oxford Bioscience Partners
- **Jean M. George, M.B.A.***
  Partner, Advanced Technology Ventures

- **Lila Gierasch, Ph.D.**
  Professor, Biophysical Chemistry, Department of Biochemistry, University of Massachusetts Amherst
- **Richard A. Goldsby, Ph.D.**
  John Woodruff Simpson Lecturer and Professor of Biology, Amherst College
- **Jeffrey Leiden, M.D., Ph.D.***
  Managing Director, Clarus Ventures
- **David T. Scadden, M.D.**
  Professor of Medicine, Harvard University, Co-Chair, Department of Stem Cell and Regenerative Biology, Harvard University, Co-Director, Harvard Stem Cell Institute, Director, MGH Center for Regenerative Medicine
- **Alan E. Smith, Ph.D.**
  Chief Scientific Officer, Genzyme Corp.
- **Allison Taunton-Rigby, Ph.D.***
  CEO and Director, RiboNovix, Inc.
- **David Walt, Ph.D.**
  Robinson Professor of Chemistry and Howard Hughes Medical Institute Professor at Tufts University School of Medicine
- **Philip Zamore, Ph.D.**
  Professor, Biochemistry and Molecular Pharmacology, UMass Medical School

Appendix B – Internship Challenge Map