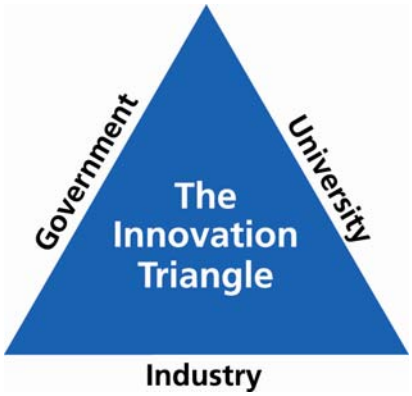

University-Industry-Government Model Partnerships

Collaborations to Meet Global Challenges

Mass Insight CORPORATION

This **Model Partnerships** report is a collection of profiles of talent/education and R&D partnerships between university, industry, and government partners in the life sciences, financial services, and clean energy sectors, with a special chapter devoted specifically to university partnerships. Launched at the U.S.-China-India Innovation Partnerships Conference, many of the featured partnerships are collaborations between institutions in Massachusetts and Asia, but examples of other U.S. and global partnerships are included. The report is primarily a web publication with this print edition produced specifically for the convenience of our key partners. To view the report online, please visit http://www.massinsight.com/mpr.

This report is in many ways a precursor to the **U.S.-China-India Model Partnerships Study** – focused on large-scale university-industry collaborations and the government policies required to support them. The Study, which Mass Insight will lead in 2009 and 2010, is being developed in answer to the conference's call for better partnership models and will offer a significantly more in-depth examination of international university-industry-government partnerships in the finance, life sciences, clean energy, and IT sectors. Focused especially on emerging models in China and India and lessons learned from those in the U.S., the main objectives of the Study will be to:

Identify lessons from successful partnerships in the U.S., China, and India, as well as selected examples from Europe and Asia that can inform new partnerships;

Shape the next generation of talent and innovation partnerships with recommendations for universities, industry and government; and

Consider the policies and investments to support the next generation of partnerships (e.g., the proper role of government in supporting partnerships).

The plan for the Study will be developed by an international advisory group and will be implemented by research partners in the U.S. and Asia. The advisory group will be assembled this winter and will select the research firm and secure foundation funding. Research will begin in the summer.

If you would like more information about the Study, please contact Mass Insight editorial and communications director B.J. Richards at bjrichards@massinsight.com

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University Collaboration

Energy Technology Innovation Policy (ETIP)

Harvard University Belfer Center for Science and International Affairs

MISSION

To identify and promote strategies that the United States, China, and India can pursue, separately and collaboratively, for accelerating the development and deployment of advanced energy options that can reduce conventional air pollution, minimize future greenhouse gas emissions, reduce dependence on oil, facilitate poverty alleviation, and promote economic development.

PROGRAM

ETIP researchers investigate the patterns and processes of energy-technology innovation, and especially the role of government policy in the development and deployment of advanced and cleaner energy technologies. ETIP concentrates on the electricity and transportation sectors, emphasizing policies for advanced coal, carbon capture and storage, biofuels, cleaner and more efficient vehicles, and biomass-gasification technologies. ETIP focuses on the critical nations of the U.S., China, and India in order to multiply its leverage globally and facilitate the pursuit of cooperative efforts.

Location: Cambridge, Massachusetts

Cross Border: Yes

Partner Nationality: Global

Focus by Region:

United States: ETIP is one of the world's leading research groups studying and shaping energy and climate-change policies in the U.S. ETIP plays a central role in assessing U.S. energy policy and recommending specific policy actions. Areas of particular focus in the United States are climate change policy and energy technology policy, especially with respect to the transportation sector and carbon capture and storage.

China: In China, ETIP primarily addresses energy challenges related to the transportation and electricity sectors. ETIP works in partnership with the Chinese Ministry of Science and Technology to conduct in-depth research on Chinese energy and environmental policy and has also promoted cooperation between China and the U.S., facilitating the first joint agreement on mobile sources of air pollution between the environmental protection agencies of both countries.

India: In India, ETIP's efforts are devoted to the energy-related challenges of the transportation and electricity sectors, as well as biomass gasification—the source of as much as one-third of India's primary energy. ETIP's Indian partners include the Indian Institute of Technology in Delhi and the Energy and Resources Institute.

FUNDING

Annual Budget: Approximately USD $2.5 million

Sources: Current and past grants and gifts from Doris Duke Charitable Foundation, The Energy Foundation, The David and Lucile Packard Foundation, The William and Flora Hewlett Foundation, The U.S. Environmental Protection Agency, The Winslow Foundation, Ford Motor Company China, General Motors Corporation China, Shell Oil, The Pew Center for Global Climate Change, BP International, Ltd., BP Alternative Energy Holdings, Ltd., and the endowment funds of the Science, Technology, and Public Policy Program of the Belfer Center for Science and International Affairs.

Is future funding dependent upon reaching certain milestones? No.

STRUCTURE

Current Partners: Carbon Mitigation Initiative, Princeton University; China Automotive Technology and Research Center (CATARC); China Ministry of Science and Technology (MOST); Tsinghua University; Chinese Academy of Sciences Institute of Thermoengineering Physics, Indian Institute of Technology, Delhi; The Energy and Resources Institute (TERI).

Governance Structure: The research program is run out of the Belfer Center for Science and International Affairs at Harvard Kennedy School and is directed by Kelly Sims Gallagher. Faculty co-PIs are John Holdren, Director of the Science, Technology, and Public Policy Program, and Henry Lee, Director of the Energy and Natural Resources Program.

Sunset Date: None.

PEOPLE

Staff: Approximately 25 full-time staff include administrative staff, research fellows (graduate students, post-docs, and visiting scholars), and faculty.

Professors/Instructors: ETIP professors are affiliated with Harvard University.

Students: Some research assistant positions are available for Harvard Kennedy School students.

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University-Industry Partnership

Global Climate & Energy Project (GCEP)

PARTNERS & OBJECTIVES

Stanford University: To be at the forefront of clean energy research

Exxon Mobil Corporation, General Electric Company, Schlumberger Technology Corporation, Toyota Motor Corporation: To discover breakthroughs in clean energy sources that lead eventually to commercial applications

MISSION

To create a path toward an energy future that is feasible and practical, applicable to both the developed and the developing world, with much lower greenhouse emissions.

PROGRAM

GCEP is a massive, complex program that conducts basic science research on energy sources with the potential to reduce greenhouse gas emissions. To accomplish this, the organization:

1. Identifies options for commercially viable systems for supplying energy with substantially reduced net greenhouse emissions;
2. Identifies barriers to commercializing those technologies such as cost, performance, safety, regulation, and consumer acceptance;
3. Creates possible solutions to those barriers;
4. Researches the options, commercialization barriers, and potential solutions.
5. Publicizes the options, commercialization barriers, solutions, and research.

Locations: USA, Europe, Australia, and Japan.

Type of Partnership: Talent and innovation.

Cross Border: Yes

Student Nationality: International

Research Areas: Solar energy, biomass energy, hydrogen, advanced combustion, CO_2 capture, CO_2 storage, advanced materials and catalysts, advanced coal, advanced transportation, other renewables, integrated assessment, advanced nuclear energy.

History: Stanford started research conversations with Schlumberger, and then ExxonMobil. Other companies began to express an interest in a global collaboration between academia and industry. In 2002, the collaboration agreement was signed.

FUNDING

Initial Funding: $225 million USD

Sources:

- ExxonMobil plans to invest up to $100 million.
- General Electric plans to invest up to $50 million.
- Schlumberger plans to invest up to $25 million.
- Toyota plans to invest up to $50 million

STRUCTURE

Current Partners and Sponsors: Stanford, ExxonMobil, GE, Schlumberger, and Toyota.

Governance Structure: Stanford University manages the project through the GCEP Management Committee, which includes one person from each of the sponsors. The GCEP also has three advisory committees: the External Advisory Board, Faculty Advisory Committee, and Deans' Advisory Committee. The GCEP central staff coordinates the research efforts of the principal investigators, at Stanford and external institutions, and works with the sponsors. They report to the Dean of Research.

GCEP project selection process is as follows:

1. The GCEP performs a technical assessment of a research area.
2. The GCEP releases a Request For Proposals (RFP) to selected institutions. In certain cases it issues a world-wide targeted call for pre-proposals to screen for concepts that may be appropriate for GCEP research before soliciting full proposals.
3. Each proposal goes through two rounds of reviews with technical experts who have no affiliation with Stanford or the sponsors. Separately, one person from each sponsor reviews the proposals. The final decision about funding is made by the GCEP Management Committee.

The GCEP is governed by the university's rules for research openness. Stanford's policy requires research results to be made public and publication is not subject to prior approval or review of any sponsor.

IP: Stanford or the external institution performing the research holds formal legal title to all technology and information derived from this program and also holds formal legal title to all patents. GCEP sponsors receive a royalty-free license to patents that arise from research funded by the Project. After five years, Stanford or any of the sponsors can license the technology to any other entity that wants to use it.

Sunset Date: The research has a 10 - 50 year time horizon. There is no sunset date.

PEOPLE

Organization: The GCEP currently runs 44 full-term research programs around the world and 11 exploratory research activities. There are 24 institutions collaborating globally plus 17 departments at Stanford.

Research Investigators: 70

Project and Staff Allocation: 6 (Project Director, Executive Director, Managing Director, 3 energy assessment analysts).

Administrative Staff: 4 (Communications Manager, Web and IT Administrator, Administrative Associate, and Event Coordinator).

Students/Target Audience: Over 300. GCEP is preparing a steady flow of talented students who are deeply knowledgeable about the fundamentals of energy conversions. These highly trained people will lead the way in building the world's new energy systems.

Nationality: International

Institutional Affiliation: Stanford and some external institutions.

Education Level: graduate students and post-docs.

ACCOMPLISHMENTS/MILESTONES

The collaboration has applied for 6 patents and has been awarded one.

Advances have been achieved in a number of areas. GCEP researchers note significant progress in their goal of reducing greenhouse gas emissions through new kinds of solar cells in the area of biological energy conversions. In addition, they have achieved a much better understanding of CO2 trapping mechanisms in geological storage reservoirs. Researchers also cite advances in low-cost photovoltaic systems and enhanced biofuel production. Additionally, the GCEP has investigated ways to increase the energy density of lithium batteries for application in transportation; generated new strategies for storing and using hydrogen for transportation; made progress in redesigning engines using highly efficient, low emissions architectures; and "developed a zero-emission coal energy conversion scheme for electricity production."

SUMMARY

GCEP is a an unusual collaboration due to its size and complexity, long time horizon, research independence rules, and its insistence that basic science breakthroughs are owned by Stanford rather than the four corporate sponsors.

In the past, the U.S. government sponsored much of the costly, long-term basic science research that had no immediate commercial application. Stanford did not pursue government grants, and by accepting corporate funding it avoided the red tape that normally accompanies government money. The funds from corporate sponsors, though not expected to yield commercial opportunities for decades, are not considered philanthropy—indeed, this is capitalist self-interest at its best. But in an unusual twist, GCEP appears to share many values common to large philanthropic organizations—independence, objectivity, and transparency.

In the future, GCEP plans to pursue additional research areas such as energy distribution and infrastructure and geoengineering.

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University-Industry Partnership

Clean Energy Research and Education Center (CEC)

PARTNERS & OBJECTIVES

BP
Dr. T. Stephen Wittrig, Director, Advanced Technologies

Objective: To build a capability for independent energy and environmental policy analysis in China and to help China discover new sources of clean energy.

Tsinghua University (Tsinghua)
Dr. Li Zheng, Director, CEC; Professor, Tsinghua University

Objective: To become a center of excellence in the study of Chinese energy policy.

MISSION

The mission of the CEC is comprised of four interrelated components: 1) to become an institute of world influence in energy strategy study for China; 2) to serve as a nexus for information exchange about recent advances and new ideas from around the world and an information center dedicated to clean energy topics; 3) to become a research base for attracting worldwide projects and teams conducting leading edge research, and for strategic thinking on clean energy development; 4) and to help create networks between technology, policy, and government groups to accelerate the implementation of clean energy technologies.

PROGRAM

The Tsinghua BP Clean Energy Center is an independent academic unit of Tsinghua University founded with a grant from BP. Professors, post-doctoral students, and a score of graduate students work at the CEC. In addition, four to five BP scientists and engineers visit the CEC each month for several days at a time to gather information on China's energy and environment, develop new projects, or monitor ongoing projects.

Location: Tsinghua University in Beijing, China.

Type of Partnership: Talent and innovation

Cross Border: Yes

This program is part of BP's Great Universities Programme, a global initiative under which BP has formed partnerships with leading universities around the world, from Princeton and Caltech in the U.S. to MGIMO, Gubkin University of Oil and Gas and D.Mendeleev University of Chemical Technology in Russia, to Cambridge in the U.K.

Student Nationality: Chinese

Curriculum/Research: Windpower, carbon capture and storage (CCS), low carbon coal utilization, urban mobility systems, biofuel technologies, and energy efficiency.

Target population for training: Tsinghua PhD students.

Cross benefits to participants on both sides: BP gains insight into what technologies are likely to play a role in China's future and China benefits from the new technologies likely to arise from the partnership. There is also an important talent aspect to the partnership, because BP gets "first shot at the best" PhDs when hiring for its own operations.

Is the IP open source or protected? Open-source

Who owns the resulting IP, if any? BP owns the resulting energy technologies that are invented under BP's funded projects; otherwise they have no ownership.

What are the expectations, if any, for commercialization? BP, if interested, would negotiate a separate agreement.

TIMELINE

2002: Tsinghua expressed interest in engaging BP's assistance to develop a thinktank for energy policy and technology options for China.

2003: BP agreed to help establish the Clean Energy Centre.

2003-04: The CEC hosted a strategy development project for China's Long Term Science and Technology Development for Energy and Resources.

2005: Polygeneration based on coal gasification (a long-term study at CEC supported by BP) was included in China's National Long-term Science and Technology Development Outline. This document is widely regarded as providing China's strategic direction for coal gasification.

2005-06: The CEC researched the dynamics between energy and the economy in support of the energy strategy study.

FUNDING

Annual Budget: USD $500K annual donation, but will likely rise in future years; BP also funds specific projects at the CEC.

Sources: BP was the sole sponsor when it founded the CEC in 2003 with a grant of $500,000. Today BP is one of many sources of funding.

Is future funding dependent upon reaching certain milestones? No. Funding is based on 5-year commitments.

STRUCTURE

Current Partners and Sponsors: BP and Tsinghua are the only named partners. Today there are many commercial sponsors of projects in the CEC.

Governance Structure: The Tsinghua BP Clean Energy Center is an independent academic unit of Tsinghua University. BP has no formal management role in the portfolio or the content of the projects of the Center (unless it sponsors the project) nor any contractual access to IP created in the work of the Center (unless BP has funded the particular project). Decisions at the CEC are made by the Director, Li Zheng, with substantial input from the Tsinghua leadership.

As part of BP's Great Universities Programme, the CEC is one of a number of university partnerships that BP has around the world and almost all of them (MIT, Berkeley, Caltech, Princeton, Cambridge, Imperial) use a similar general structure of funding PhD work directed by eminent professors.

Non-Financial Contributions: Tsinghua contributes expertise, students, and access to their facilities; BP also contributes expertise.

Sunset Date: None, but funding for the CEC is renewed every five years.

Success Criteria: Tsinghua leadership provides feedback to the CEC and to BP. BP must continue to be an effective partner in China's development.

PEOPLE

Organization: 4 professors, 20 graduate students, 5 post-doctoral fellows, and 3 administrative staff members. Dr. Stephen Wittrig, BP's Director of Advanced Technologies, is based at Tsinghua. In addition, four to five BP scientists and engineers visit the CEC each month for several days at a time to gather information on China's energy and environment, develop new projects, or monitor ongoing projects.

Students: The 20 graduate students and 5 post-doctoral fellows are all Tsinghua University affiliates.

ACCOMPLISHMENTS/MILESTONES

The CEC has begun to make a positive impact on China's energy public policy. In 2006, the Center completed a Technology Road Map for China's Renewable Energy Law. Separately, from 2006 to 2007 the CEC developed an energy strategy analysis for low carbon alternatives for China's energy strategy.

In another example, the CEC served as a model for one of Tsinghua's other major industrial partnerships in China—GM's recently announced sponsorship of the China Automotive Energy Research Center at Tsinghua for USD $6 million.

The strategy of the partnership has not changed since its inception, but the CEC's responsibilities have increased significantly. Initially the Center focused on polygeneration and clean coal systems. Over time the portfolio has expanded to include management of China's renewable energy technology roadmap and a university-wide study of sustainable mobility options in China's cities. Much of this analysis is being used by China's Energy Leading Group during the formulation of China's energy strategy.

SUMMARY

One of the key advantages Dr. Wittrig has enjoyed in building this strong cross border partnership has been the BP "top management's interest in building true understanding of China's perspectives on clean, secure sources of energy and a commitment to seeing China through Chinese eyes."

But those trying to build an international partnership must be prepared for the long haul. "It takes at least 2 years of presence in such a relationship before trust really starts to build," said Dr. Wittrig. "That requires significant senior management commitment to a time for listening and learning."

One of the benefits achieved through the partnership that otherwise might not have occurred is familiarity with China's public energy policy and the reasons behind it. "BP has a much greater understanding of the directions that China is going to take to address her energy security and environmental challenges than they would have otherwise," explained Dr. Wittrig. "BP also has a very strong reputation in China as a company that is committed to working with China to create new solutions in fuels, materials, and power production."

Making use of the strong bond that exists between BP and China, BP has started a new commercial venture in China to develop and commercialize new energy solutions. Hopefully BP "will start to see those results over the next few years," concluded Dr. Wittrig.

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University-Industry Partnership

The Energy Biosciences Institute

PARTNERS

UC-Berkeley Energy Biosciences Institute
Susan Jenkins

BP

MISSION

To apply bioscience and biotechnology techniques to the global energy challenge.

PROGRAM

The EBI conducts work to harness the potential of bioenergy, to make discoveries, and to commercialize realities out of these, which could benefit the world. The primary initial thrust of EBI research is the development of commercially viable, highly productive, and environmentally benign transportation fuels from biomass (cellulosic biofuels).

Location: Berkeley, California; Urbana-Champaign, Illinois

Cross Border: No

Partner Nationality: International

TIMELINE

2006: BP issued an international call for proposals to engage in a 10-year, $500 million research partnership to explore the application of scientific advances in basic biological sciences to the energy sector. Berkeley, whose legacy of energy-related research persuaded them to compete for the program, invited the agronomy-rich University of Illinois to participate in the proposal. Their proposal was selected and the EBI was born.

2007: Following an international competition, BP selected a consortium consisting of the University of California at Berkeley, Lawrence Berkeley National Laboratory, and the University of Illinois at Urbana-Champaign to host the new Energy Biosciences Institute (EBI). The operating agreement was signed in November 2007.

FUNDING

Budget: Roughly $50 million per year for 10 years.

Sources: BP

Is future funding dependent upon reaching certain milestones? Most programs and projects have been funded for an initial three-year period, with options for extension.

STRUCTURE

Current Partners: BP; University of California, Berkeley; University of Illinois Urbana-Champaign; and Lawrence Berkeley National Laboratory.

Non-Financial Contributions: The research programs of each participating institution bring resources provided for them by their home institutions (e.g., research tools, technical support, and in some cases office and lab space). In many cases, the home institutions also provide administrative assistance.

Governance Structure: A director and a small team of colleagues and advisors from the four partners manage the EBI on a day-to-day basis.

An Executive Committee is chaired by Director Chris Somerville and includes the deputy and associate directors, five other professors from the partner institutions, and one additional BP representative and is responsible for proposing the annual strategic work plan (including priority research projects for institute funding) for approval by the Governance Board.

The Governance Board is comprised of eight voting members: Four from the research partners (including at least one each from the Berkeley and Illinois campuses and one from Lawrence Berkeley National Lab) and four appointed by BP. The EBI Director, Associate Director, and Deputy Director are ex-officio members. The Board appoints the EBI Director and Deputy Director.

Curriculum/Research: The EBI focuses on technical and analytical skills that encompass the breadth of its research programs, in fields such as agronomy, microbiology, mechanical and chemical engineering, biochemistry, chemistry, geography, economics, law, and policy analysis.

Four categories of focus envelop the broad scope of EBI's mission:

1. Research, which will allow scientists to use modern biology to solve global energy problems;
2. Workshops and conferences, which will serve as forums for the exchange of ideas and broadening the knowledge of energy bioscience;
3. Education, to inspire the next generation of researchers in energy bioscience by challenging talented undergraduate and post-graduate programs; and
4. Outreach, to educate the public (including K-12) about the value of sustainable energy and the research being done at the EBI.

EBI's research mission is divided into several areas of inquiry:

- Feedstock Development—seeks to identify and characterize plant species that can maximize cellulosic biomass production in various regions around the world, and to learn how to grow and harvest them sustainably;
- Biomass Depolymerization—finding a more efficient and less costly method to convert polysaccharides to sugars by severing the chemical bond that holds them together in plant cell walls;
- Biofuels Production—bioconversion of sugars to next-generation fuels by using the methods of systems biology to characterize new types of microbes and by testing genetic modifications of promising organisms; and
- Environmental, social, and economic impacts of biofuels—working to understand how land is used around the world and to model the impacts of growing bioenergy crops on a global scale via a full life cycle analysis, from ground to gas tank.

Future work will focus on areas that include microbially enhanced hydrocarbon recovery and carbon sequestration.

Intellectual Property: If the commercial application of new inventions (excluding biofuels) were interesting enough, EBI could potentially pursue IP protection and/or business development in that area. Most inventions with significant IP and commercial applications are likely be protected by patents. It is also possible, though not likely, that, under certain circumstances, inventions may be developed open-source. Any IP that is generated by the EBI will be owned by the specific institution that generated that IP. For example, a UCB invention will be owned by UCB, a UIUC invention will be owned by UIUC, and a LBNL invention will be owned by LBNL. Any joint inventions will be shared.

Sunset Date: The EBI contract is for 10 years, concluding in 2017, with an option to extend.

Success Criteria: Program reviews are conducted 2-3 times a year by EBI management. The programs are judged against the goals originally established for each program during the proposal-solicitation phrase. Then, recommendations are made to the Governance Board on a continuing slate of programs to be funded in the subsequent years.

PEOPLE

Staff: 9 administrative staff, 2 research staff, and 5 staff from BP.

Students: 65 graduate students; 65 post-doctoral fellows; 43+ undergraduates.

Professors/Instructors: 141 professors.

MILESTONES

The most important accomplishment of the startup phase (year one) was the implementation of a broad research portfolio within the three academic partner institutions.

SUMMARY

Despite its youth, the EBI has embraced an ambitious agenda. The Institute is committed to not only the advancement of science and awareness of biosciences, but is also committed to building strategy partnerships that focus on research, the development of talent, and in some cases, both. The Institute is both a center of scientific innovation and an ideal environment for student education and experience.

Education and training are critical to development of the human and social capital required for an initiative of this magnitude. UC Berkeley, Lawrence Berkeley National Laboratory, and the University of Illinois have exceptionally strong undergraduate, graduate, and postdoctoral training programs and so the partnership is able to provide a large number and wide variety of extraordinary educational program options. Furthermore, the program consists of a diverse mix of scientists and investigators from many disciplines and its global focus will involve interactions with other nations and could lead to cross-national collaborations by students and faculty.

EBI is in the first year of a 10-year program, making it too early to assess the success and impact of EBI, but progress is certainly being made: The launch of EBI itself was successful, and the Institute has many plans to carry out to reach the goals of its mission. The University of California, Berkeley, has always been a campus concerned with energy issues from all angles, and this collaboration with BP has greatly strengthened the University's potential to become a major scientific force in the area of biofuels and other forms of alternative energy.

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University-Industry Partnership

State Street—Bentley University

PARTNERS & OBJECTIVES

State Street Corporation (State Street)
Jerry Cristoforo, Executive Vice President and Head of State Street Zhejiang Technology Company (mainland China) for State Street Corporation

Joseph Antonellis, Vice Chairman; Chief Information Officer

Objective: To develop top future talent for potential full-time hires.

Bentley University (Bentley)
McCallum School of Business
Wendy D'Ambrose, Director of Graduate Career Services

Heikki Topi, Associate Dean of Business, Associate Professor

Objective: To give students experience on the ground in China and to increase their marketability in the full-time job market.

MISSION

To give students experience in a dual-shore IT environment while also providing exposure to the banking industry and to optimize State Street's processes that underlie its communications, project planning, analysis, and other standards and processes between the China and Boston operations.

PROGRAM

Bentley graduate level students (across all programs) begin work on different projects and in different business units at State Street Boston beginning in late May until the end of June. On or about July 1, they travel to Hangzhou, China for the month of July. While in Hangzhou, they take language classes at Zhejiang University in the morning and continue work on their designated projects in the afternoon at the State Street China Technology Center.

Location: Boston, Massachusetts and Hangzhou, China

Type of Partnership: Educational/Talent

Cross Border: Yes

Student Nationality: U.S. and international.

Curriculum/Research: Four hours of Mandarin Chinese language instruction per day for 4 weeks (month of July). The program also offers cross cultural experiences via local travel while in China.

TIMELINE

2005: Program began with 2 internship positions at State Street.

2006: Increased to 3 positions.

2007: Increased to 4 positions.

2008: Number of internships remained steady at 4 positions.

FUNDING

Annual Budget: State Street determines the budget and covers all costs which include:

1. State Street pays interns $15/hr - $18/hr while in Boston.
2. State Street provides a $500/mo per diem while in Hangzhou.
3. All travel (including visas) & accommodations (dorm-style) in Hangzhou are provided by State Street.

Sources: State Street

What non-financial resources does each partner provide?

- McCallum Graduate School of Business Graduate Center Career Services, along with faculty, helps source students for the program.
- Bridie Minehan, Assistant Professor at Bentley and China expert, briefs the students regarding Chinese culture and customs.
- State Street provides inclusion in a wide range of corporate activities while the students are in Boston.

Is future funding dependent upon reaching certain milestones? Not at this time. As long as there is a business need the program will continue with a goal to grow the program each year.

STRUCTURE

Current Partners and Sponsors: State Street and Bentley University

Governance Structure: The program is based on project needs and is driven by State Street line managers identifying problems they would like students to address in a dual shore environment.

Sunset Date: Ongoing, based on project needs.

Success Criteria: In Boston, State Street managers work with Bentley interns to define goals and objectives and begin the interface with their appropriate counterparts in Hangzhou. In Hangzhou, State Street China Technology Center managers continue the process. Interns must complete any requested wrap-up at the end (generally by August 31st) and provide relevant documentation on their work and the overall dual shore experience to State Street and to their Faculty Internship Advisor at Bentley.

PEOPLE

Professors/Instructors: Faculty Internship Advisors teach in the MBA, MS IT, MS Finance/Quantitative Finance, and MS Accountancy programs.

Project and Staff Allocation:

Administrative Staff: Within **Bentley**—the Project Leader is the Director of Graduate Career Services and her team of two student advisors.

Within **State Street**—Sabine St. Lot, Vice President/China CTO & Global Markets, and Noreen Curtin, China CTO & Global Markets, plus Xiaomei Jia, China Technology Office/CTO, Hangzhou, and heads of various State Street business units. The number of staff can change each year and is based on need.

Students/Target Audience: Students are Masters candidates doing graduate level/advanced internship work.

Selection Process

- State Street provides job descriptions to Bentley for posting (March/April)
- Interested students submit resumes (March/April)
- Resumes are distributed to State Street managers (April)
- State Street managers phone screen Bentley student candidates (May)
- State Street managers conduct face to face interviews (May)
- State Street hires their desired candidates through their HR/staffing process (May)

Do the students have to have had certain courses prior to the internship? Yes, students need to have fulfilled prerequisites in their program in order to qualify to take this internship as an elective for academic credit.

Nationality: To date interns have been from China, Ukraine, Venezuela, Mexico, India, and the U.S.

Institutional Affiliation: Bentley University - McCallum Graduate School of Business.

Education Level: Graduate students: MBA, MS IT, MS Finance/Quantitative Finance, and MS Accountancy candidates.

Career Level: 3 to 4 years of work experience.

ACCOMPLISHMENTS/MILESTONES

"….You have to take time to study Chinese culture and language. This is a real experience you will never forget in your life if you like to enjoy the changes in the world."

Yong Fang, MS Finance '07

"This was a great opportunity for me to accomplish my 'crossover' from IT to Finance, and also get firsthand experience in one of the most important financial companies in the U.S. and the world."

Juan Pablo Fortoul, MS Finance '07

"A terrific experience because it not only helped me appreciate the global effect of technology but also offered the opportunity to immerse myself in a culture very different from the West and understand business halfway around the globe."

Kaushik Pattamadai, MBA '08

"The trip to China was the most valuable takeaway in the program. I think I have played my part in downsizing the cultural gap between employees in Hangzhou and Boston by creating awareness about the business practices of each group."

Rushabh Shah, MBA '08

SUMMARY

The sincere desire of both State Street and Bentley to see this partnership succeed and to ensure that all involved derive value from it has been very important to its success. In particular the willingness by all key players (administrators, faculty, heads of business units) to do a significant amount of extra work has been invaluable. And of course, the enthusiasm of the students for this unique internship opportunity and their commitment to deliver the highest quality of work to State Street has been a strong factor in the corporation's decision to expand each year.

But the most critical element in making this partnership work has been open communication among all groups—State Street (Boston), the China Technology Center/CTO (Hangzhou), and Bentley University (Waltham)—and their respective point people

It is also very important that all parties are willing to reconsider their existing approaches to find a model that works for everybody. Understanding and taking into account differences in organizational practices and cultural expectations is significant, too. All these elements contribute towards building trust and establishing credibility.

In today's global environment, multinational companies highly value professionals who are able to operate comfortably in unfamiliar cultures. This partnership gives students an important competitive advantage in today's job market.

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University-University Partnership

MIT—China Management Education Project

PARTNERS & OBJECTIVES

MIT Sloan School of Management
Alan White, Senior Associate Dean

Objective: To support MIT's global mission by learning about China and its economy; contributing to the business education capabilities of China's universities; and to "learn by going".[1]

Tsinghua University, Fudan University, Sun Yat-sen (Lingnan College), Yunnan University

Objective: To offer world class graduate degrees in management that blend the best of Western teaching practices with China's culture and unique business landscape.

MISSION

To strengthen graduate management education programs at selected Chinese universities.

PROGRAM

Faculty from Tsinghua, Fudan, Lignan, and Yunnan Universities spend a semester at MIT Sloan attending regular MBA classes and being mentored one-on-one by MIT Sloan faculty members.

The professors return to their respective universities and begin to blend the lessons from MIT with Chinese culture and the nation's unique business landscape to create an optimum business learning experience for Chinese students.

That is the core program. It has sparked so much interest in China that some MIT Sloan professors have taught at partner universities in China in order to better understand their Chinese colleagues' unique business challenges and opportunities.

MBA candidates from MIT Sloan also travel to China and work on team projects with their counterparts at the partner universities.

Location: Cambridge, Massachusetts; Shanghai, Beijing, Guangzhou and Kunming, China.

Type of Partnership: Talent

Cross Border: Yes

Student Nationality: Chinese and international

Curriculum: The primary purpose of the Chinese faculty visits to MIT Sloan is to develop a curriculum that they will return to China to teach in their International (IMBA) Programs.

Research: Professors learn Western research methodologies and identify research topics they will continue at their own universities, often in collaboration with MIT Sloan faculty.

Does it seek to instruct, immerse, or both? Both, but with an important caveat. Dean White remembers advising the partners in the very beginning, "We do not want you to come here and copy what we're doing. Because what we're doing here may or may not have some relevance in your country. You need to think through this from the standpoint of what you need, and not pick up some curriculum that's been developed in the Eastern United States and try to put it inside your university."

[1] Refers to a phrase frequently used by Dean White: "Those who go, learn." which refers to his Peace Corps days. "We thought we were going off to save the world, and of course we were the ones who learned the most," he said.

Is your goal specifically to train Asians or Americans, or are there cross benefits to participants on both sides?

Dean White's view of learning and cross benefits is the following:

"Instead of going to another country and 'implanting' MIT, we go to another country to assist them in further development of their own institutions. And by doing this, we find that we are able to develop very good relationships with them, which leads to all kinds of benefits to our faculty and staff, whether it's doing research or student projects or field trips, many kinds of activities result from these kinds of engagements."

Frequency/Duration: One semester, but some professors have returned for a total of two or three semesters.

TIMELINE

1996: The MIT – China Management Education Project was founded by MIT Sloan, Tsinghua University, and Fudan University.

1999: Fudan and Tsinghua Universities graduated their first International MBAs (IMBAs). Sun Yat-sen (Lingnan College) and Yunnan University joined the partnership.

2001: This year marked the partnership's 5 year anniversary. The agreement was renewed for 5 more years.

2002: Lingnan College graduated its first IMBAs, and Yunnan University began offering internationally oriented (IOMBA) classes.

2005: Administrative staff from the partners traveled to Cambridge for workshops on important functions such as marketing and communications, admissions, career development, alumni relations, resource development, finances, and technology services.

2006: The universities celebrated their 10 year anniversary and the partnership was renewed until 2011.

FUNDING

Annual Budget: N/A

Sources: 100% of the funding has come from MIT alumni and friends, located on the rim of China and overseas, Canada and the United States. The collaboration does not accept funds from China.

Is future funding dependent upon reaching certain milestones? No

STRUCTURE

Current Partners and Sponsors: The current partners are MIT Sloan, Tsinghua University, Fudan University, Yunnun University, and Lignan College. Names of the sponsors were not unavailable.

Governance Structure: The head of this project is Alan White, Senior Associate Dean, MIT Sloan. The senior associate dean and the Deputy Dean are responsible for all international programs.

The project has an international initiatives committee. This is a faculty committee that Dean White co-chairs with Deputy Dean/Professor Steven Eppinger. This committee evaluates such issues as whether to continue a program in a particular country. Dean White cited another example: "Lately we've decided we would like to see more of our students involved in projects in different countries and there's a lot of activity going on in this regard, and this has meant shifting some resources in these projects to support some of these student activities. That's an example of a decision that needs to be made, and so we evaluate what we think the impact is going to be of the student's doing the project and come to some decision."

The project has annual meetings with its advisory boards that are made up of the sponsors of these projects and they evaluate what the project has been doing. There is an Advisory Board composed of Chinese educators, Chinese-based entrepreneurs, and multinational corporations doing business in China.

Sunset Date: The project has been extended twice, most recently until 2011; at that time the partners will have the opportunity to renew for another 5 years.

Success Criteria: Advisory boards comprised of sponsors evaluate the project annually. The criteria are not always simple deadlines or numbers of courses taught. There are other less objective criteria. "We believe that we have had an important impact on management education in other countries and we believe that this activity has led to different kinds of learning for us here at the school. In some cases the faculty who come

here interact with the students, they make presentations in courses in the school, so there's a lot of ongoing learning that occurs. So the best way of summing it up is what we are learning and what they are learning and obviously they feel good about what they're learning and we have to feel the same."

PEOPLE

Organization: There is no separate organization. Dean White runs international programs and has several people reporting to him.

Professors/Instructors: Over 200 have visited MIT Sloan from China. Each visitor has an MIT Faculty member as a mentor.

Project and Staff Allocation:

Program Manager: Ms. Eleanor Chin

Administrative Staff: 1 (Phyllis Green)

Target Audiences:

1) Chinese professors who train at MIT Sloan: Between 13 – 17 each semester.

- *Nationality:* Chinese
- *Institutional Affiliation:* Fudan University, Tsinghua University, Sun-Yat sen (Lingnan College) and Yunnan University.
- *Education level:* Professors with PhDs.
- *Career level:* Early career stage.
- *Selection Process:* Dean White explained, "The Chinese universities nominate them to us. We've never refused anyone. They are very good selections. We asked them that they chose younger faculty so there would just be that much longer for their impact at their schools."

2) MIT Sloan MBA candidate: Over 148 have participated in project team visits to Chinese partner universities.

3) Chinese partner IMBA and IOMBA MBA candidates:

- Fudan University: Over 619 IMBA graduates to date.
- Tsinghua University: Over 840 IMBA graduates to date.
- Sun-Yat sen (Lingnan College): Over 751 IMBA graduates to date.
- Yunnan University: Over 117 IOMBA graduates to date.

ACCOMPLISHMENTS/MILESTONES

The project has a track record most would envy. Since its inception, over 200 Chinese management professors have trained at MIT Sloan. The project has worked so well that it has been extended twice. The sponsors were so happy with the partnership that in 2002 they funded an endowed professorship for Chinese studies at MIT, in addition to their other support.

Traditionally, Chinese universities have not placed a strong emphasis on research, and when the project began the professors hadn't much research experience. This has changed over the course of the partnership, and today they bring their own research programs, displaying significant progress.

Participants have highly praised the program:[2]

"I learned the concept of system dynamics in China, but it's different learning it here from the father of the discipline [Professor Emeritus Jay Forrester]."

Zhang Cheng, IFF[3] Fudan Fall '07

"In China, the legal framework for innovation and entrepreneurship—intellectual property, venture capital, financing—is very different. I got many good ideas from my faculty adviser, Fiona Murray, and other MIT Sloan faculty."

Wang Anyu, IFF Fudan Spring '07

[2] These quotes appeared in MIT Sloan's International Faculty Fellows brochure, spring 2008.

[3] International Faculty Fellow, the title given to the professors from China who come to MIT for this program.

"I have seen many changes since the IMBA program began in China 12 years ago. The level of everything—students, teaching, faculty, speaking English—is higher. The students are equal to our students."

MIT Sloan Professor Robert S. Pindyck

SUMMARY

Partnerships take years or even decades to establish. The dialogue between MIT and China began in 1979; the partnership began in 2006. "We invited them on field trips, short seminars, we would have conferences, and so

On—it took quite a while to work out this project," said Dean White.

This project also has had its own unique challenges. "Their universities have been largely teaching institutions. They are not typically research based and they have not typically had much time for consulting. So they haven't had as much outside experience as they need to have," related Dean White. "The challenge has been not so much their understanding of academic content—they grasp that very quickly. The challenges have been relating it to what will be useful to their graduates outside this university after they graduate, and also the style of teaching, the pedagogy."

MIT Sloan decided to focus on the pedagogy through teaching workshops so the professors could see how they might make the transition from traditional lectures to other teaching styles such as the case method.

And what value has MIT Sloan received from the partnership that would not have been possible any other way? "Lifelong professional associations and enduring personal friendships," said Dean White.

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University-University Partnership

Technology Center at Zhejiang University

PARTNERS & OBJECTIVES

State Street Corporation (State Street)
Jerry Cristoforo, Executive Vice President; Chief Technology Officer

Objective: To gain access to top talent and develop advanced banking technologies for use in State Street

Zhejiang University (Zhejiang)
Zhijun He, Professor & Founder of Computer Science College

Objective: To apply the university's intellectual capacity to practical use and to increase employment opportunities following graduation.

MISSION

To jointly develop advanced technologies for internal use at State Street and to develop up-and-coming engineering students for potential careers at State Street.

PROGRAM

The Technology Center at Zhejiang University gives students the opportunity to work on real world technology projects in the banking industry. Upon graduation State Street recruits these students for full time employment in an offshoot called SSTZ created for this purpose. State Street also entered into a joint venture called HengTian which commercializes promising technologies arising from the work of the Technology Center.

Location: Hangzhou, China and Boston, Massachusetts, USA

Cross Border: Yes

Student Nationality: Chinese

TIMELINE

2001: Three associate professors from Zhejiang University spent several months at State Street's headquarters in Boston to gain a deeper understanding of the brokerage technology and State Street's project management methodology.

Nov 2001: An MOU was signed between State Street and Zhejiang University establishing the new Technology Center. State Street and the founder/director of the computer science department at Zhejiang organized a small team of 3 professors and 15 graduate students to work on applications for State Street.

April 2003: State Street entered into a partnership with Insigma Technologies and together they began developing projects that ultimately became Technology Center spinoffs: SSTZ hires Technology Center alums to develop software for State Street, while HengTian commercializes and sells the Technology Center's most promising technologies.

FUNDING

Annual Budget: Not available

Sources: Zhejiang University provides RMB 2,000 per student per year as training compensation, plus lab space and access to all university facilities. Additional partner Insigma Technologies built a new building in 2008 that houses the Technology Center as well as its two offshoots, State Street Technology (Zhejiang), Co. Ltd. (SSTZ) and HengTian.

Is future funding dependent upon reaching certain milestones? No.

STRUCTURE

Current Partners and Sponsors: State Street Bank and Zhejiang University.

Governance Structure: The Technology Center includes three entities: (1) State Street Zhejiang Technology (SSTZ), a wholly owned subsidiary of State Street; (2) HengTian, an equity-based joint venture between State Street and Insigma Corporation and a publicly listed company on the Shanghai Stock Exchange focusing on high-technology services in China; (3) a MOU-based partnership between State Street and Zhejiang University.

State Street Executive Vice President Jerry Cristoforo is General Manager of SSTZ and reports to a board of directors comprised of State Street Executive Vice Presidents. Mr. Cristoforo also serves as a board member to HengTian.

Project and Staff Allocation: State Street's Office of the CIO decides how projects will be allocated in SSTZ.

Curriculum/Research: Advanced banking technologies

Sunset Date: Perpetual

Success Criteria: Growth. The original goal of the Technology Center was to grow from 15 to 50 students in five years. By 2005 there were 300 people; in 2008 there are more than 1,000 people between SSTZ and HengTian. Today there is no required growth target, but demand for the students' research is expected to continue to outstrip supply.

PEOPLE

Organization: 1,200 employees: 300 students working part-time and 900 full-time employees employed by SSTZ or HengTian after their graduation.

Administrative Staff: 80

Professors/Instructors: 8

Students: 10% PhD candidates, 50% Masters candidates, and 40% undergraduates.

ACCOMPLISHMENTS/MILESTONES

- By 2007 the Technology Center had re-engineered more than 100 of its old legacy systems for approximately two percent of what it would have cost to purchase new systems. More than 50 academic research papers have been published on the systems.
- State Street's approach to collaboration—investing significant effort over many years to understand the Chinese language and culture, and in turn teaching Zhejiang professors about western brokerage technology and IT project management practices—has helped strengthen its relationship with the Chinese government and has had unexpected benefits.
- State Street significantly expanded its goals since the first MOU, working with new partner Insigma Technologies to form two companies as a direct result of the collaboration: SSTZ, which employs promising Center students full time after graduation, and HengTian, which provides advanced technology off-shoring services to State Street's clients.
    - SSTZ has proven so valuable that State Street purchased Insigma's share of the company in 2005, turning it into a wholly owned subsidiary.
    - State Street also holds a 49% stake in HengTian, which has in-depth experience in advanced re-engineering technologies, including an Equity Trading & Execution System, an Actuate Reporting System, and a web-based Mutual Fund Administration System. For a full list of projects go to: www.hengtiansoft.com/case.asp
- Aoyu Wang and Yiru Jin are examples among the students who have become promising young professionals in leadership positions. Both worked in the Technology Center as students and both were hired by SSTZ upon graduating from Zhejiang.

  Wang began applying his knowledge as Associate Team Leader of the Performance Evaluation & Reporting System (PERS) Team. "I am part of the PERS system supporting team and lead the team to

refactor the PERS backend applications. The work is very challenging but exciting," he told *State Street World* in 2006. By 2008 Wang had been promoted to project manager.

Jin chose another role, Quality Assurance Manager for State Street Global Markets at the Technology Center. She observed, "The work environment is energetic here. I think we have a good relationship between the development teams. We work as a whole team and have the same goals." In 2008 Jin has also achieved the status of project manager.

SUMMARY

There are many factors that have contributed to the success of the State Street-Zhejiang partnership, but State Street CTO Jerry Cristoforo believes that the time spent learning the Chinese culture and language was crucial to developing trust. He met Professor Zhijun He, founder of Zhejiang University's Computer Science Department, in the mid-1980s and was involved in several cross-border collaborations before joining State Street.

Twenty-five years later, Cristoforo still spends two hours per day in school at Zhejiang University studying the Chinese language. "I'm not completely fluent but I've gotten to the point where I can deliver a 30 minute speech in Mandarin," he says. This commitment has also earned him an advisory post at the People's Bank of China.

However, the most important ingredient of success, and perhaps the most rare, has been the "open minds" in the C-Suite at State Street. Cristoforo believes that top management commitment from State Street Chairman and CEO Ron Logue and the rest of the executive team is the irreplaceable "must have" ingredient for a successful cross-border collaboration.

Although State Street might have realized some savings initially through a traditional outsourcing arrangement in China, the partnership has yielded an exponential benefit in terms of productivity and innovation. Today there are two commercial spinoffs of the Technology Center. Tomorrow is only limited by the students' imaginations.

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University-Industry Partnership

National Emerging Infectious Diseases Laboratories (NEIDL)

PARTNERS & OBJECTIVES

Boston University
Gerald Keusch, Director of Collaborative Research, NEIDL Institute

MISSION

To conduct fundamental discovery research on emerging and re-emerging infectious diseases to identify and develop vaccine, drug, and diagnostic targets.

PROGRAM

The product of a National Institute of Allergy and Infectious Diseases (NIAID) grant, Boston University's NEIDL will allow its researchers to investigate and unlock solutions to infectious diseases that plague citizens around the world. This highly sophisticated facility includes a Biosafety Level 4 laboratory, which will allow its scientists to work with some of the world's most dangerous diseases. (Biological safety levels (BSLs) are rated 1-4 and measure the relative danger that a lab and its contents pose to the surrounding environment; BSL4 is the highest risk.)

Building national and international research collaborations is essential to NEIDL's mission to engage emerging infectious diseases threats globally. One way NEIDL will accomplish this is through the establishment of an in-house Collaborative Core Research Team, which will work in the Level 4 facility. Program directors have already begun developing these research and product development relationships, most notably through the development of MOUs with Indian scientists and institutions. NEIDL will also be involved in training professionals from partner programs around the world who may work in high containment facilities being developed in their own country.

Location: Boston, Massachusetts, USA

Cross Border: In development. NEIDL will develop strategic partnerships with foreign institutions as appropriate to fulfill its mission.

Partner Nationality: Global.

Commercialization: Connection with the private sector is an important means of insuring that research is quickly translated into commercial products available for diagnosis, treatment, and prevention of infectious diseases.

Intellectual Property: An innovative IP regime is being developed to insure that IP created in the NEIDL is fairly apportioned among the research partners.

TIMELINE

2003: Boston University Medical Center (BUMC), a consortium of Boston University (BU) and Boston Medical Center (BMC), was awarded a grant from NIAID to build one of two new National Biocontainment Laboratories.

2006: Construction began on the laboratory.

2009: Projected opening date for laboratory. The facility will initially be a training center for level 4 research before the laboratories are commissioned and actual research can begin.

FUNDING

Funding Sources: Core support for the facility is provided by a grant from the National Institute of Allergy and Infectious Diseases. Research will be supported through specific research grants from public and private sector funders, including foundations and industry.

Construction of the laboratory has been supported by Boston University and Boston Medical Center (26%) and the U.S. National Institutes of Health (74%). BU and BMC will own, operate, and manage NEIDL.

Is future funding dependent upon reaching certain milestones? No, though it is dependent on the competitive research grant process.

STRUCTURE

Partnership Development: NEIDL seeks partnerships with academic, industry, and government partners in the U.S. and abroad. Partnerships are in various stages of development with the Department of Biotechnology, Government of India; Department of Health Research and Indian Council of Medical Research, Government of India; All India Institute of Medical Sciences; St. Johns Medical College Research Institute; Serum Institute of India, AstraZeneca Research Laboratories, India; and others.

Current Sponsors: Boston University, Boston Medical Center, National Institutes of Health.

Governance Structure: NEIDL is a part of the Boston University Medical Campus and Boston Medical Center. BU owns, operates, and manages NEIDL along with BMC. The Executive Committee of the NEIDL Institute develops the scientific priorities and oversees the operational activities of the program. The group includes representatives from BU and the surrounding community.

Research: NEIDL will provide comprehensive core research facilities to enable basic, translational, and clinical research leading to the rapid development of products for emerging infectious diseases. NEIDL will have facilities for discovery research on pathogenesis to identify potential targets for new diagnostics, vaccines, biologicals, and therapeutics, as well as initial translational research on molecular targets/protective immune responses/and reagents that may be useful as diagnostics, immunogens, biologicals, or therapeutics, as well as in vivo studies in small animals and early clinical studies in normal human volunteers. NEIDL facilities include the following research “cores”:

- Aerobiology
- Biomolecule Production
- Cell and Tissue Imaging
- Clinical Research
- Collaboration (Non-BU Investigator Collaborative Research)
- Genomics/Microarray
- Immunology
- Whole Animal Imaging
- Proteomics/Mass Spectrometry
- Specimen Processing
- Systems Biology
- Vector Biology

Sunset Date: None.

Success Criteria: NEIDL will measure its success by its ability to generate fundamental discoveries leading to product leads in an efficient manner to meet national and global needs. In the latter context, and with its first strategic focus on India, success will be measured by the vitality of research collaborations developed with Indian institutions and investigators, and the development of lead targets for intervention at an affordable cost.

PEOPLE

Administrative Staff: NEIDL is currently actively recruiting for its full time administrative staff, and other personnel necessary to the secure and safe operation of the facility.

Professors/Instructors: NEIDL will be the home of more than 75 new BU faculty and NEIDL investigators, many of whom will be involved in research on emerging infectious diseases of relevance to India. Faculty and research staff are being recruited internationally. Research staff will hold BU faculty appointments in relevant departments in addition to their NEIDL positions.

Students: Post-doctoral fellows and graduate students affiliated with NEIDL-specific research will also work in the building under the direct supervision of a NEIDL faculty advisor.

SUMMARY

Infectious diseases are the single most modifiable cause of worldwide morbidity and mortality. They affect large sectors of the global population with a particularly heavy toll on infants, children, and adults in their most productive years, with devastating secondary effects on families and local and global economies. Using the full spectrum of cutting edge research technology platforms, assembled in one location, with innovative faculty drawn from non-traditional disciplines for infectious diseases discovery research, and critical international collaborative agreements with strategic partners in the developing world, NEIDL seeks to overcome the most critical and fundamental knowledge barriers and gaps to the prevention and control of emerging infectious diseases, leading directly to needed products accessible to all populations at risk.

The potential impact of NEIDL's international collaborative focus on India is that strategic partners within India will be able to develop research proposals together with NEIDL investigators and have access to the extraordinary research capacity within the facility. This capacity can be brought to bear on emerging infectious diseases in India, and the region, through this close and highly crafted relationship. It therefore represents an unparalleled opportunity to create products at the commercial scale required for rapid deployment to address emerging problems. These partnerships are being built on the dual platform of complementary competency and the bedrocks of mutual benefit and trust.

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University-Industry Partnership

Genzyme-Shanghai Jiao-Tong University Postdoctoral Fellowship Program

PARTNERS & OBJECTIVES

Genzyme Corporation
Dr. Canwen Jiang, Head of Genzyme R&D China

Objective: to understand the research ddirections and quality of biotechnology in China and to gain access to talent and IP.

Shanghai Jiao Tong University (SJTU)
Dr. Zhenggong Zhu, Vice President and Dean of Medical School

Objective: To spur innovation in the biotech industry in China and to improve graduates' skill sets.

MISSION

To encourage innovation at SJTU, to strengthen the strategic partnership between Genzyme and SJTU, and to lay the groundwork for future cooperation.

PROGRAM

The fellowship program provides post-doctoral support to investigators interested in pursuing research aimed at addressing unmet medical needs.

Location: SJTU in Shanghai, China

Type of partnership: Talent and innovation

Cross Border: Yes

Curriculum/Research: The program covers a spectrum of basic biomedical research and clinical sciences, with a focus on oncology, genetic diseases, and cell therapy/tissue engineering. Examples include oncologic molecule targets, disease models, novel therapeutic entities, biomarkers, and diagnosis of genetic disorders.

Is the IP open source or protected? Protected

Who owns the resulting IP, if any? The IP is jointly owned

What are the expectations, if any, for commercialization? Low

TIMELINE

June 2006: Genzyme and SJTU sign a Memorandum of Preliminary Agreement confirming their mutual interest in collaborating on various research, testing, and clinical activities.

2007-2008: The partnership awarded two grants and is in the process of selecting additional applications.

FUNDING

Annual Budget: Up to $100K USD

Sources: Genzyme and SJTU

Is future funding dependent upon reaching certain milestones? Yes, it is dependent upon the successful selection of high quality proposals/applications and post-doctoral fellows.

STRUCTURE

Current Partners and Sponsors: Genzyme and SJTU

Governance Structure: A Joint Management Committee (JMC) consisting of three executives or scientists from each partner, led by a co-chair from each partner, manages the collaborative effort.

Decisions: Decisions are made jointly.

What non-financial resources does each partner contribute? Both parties provide staff to manage the program and scientists to select the grants.

Success Criteria: Progress reports are periodically reviewed by the JMC.

Sunset Date: The partnership will be reviewed for possible extension five years after its 2007 inception.

PEOPLE

Organization: Consists of 10 to 14 people from both organizations, plus:

Professors/Instructors: Several SJTU professors .

Post Doctoral Fellows: Two grant recipients from SJTU.

ACCOMPLISHMENTS/MILESTONES

After approximately 18 months of operations, the collaboration has identified a number of high quality applications and has awarded the first two grants.

Project 1:

The mission of Project 1 is to strengthen SJTU's leading position as a major national center for Fabry disease in China. The patient registry will enable SJTU to conduct clinical trials and make the most advanced therapies available to patients. The outcome of these efforts will help establish national guidelines for the diagnosis and management of Fabry disease in China.

In particular, Project 1 will analyze patients (who come to SJTU's clinical programs or who are already under SJTU's care) and their family members by sequencing the GLA gene (Fabry disease is caused by mutations of the GLA gene). The identified mutations will be analyzed using genomic tool software and deposited in a database. An in vitro expression system will be established to analyze the stereochemical structure of the protein products, which will advance the understanding of the pathogenesis of the phenotype of the patients.

Project 1 will invest major efforts to establish a diagnosis platform for the diagnosis of Fabry disease. These efforts will lead to validations of technology platform and specific assays based on genetic analysis and other methods. Project 1 will also screen high risk patient populations with left ventricular hypertrophy, stroke, and end-stage kidney disease.

Project 2:

The mission of Project 2 is to understand the function of a novel oncogene using transgenic mouse models. Further details are unavailable due to the confidentiality agreements in place.

SUMMARY

Dr. Canwen Jiang shared his views as to why this partnership has been successful to date:

> The first is that you must share some strategic common ground with your partner. In our case, SJTU wants to encourage innovation and learn about the needs of the biotech industry in order to spur innovation and improve graduates' skill sets. Genzyme wants to understand and capitalize upon academic R&D in China, primarily through access to talent and IP.
>
> Next, I think strong leadership and vision are required to build a partnership that will have an impact. At Genzyme, Dr. Richard Gregory, Senior Vice President and Head of Research, envisioned the program as a launch pad for a long-term strategic partnership. He also provided guidance on execution, and we could never have done this without his involvement.

> And then to ensure that the partnership runs smoothly, good communication is essential to effectively understand each other's intentions and needs and to achieve mutual respect and trust.

Of the three, Dr. Jiang cited leadership and vision as being the most crucial element of a successful collaboration.

Other tips for navigating cross border partnerships include "avoid generating false expectations on either side" and gaining mutual trust and respect by practicing "honesty and walking the walk (not just talking the talk)."

Dr. Jiang added that a special benefit of the partnership was the opportunities for Genzyme to connect with key opinion leaders and to establish relationships within the research community.

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University-Industry Partnership

Novartis-Fudan Joint Research Laboratory

PARTNERS & OBJECTIVES

China Novartis Institutes for BioMedical Research Co., Ltd. (CNIBR)
Dr. En Li, Head, CNIBR

Objective: To support Novartis' commitment to China and to discover breakthrough innovative medicines for diseases that are prevalent among Chinese.

Institute of Biomedical Sciences (IBS), Fudan University
Dr. Lin He, Director, IBS

Objective:To advance the state-of-the-art of biological science and translational medicine research in China.

MISSION

To combine the expertise and technologies of Novartis with Fudan University's resources in Shanghai, to promote drug discovery in China, and to support the Novartis Institutes for Biomedical Research (NIBR Shanghai)'s efforts in discovering innovative medicines in China.

PROGRAM

The institution's goals are to discover new drug targets and biomarkers for cancer and to publish research papers in peer reviewed scientific and medical journals. One focus will be on liver cancer in China.

Location: Institute of Biomedical Sciences at Fudan University in Shanghai, China.

Type of Partnership: Talent and innovation

The partnership seeks to immerse and instruct the graduate students and post-doctoral students who work at the Lab.

Cross Border: Yes

Is the IP open source or protected? The IP is protected for both parties.

Who owns the resulting IP, if any? That depends on the type of project. Under the various project categories, the ownership of the resulting IP is clearly defined.

What are the expectations, if any, for commercialization? Not likely in the near term, but the partnership aims for the long term.

HISTORY

2006: Novartis announced plans to build a Novartis Institute for Biomedical Research (NIBR) in Shanghai's Zhangjiang Hi-Tech Park, bringing the number of NIBR research centers around the world to a total of 6. (A seventh has since been added.)

2007: With their researchers having been in contact for a number of years through international research conferences and industry events, Fudan and Novartis began to discuss a possible collaboration in China.

2008: A research collaboration agreement was signed creating the partnership. The joint research lab was completed and became operational.

FUNDING

Annual Budget: N/A

Sources: Novartis

Is future funding dependent upon reaching certain milestones? No.

Non-Financial Resources: Novartis will contribute drug discovery expertise and cutting edge technologies to help make those discoveries. The Institute of Biomedical Sciences at Fudan University will provide lab infrastructure, some of the research staff, and expertise in specific scientific fields.

STRUCTURE

Current Partners and Sponsors: China Novartis Institutes for BioMedical Research Co., Ltd. and the Institute of Biomedical Sciences, Fudan University.

Governance Structure: A Joint Steering Committee composed of an equal number of members from Novartis and Fudan University governs the partnership.

Sunset Date: 2011 with an option to extend.

Success Criteria: The Joint Steering Committee is responsible for setting up the objectives, overseeing the collaboration activities, and determining whether the goals have been met.

PEOPLE

Organization: The target size is 20 – 25 research scientists.

Professors/Instructors: Between 2 and 5.

Project and Staff Allocation:

> *Administrative Staff:* Not yet available.
>
> *Researchers:* Novartis senior investigators and Fudan professors will serve as program leaders. Additional researchers will be recruited who are "open to collaboration, open to self discovery," explained Dr. Amber Cai of Novartis.

Students/Target Audience: The students will include graduate and post-doctoral students as well as entry level scientists.

Nationality: Chinese

Institutional Affiliation: Fudan University.

Education Level: Graduate and post-doctoral students.

Career Level: Entry to mid-level scientists.

ACCOMPLISHMENTS/MILESTONES

The partnership is in the start-up phase. The first milestone has been reached; the laboratory has been completed and is functional.

SUMMARY

Dr. Cai, Head of Corporate Development of Novartis' new R&D center in Shanghai, was asked what she felt were the most important success factors in establishing the partnership with Fudan University. She cited many factors: mutual trust, common goals, top talent committed to the partnership, and a well-defined structure for the collaboration. As the partnership takes off, strong project management capabilities and open communications will be the key to running it smoothly, Dr. Cai believes.

Asked what the most important single success factor has been, Dr. Cai said, "Mutual trust is the most critical element to establishing cross border collaborations. Joint research endeavors come usually as a result of extended efforts on both sides to understand each country's culture and systems. Honest and open communications provide the foundation for maintaining good relationships, which is vital to a long term partnership."

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University-Government Partnership

Public Health Foundation of India (PHFI)

PARTNERS & OBJECTIVES

Harvard School of Public Health
Barry Bloom, Harvard Distinguished Service Professor

Objective: To assist in the conceptualization, creation, strategic roadmap, and governance of the Public Health Foundation of India.

Ministry of Health and Family Welfare, Government of India
Dr. K. Srinath Reddy, President, Public Health Foundation of India

Objective: To establish a national healthcare infrastructure to conduct research and train the next generation of healthcare professionals.

MISSION

To set the benchmark for quality standards for public health education, establish public health institutes of excellence based on these standards to undertake research, and advocate for policy linked to broader public health goals.

PROGRAM

The PHFI is working toward building public health capacity in India by:

- Establishing 9 new institutes of public health over the next 6 years (4 already under construction);
- Assisting the growth of existing public health training institutions/departments and facilitating their evolution into major institutes of public health;
- Advising the Indian government on public health matters and developing a public healthcare workforce for India.
- Establishing a strong national research network of public health and allied institutions undertaking policy- and program-relevant research to advance public health goals in prioritized areas—utilizing international partnerships where appropriate;
- Engaging public health expertise to generate public health policy recommendations and developing a vigorous advocacy platform to communicate these recommendations to policy makers and other relevant stake holder groups; and
- Facilitating the establishment of an independent accreditation body for degrees in public health that are awarded by training institutions across India.

Location: India, with eventually nine total locations and the PHFI HQ. PHFI has signed agreements with the Governments of Andhra Pradesh, Gujarat, Delhi, and Meghalaya. Currently, PHFI is also discussing similar arrangements with Orissa, Punjab, Tamil Nadu, Uttar Pradesh, and West Bengal.

Cross Border: Yes—HSPH continues a relationship with PHFI and members of the governing board and advisory committee are international figures anchored in India.

Nationality: Professors and students will be mostly Indian.

TIMELINE

2005: HSPH Dean Barry Bloom, HSPH professor and World Bank economist Peter Berman, and Rajat Gupta of McKinsey & Company approached Prime Minister Manmohan Singh with a proposal to found the Public Health Foundation of India (PHFI).

2006: An MoU signed by then-Harvard President Lawrence Summers, Bloom, and Dr. K. Srinath Reddy established the new Foundation in the interest of encouraging the cultivation of research collaborations and

the development of educational and research programs, including student exchanges and faculty visits. Reddy was tapped to lead the initiative.

2008: Construction has begun on 4 schools with plans to build at least 4 more. The Indian government has set up a system whereby states compete to house one of the nine schools.

FUNDING

Annual Budget: Rs 20-25 crores (USD $4-5 million), which does not include the investment being made in establishing the institutes (total USD $30 million each)

Sources: HSPH, Indian government, charitable foundations, NGOs, and private contributions.

Is future funding dependent upon reaching certain milestones? No.

STRUCTURE

Current Partners: Harvard School of Public Health, Government of India (Ministry of Health and Family Welfare; Planning Commission; Department of Science & Technology; Finance Ministry), Bill and Melinda Gates Foundation, London School of Hygiene and Tropical Medicine, Association of Schools of Public Health, John Hopkins Bloomberg School of Public Health, Boston University School of Public Health, Emory University Rollins School of Public Health, Erasmus Medical Center, Institute of Tropical Medicine, University of North Carolina Chapel Hill School of Public Health, McGill University, Royal Tropical Institute, Tulane University School of Public Health and Tropical Medicine, University College London, University of Albany School of Public Health, University of California Los Angeles School of Public Health, University of Michigan School of Public Health, University of Minnesota School of Public Health, University of Glasgow, University of California, Los Angeles, University of Illinois-Chicago, University of Medicine and Dentistry, University of Pittsburgh, University of North Carolina.

Current Sponsors: The Deshpande Foundation, The Nand and Jeet Khemka Foundation, AKM Systems Private, HCL Corporation, Vinod and Neeru Khosla Amar Foundation, Rohini Nilkeni - Akshara Foundation, The Ranbaxy Promoter Group, Reliance Industries Ltd., Vedanta Resources Plc, Wockhardt.

Governance Structure: PHFI is an autonomously governed public-private partnership initiative. It is managed by a fully empowered, independent, governing board that is represented by multiple constituencies. The Board includes senior government officials, eminent Indian and international academic and scientific leaders, civil society representatives and corporate heads. The Board is chaired by Rajat Gupta and the full list of board members is available here. Day-to-day operations are overseen by President Dr. K. Srinath Reddy.

Curriculum/Research: PHFI adopts a broad, integrative approach to public health tailored to Indian conditions with relevance extending to countries facing similar challenges and concerns. The Association of Schools of Public Health of the U.S. will offer educational and technical assistance.

Sunset Date: None

Success Criteria: The number of schools created, the number of students who are recruited to and complete training in those schools, and whether graduates can find jobs in India's public health sector.

PEOPLE

Administrative Staff: Over 50 professional staff members.

Professors/Instructors: PHFI has implemented a "Future Faculty" program to recruit teachers from around the world. The plan includes granting fellowships to selected candidates (40 over the last three years) to complete Masters level course work at premier public health schools in the U.S., Canada, Europe, and Australia in exchange for a commitment to return to PHFI and work with the institutes

Students: Goal is to ultimately train more than 1,000 students per school per year, graduating as many as 10,000 students annually.

ACCOMPLISHMENTS/MILESTONES

- PHFI's goal initial goal was to construct nine schools of public health across the country to conduct research and conduct graduate-level research and collaborations, such as to partner with clinical research organizations to run trials. The PHFI has already broken ground on four schools with at least four more to be built. The remarkable pace of development was made possible by the

government's recognition of the overwhelming national need and the extraordinary leadership provided by PHFI's founders and board.

- The PHFI has become one of the first public-private partnerships in health in India, but it needed government support and the generosity of the private sector—especially through donations from Indians who felt an enormous sense of responsibility to give back to their country. There was also tremendous enthusiasm from the Indian healthcare industry to get involved.

SUMMARY

The Public Health Foundation of India began with Dean Bloom's desire to use his position in the public health community to help improve health in India. Working with Peter Berman and Rajat Gupta, he developed an idea to establish a new institution that would standardize Indian public health training, help bridge the nation's public health professional labor gap, and serve as an advisory body to the Indian government. Prime Minister Singh and his coalition were also attracted to the idea because it closely aligned with the country's Common Minimum Program, which outlined the Indian government's minimum objectives. As a result, the PHFI was structured as an independent foundation to serve and train the citizens of India about the broad dimensions of public health.

The Institutes of the PHFI will greatly bolster India's existing schools of public health by creating a pool of permanent faculty and establishing an accreditation agency that will standardize public health education. The Institutes will not only improve the quality of public health training, but will also provide the capacity necessary to fill an urgent labor gap: India currently graduates some 375 students each year from its schools of public health and institutions—compared to the 10,000 needed annually.

For Barry Bloom, PHFI has a deep, personal resonance. In 1981, the WHO sent him to New Delhi to teach the first immunology course ever offered in India. Twenty-eight students attended the class. Today, the intense pace of medical and public health research, coupled with spiraling disease rates, means that India needs not only top-rank immunologists, but other health professionals well-versed in economics, sociology, environmental studies, and epidemiology:

> When I became dean, in 1999, I sought a way to give something back to India. While modern India excels in many sciences, it is equally clear that, for a country of a billion people, it has few schools of public health and a tragically underdeveloped public health system. In September of 2000, I was privileged to meet Rajat Gupta, a distinguished Indian expatriate who had accomplished a great deal for India by organizing humanitarian activities within the Indian community in the United States.

And from that initial meeting, the seeds for the PHFI were sewn.

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University-Government Partnership

MIT-Department of Biotechnology, Indian Ministry of Science and Technology

PARTNERS & OBJECTIVES

Massachusetts Institute of Technology (MIT)
Martha Gray, Director Emeritus, Harvard-MIT Health, Sciences and Technology (HST) Division

Objective: To establish research and educational relationships between HST and India towards a shared goal of advancing health through innovations accessible to those in low-resource settings.

Department of Biotechnology, Ministry of Science & Technology, Government of India
Dr. M. K. Bhan, Secretary

Objective: To develop a nationwide ecosystem (community) for research and education that will develop and support Indian innovators and innovations that advance human health.

MISSION

To assist in the creation and the ongoing mission of the Translational Health Sciences and Technology Institute (THSTI) in India, an innovative organization founded by the Indian government to address unmet medical and health needs in India. THSTI will develop a network of partnerships that will drive research aimed at enhancing the “healthspan” of India's citizens, and will also establish educational and training programs that will produce India's innovators of tomorrow.

PROGRAMS

There are two programs, a Faculty Development Program and an Innovation Program* to commercialize new treatments and drugs.

Faculty Development Program

Phase 1: Search An international search for the founding faculty of THSTI will be launched in the winter of 2008/2009, with the aim of recruiting up to 4 faculty per year for a total of 16 founding faculty. The new faculty will train in the US for two years. The search will be conducted in concert with faculty searches at the Harvard-MIT HST with the aim of sharing practices for faculty recruitment and providing a basis for comparison of quality and attributes.

Phase 2: Development The development phase will be an immersion experience within the Cambridge HST community. The appointed faculty will spend two years in residence in Harvard-MIT HST, where they will work as a team with local faculty to develop research and educational programs, as well as institutional policies, for THSTI. New professors will undergo experiential learning through participating in the regular faculty activities of HST. They will be mentored in the development of research, curricula, and policies for THSTI.

*Phase 3: Delivery** The new faculty will travel to India to launch THSTI, which will be operational by 2011. They will continue to further develop THSTI research and educational programs.

Location: NCR/Delhi, India and Cambridge/Boston, USA.

Cross Border: Yes

Professor Nationality: International with preference for Indian heritage.

Professor qualifications incl. expertise and research: Candidates may be at the junior or senior level, and must have earned a doctorate (PhD, MD/PhD or MD) in a field related to medicine or biomedical sciences, chemistry or chemical engineering, immunology, genetics, biological or biomedical engineering, material sciences, engineering, or physical sciences and cellular and molecular biology, and are working at the interfaces of health sciences and technology. Of special interest are candidates focused on areas ranging from fundamental biosciences to clinically motivated research such as the application of emerging

technologies to biomedical sciences, development of transgenics and knock-outs animal models of human diseases, biosensors, new therapeutics, or biomaterials.

HISTORY

2004-2005: A delegation of the Indian government traveled around the world to observe models for promoting innovation and for training innovators, with a focus on translational medicine.

2006: The Indo-U.S. Science and Technology Forum (IUSSTF) sponsored a meeting in Delhi with key thought leaders to discuss possible translational medicine research and collaboration models for India.

2007: The Indian Parliament created the Translational Health Sciences and Technology Institute (THSTI). A Joint Statement of Intent was signed between the Indian government and MIT to partner on certain programs to benefit THSTI.

2008: A contract was signed establishing Phases 1 and 2 of the THSTI Faculty Development Program and funding was approved by the Indian government.

INITIAL FUNDING

Annual Budget: USD $1 million annually for 5 years. An undisclosed amount will also be provided to pay the salaries and associated costs of new faculty.

Sources: The Indian government.

Is future funding dependent upon reaching certain milestones? No.

Frequency and Duration: Each September, for the next 5 years, a new search will be initiated. The search is expected to take one year and the development phase unfolds over the subsequent two years.

STRUCTURE

Current Partners and Sponsors: Harvard-MIT Division of Health Sciences and Technology (HST) and the Department of Biotechnology, Ministry of Science & Technology, Government of India.

Governance Structure: There is a Joint Statement of Intent between the two partners covering many facets of potential collaboration. A contract was signed for the Faculty Development Program in 2008.

The program will be directed by Martha Gray and will be governed by the Governing Body of THSTI (yet to be selected).

Curriculum/Research: Working together, the THSTI and Harvard-MIT HST faculty will develop graduate degree programs focusing on the convergence of engineering, science and medicine. Research programs are expected to focus, in part, on addressing key unmet health needs in low resource settings. Given the translational focus, other potential programs may include a biomedical enterprise program, a biomedical informatics program, a program in pharmacology and toxicology, the development of a research resource on microscale devices for life sciences, the creation of a research resource on biooptics, a program to create business mechanisms through which academic discoveries can be commercialized (based on the Deshpande Center for Translation at MIT) and the creation of an “x-prize model” – a desired translational health innovation -- to be invented in order to compete in a “grand challenge competition” for prize money.

Sunset Date: None established. It is likely that the program will change, along with the changing needs of THSTI.

Success Criteria: Successful recruitment of faculty comparable to faculty at Harvard-MIT HST, and the development of appropriate research and educational programs for THSTI in time to be operational by 2011.

PEOPLE*

Organization: The THSTI Faculty Development Program will be conducted by Harvard-MIT HST and an undetermined number of experts from India.

Administrative Staff: As of October 2008: ½ FTE at MIT and ½ FTE in India. When fully staffed: 2 FTEs at MIT and 2 FTEs at THSTI. Student volunteers such as those from HST’s India Internship program will potentially be involved in mentoring the students. It is not yet known how many will be required.

Professors/Instructors: 15-20 professors from Harvard-MIT HST will teach on the THSTI Faculty Development Program.

Innovation Program*

Still in the conceptual stage, this program will commercialize new treatments and drugs that emerge from academic research. The program will be modeled after the Deshpande Center at MIT, which funds promising early stage research and connects MIT's innovators to the business community. Under the Innovation Program, preproposals will be solicited from India's academic institutions. Successful proposals will be provided funds and assigned a catalyst – an experienced mentor or team – who will help guide the development effort and the hand-off strategy for licensing or to a start-up company. Awardees will also be expected to attend semi-annual events where they will network with leaders from industry and with one another.

Location: India (throughout)

Cross Border: Yes

Nationality: Indian

FUNDING*

Initial Funding: An estimated USD $1M seed funding.

Source: Department of Biotechnology, Government of India.

STRUCTURE*

Current partners: Department of Biotechnology, Government of India, the Harvard-MIT Health Sciences and Technology (U.S.) Division.

Governance Structure: A Joint Statement of Intent to cooperate on several programs to benefit THSTI was signed by MIT and the government of India in November of 2007. A contract is being developed for the Innovation Program. With respect to a reporting structure, this program will be overseen by the governing body of THSTI (yet to be announced) and will collaborate with an advisory committee (under recruitment). The program's co-directors from MIT will be Martha Gray, Director Emeritus of the Harvard-MIT Health, Sciences and Technology Division, and Chemical and Biochemical Engineering Professor Charles Cooney, who is also Faculty Director for the Deshpande Center for Technological Innovation at MIT. Drs. Gray and Cooney will recruit a program director and provide ongoing support.

Frequency and Duration: An annual solicitation of pre-proposals is expected. Funding will be awarded for 1-2 years.

Success Criteria: The recruitment of a team of "catalysts" from the private sector in India; and an expanded pipeline of new science and technology entering the commercialization phase.

PEOPLE*

Organization: There is no separate organization.

Administrative Staff: TBD

Participants: A minimum of 20 from the Indian private sector and 20 from the US private sector.

PROPOSED MILESTONES*

Faculty Development Program

Winter 2008/2009: Begin recruitment of THSTI founding faculty;

Prior to 2011: Develop appropriate research and educational programs for THSTI in time to be operational by 2011.

Innovation Program

December 2008: Planning session is tentatively scheduled in India for the Innovation Program.

Spring 2009: Innovation Program launched.

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University-Industry-Government Partnership

Translational Medicine Research Collaboration (TMRC)

PARTNERS & OBJECTIVES

Wyeth Pharmaceuticals
Giora Feuerstein, Assistant Vice President, Head of Discovery, Translational Medicine

Objective: To develop commercial treatments for certain diseases as quickly and efficiently as possible

Scottish Enterprise
Jack Perry, Chief Executive

Objective: To stimulate Scotland's economy by adding jobs and to strengthen its reputation for innovative medical research.

NHS Scotland – Grampian, Greater Glasgow, Lothian, and Tayside
Professor Heather Cubie, NHS Lothian

Objective: To effectively treat diseases throughout Scotland as quickly and efficiently as possible.

Scottish Universities – Aberdeen, Dundee, Edinburgh, and Glasgow
Professor Andrew Morris, University of Dundee

Objective: To discover effective treatments for Scotland's most destructive diseases.

MISSION

To lead the world in the development of personalized medicine, bringing new treatments to patients suffering from serious illnesses, through the discovery and implementation of biomarkers.

PROGRAM

The TMRC is comprised of a central core research laboratory based at the University of Dundee working with Centers of Excellence established in each of the four university medical schools. The Centers of Excellence form a network with the four NHS Scotland locations.

The program employs focused workshops across the network as the vehicle for productive collaborative research. These workshops identify key translational issues in Wyeth platforms and serve as a forum for discussion by a multidisciplinary group of scientists.

Location: Scotland

Type of Partnership: Talent and innovation

Cross Border: Yes

Curriculum/Research: Cardiovascular and metabolic diseases, the central nervous system, oncology, inflammation, and women's health. Translational medicine is a new approach to developing treatments for diseases using biomarkers, new "measurable" proteins that track patients' responses to drugs and other medical treatments. The use of biomarkers will also help adapt prescription drugs to individual needs by letting doctors discover which patients respond best to which medicines.

TIMELINE

2005: Wyeth Pharmaceuticals signed a collaborative framework agreement with Scottish Enterprise and the Universities of Aberdeen, Dundee, Edinburgh, and Glasgow.

2006: TMRC was founded. Scotland hailed the new collaboration that is expected to spawn 50 to 120 jobs within 5 years.

2007: The first round of 28 research projects was announced. They cover cardiovascular and metabolic diseases, the central nervous system, oncology, inflammation, and women's health. The research projects are supported by £8 million in grants.

2008: Another 39 research projects were announced in the same research areas as the first group. These new projects are supported with grants totaling £15.5 million. A new building will be completed this winter for the Core Laboratory at Dundee with room for 110 scientists, researchers, and staff.

FUNDING

Annual Budget: £50 million over 5 years

Sources: 1) Wyeth - £33 million; 2) Scottish Enterprise - £17.5 million

Is future funding dependent upon reaching certain milestones? No, but there is an option to extend funding for another 5 years.

STRUCTURE

Current Partners and Sponsors: Four Scottish universities (Aberdeen, Dundee, Edinburgh, and Glasgow); Scottish Enterprise, a quasi-governmental organization dedicated to stimulating economic growth in Scotland; and NHS Scotland, Scotland's publicly funded national health service. The Scottish partners have formed a private company, Translational Medicine Research Initiative (TMRI), that is the legal entity that has signed with Wyeth to form the collaboration. The four Scottish universities and NHS Boards are the shareholders of TMRI.

Governance Structure: At the strategic level, TMRC has a Steering Committee with 11 members. There is also a Scientific Review Board composed of 16 scientists, professors, and doctors from the four universities and Wyeth. Program funding decisions follow one of two paths:

1. Collaborations between Wyeth and Scottish investigators begin to emerge from workshops designed to identify areas of common interest or from direct interaction with Wyeth translational scientists. Applications are evaluated by TMRC's Scientific Review Board (SRB).
2. Additionally, where Wyeth does not provide funding for a translational program, a Scottish investigator in a participating institution may still access the resources of the TMRC including the services of the TMRC Core Laboratory. Applications follow the same submission and review process as with Wyeth-funded translational programs.

Sunset Date: None

Intellectual Property:

Is it for open market discovery, or for specific market applications? Both.

Is the IP open source or protected? Who owns the resulting IP, if any? IP that predates any collaboration will remain the sole property of the contributing party. New IP that results from TMRC collaborations is owned jointly by Wyeth and TMRI unless it is relevant to Wyeth drug candidates. Wyeth will own any new IP in the therapeutic field and TMRI will own any new IP in diagnostic and other fields.

If IP that predates the partnership is required to exploit new IP, TMRI and Wyeth must provide cross licenses to that IP. Royalty sharing arrangements are in place between Wyeth and the Scottish partners through TMRI.

Success Criteria: 1) Generating new treatments and/or drugs in a shorter time than the 10 – 20 years that is typical of the industry 2) Generating specific treatments that are more customized to individual patient needs.

PEOPLE

Organization: The TMRC is comprised of a central core research laboratory working with centers of excellence in each of the four university medical schools. The core research laboratory is based at the University of Dundee, with approximately 50 scientific employees.

- *TMRC Steering Committee:* 7 professors, 2 doctors, 3 Wyeth representatives
- *TMRC Scientific Review Board:* 11 professors, 4 doctors, and 1 researcher. Of the 16 board members, 5 are from Wyeth (2 professors, 2 doctors, and 1 researcher).

- TMRC core laboratory staff is composed of doctors, professors, and researchers in the following disciplines:
    a. Bioinformatics: 6
    b. Genomics: 5
    c. Immunoassy: 4
    d. Management and Admin: 4 (One person is administrative)
    e. Proteomics: 4
    f. Sample Handling: 1
    g. Tissue Culture: 1
    h. Translational Scientists: 3

ACCOMPLISHMENTS/MILESTONES

Medical research can be a slow process, typically taking decades to show results. However, researchers at Dundee University, where the TMRC core laboratory is located, are confident that the collaboration, which brings together the best scientists and researchers from both the U.S. and the U.K., may help shorten the time to discovery for new drugs and treatments.

SUMMARY

Wyeth is proud of the value TMRC has achieved so far and the pharmaceuticals giant believes it could not have happened without the TMRC partnership.

"We believe that TMRC will deliver research dividends that no single, one-off partnership could bring," said Giora Feuerstein, Assistant Vice President and Head of Discovery Translational Medicine, Wyeth Research. "One of our advantages is our ability to quickly tap into and work with the talented physicians and academic investigators in Scotland."

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University-University Partnership

China's Leaders in Development

PARTNERS & OBJECTIVES

Harvard Kennedy School Harvard University
Anthony Saich, Daewoo Professor of International Affairs and Director, Ash Institute for Democratic Governance and Innovation

Julian Chang, Executive Director, Asia Programs, Ash Institute for Democratic Governance and Innovation

Objective: To expand the school's global reach by helping to train the next generation of China's leaders

School of Public Policy and Management, Tsinghua University
Professor Youqiang Wang, Deputy Dean

Professor Lan Xue, Dean

China Development, Research Foundation
Lu Mai, Secretary-General

Objective: To improve the quality of national leadership by partnering with one of the world's most respected government and public policy education institutions.

MISSION

To prepare Chinese public officials to manage unprecedented economic growth by combining unique local expertise and knowledge with instruction on best practices in public policy around the world.

PROGRAM

Approximately 50 Chinese mid-career students spend three weeks at Tsinghua University's School of Public Policy and Management learning from local experts and Kennedy School professors, followed by one week of travel in the U.S. and one month of instruction at the Harvard Kennedy School in Cambridge, Massachusetts. The program has been so successful that a spin-off is now in development that will be devoted to crisis management.

Location: Beijing, China and Cambridge, MA, USA

Cross Border: Yes

Student Nationality: Chinese

FUNDING

Annual Budget: USD $1,100,000 (For first five years was USD $1 million)

Sources: 100% Amway China

Is future funding dependent upon reaching certain milestones? No. Amway is required to give six months' notice if it decides to discontinue the program prior to the five years.

TIMELINE

1999: Seeing a need to train local officials in China, Kennedy School alum Mr. Lu Mai contacted his alma mater to discuss developing a leadership program.

2002: Content established and funding secured, the program officially launched.

2007: The program's original goal of training 300 Chinese public servants (60 per year) was achieved. A one-year hiatus was taken to refresh funding sources.

2008 The next five year phase of the program began with the goal of training up to 55 students each year.

STRUCTURE

Current Partners and Sponsors: China Development Research Foundation of the State Council (China), the School of Public Policy and Management at Tsinghua University (China), and the Harvard Kennedy School at Harvard University (U.S.)

Governance Structure: An MOU was signed by both universities. Tony Saich is the faculty chair responsible for the teaching; Julian Chang runs the team. The three partners collaborate to develop the curriculum, which is adjusted over time to adapt to changing needs.

Curriculum: Classes focus on leadership, strategy, new methods of public management and governance, sustainable development and social policy, U.S. domestic institutions and foreign policy, and urban planning.

Frequency and Duration: The course is given over an 11 week period. Following the first four in Beijing at Tsinghua University, the participants come to the United States for one week of study tour and four weeks of classroom instruction in Cambridge, Massachusetts.

Success Criteria: Course evaluations, faculty views, feedback from Chinese partners, promotion data. There is also the objective of training approximately 50 public officials per year.

PEOPLE

Administrative Staff: While the program is running there are three full-time equivalents working at the Kennedy School, plus five to seven student volunteers. When the program is not running, staffing drops to 1-1/2 full-time staff.

Professors/Instructors: 15 to 20 professors from the Kennedy School and a slightly smaller number at Tsinghua University. During the Beijing portion of the program the Kennedy School supplies two or three instructors.

Students: The approximately 50 students going through the program each year are selected through an internal competition administered by the Central Organization Department in China. Of the first 300 graduates, about one third were from central government organizations and two thirds were from provinces and cities around China.

ACCOMPLISHMENTS/MILESTONES

- The program taught approximately 300 Chinese public officials from 2002-2007. After a one-year hiatus, Amway China re-upped its commitment for another five years beginning in 2008 and slightly increased its yearly funding to USD $1,100,000.
- The program is so successful that a spinoff is being formed to address crisis management.
- The seniority of public officials sent to the course has risen from mid- to senior-level officers and in 2008 several participants were at the Vice Minister level.
- The program has "opened the eyes" of the non-China specialists at the Kennedy School and now several are engaged in collaborative research projects with Chinese colleagues.

SUMMARY

Asia Programs Executive Director Julian Chang believes "dedication to a common mission and a sense of trust and confidence in the coalition partners" are the elements that have allowed this ambitious program to thrive—and their absence may be the primary reason that partnerships otherwise set for success ultimately fail.

These intangible qualities are not easily developed, however, and they cannot be taken for granted once they are. Mr. Chang states that the process of building trust among the partners began long before this particular partnership was conceived, developing over many years as the same collaborators worked together time and again on multiple projects. But even such deep ties cannot be taken for granted—making

sure the partners maintain their common vision takes work. One example of how the Program accomplishes this is the annual program review the members engage in to ensure the program continues to adhere to the agreed-upon goals. "There's always change—not of mission, but in the details and curriculum . . . Working through those changes together helps to maintain and further build the mutual sense of trust and confidence."

Still, more pragmatic concerns must also be kept in mind. Mr. Chang is quick to point out that very little will come of a partnership's carefully cultivated trust and dedication if the collaboration does not have the resources necessary to effectively pursue its mission. "Trust is key, but you can't move forward in a collaboration like this without a steady source of adequate funding." With the program's sole sponsor, Amway China, having recommitted to the program for an additional five years, China's Leaders in Development will continue training China's leaders at least into the next decade.

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University-University Partnership

Duke-NUS Graduate Medical School Singapore

PARTNERS & OBJECTIVES

Duke University
Dr. R. Sanders (Sandy) Williams
Senior Vice Chancellor for Academic Affairs and Dean Emeritus, Duke University School of Medicine; Founding Dean, Duke-NUS Graduate Medical School

Objective: Extending the global reach and reputation of Duke Medical School while benefiting from the reinvigoration that comes with participation in a new endeavor.

Duke-NUS Graduate Medical School
Dr. K Ranga Krishnan
Dean, Duke-NUS Graduate Medical School

Objective: Partner with a global medical education leader to develop a new medical school capable of producing top physician-scientists.

MISSION

To develop a new world-class U.S.-style medical school in Singapore that is capable of producing the physician-scientists necessary to forward Singapore's national goal of becoming an international biomedical sciences hub.

TIMELINE

2000: Singapore launched a major biomedical institute as part of a plan to make the nation an international biomedical hub.

2001: An evaluation of Singapore's biomedical growth plan recommended developing a training program to produce highly skilled physician-scientists to support the biomedical institute.

2003: Duke University School of Medicine and Singapore's Minister of State for Education signed an MOU to develop a new medical school modeled on Duke's.

2005: Duke and NUS signed a formal agreement establishing the new medical school. The first staff were recruited and an interim campus opened.

2006: Construction of the permanent campus began.

2007: Classes began for the 27 students in the inaugural class.

2009: New campus to be completed.

PROGRAM

Duke and NUS are collaborating in the development of an innovative new medical school in the NUS system based on Duke's globally-recognized medical education program.

Location: Singapore

Cross Border: Yes

Student Nationality: Singaporean, American, Bangledeshi, British, Canadian, Chinese, Philippine, Hong Kong, Indian, Indonesian, Malaysian, Sri Lankan, Vietnamese, Zimbabwean

FUNDING

Annual Budget: n/a

Sources: Government of Singapore, Shaw Foundation, Goh Foundation, Lien Foundation, Lee Foundation, major gift from the estate of Tan Sri Khoo Teck Puat

Is future funding dependent upon reaching certain milestones? Initial funding of the partnership is guaranteed for the first seven years, subject to achievement of milestones; partners are currently engaged in talks to extend the partnership beyond the current contract, which is set to expire in 2012.

STRUCTURE

Current Partners: Duke and NUS

Governance Structure: The development of the new medical school is overseen by a board of directors comprising representatives of stakeholder units from government, academia, and healthcare in Singapore, as well as prominent leaders from the private sector, along with senior officers from Duke. Consent of the Duke representatives is obligatory for decisions relating to appointment, promotion, and tenure of faculty, student admissions, and compliance policies.

Curriculum/Research: The educational program is based on the curriculum of Duke University School of Medicine, which includes a full year of research within the 4 year experience, modified locally as deemed appropriate by Duke-NUS faculty, with opportunities for pedagogical innovation. Research groups are defined thematically (e.g. Emerging Infectious Diseases) rather than by traditional disciplinary departments.

Success Criteria: Achievement of the specific performance indicators set forth in the program's initial agreement; publications in respected medical and science journals; qualifications of the students attracted to the program and their success following completion of the program; growing reputation of the school with the goal of it ultimately being recognized as one of the best medical schools in the world.

PEOPLE

Organization: Duke Medical School dean Sandy Williams served concomitantly as dean of the new medical school until July 2008 when Duke department chair Ranga Krishnan relocated to Singapore and assumed the deanship. Williams retains the title of founding dean and remains a member of the board of directors. Krishnan reports to Williams, now Senior Vice Chancellor at Duke, with respect to his responsibilities to serve Duke interests in the partnership.

Administrative Staff: 195 non-primary faculty and staff

Professors/Instructors: 46 research faculty, 43 adjunct faculty

Students: 48 students were admitted to the class that began its studies in 2008.

ACCOMPLISHMENTS/MILESTONES

- The school quickly achieved its goal of admitting approximately 50 students per year, attracting 48 highly qualified students to its second class. The partners are considering expanding the enrollment goal to 100 students per class -- a level of enrollment similar to that at Duke's medical school.
- The new medical school has been able to develop productive collaborative relationships with other institutions in Singapore, including major hospitals and national centers focused on specific disease areas (e.g. National Cancer Center), particularly within the publicly supported SingHealth System, A*STAR research units at Biopolis and elsewhere, Nanyang Technological University, and departments of NUS both within and outside of its Yong Loo Lin School of Medicine. Forming such external relationships is vital to the success of the new school's research mission.
- Duke-NUS is establishing itself as the hub of a regional network for studies of emerging infectious diseases, including identification of new viral pathogens, surveillance of known pathogens with potential to generate pandemics, definition of host responses to viral infection in different Asian populations, and development of new antiviral therapies and vaccines. Duane Gubler, a leading Dengue virus expert, has joined the faculty to lead this program.

- Duke-NUS has partnered with A*STAR-Biopolis to attract prominent British neuroscientist Colin Blakemore, previously Chief Executive of the UK Biomedical Research Council, to lead a Neurosciences Research Partnership that will address molecular, cellular, clinical and behavioral aspects of cognition, neurodegenerative diseases, major psychiatric illnesses, and behavioral disorders.

SUMMARY

It is clear that a pioneer spirit and a shared dedication to innovation have been key drivers of success for this groundbreaking partnership. The government of Singapore recognized the need for innovation: Asian medical schools are typically undergraduate institutions that offer a less research-oriented experience than is gained in the graduate medical schools familiar to Americans and carried further in the unique Duke curriculum. Understanding the importance that emulating the American model held for its national biomedical ambitions, the Singaporean government not only sought Duke's assistance, but provided the high-level leadership that was necessary to win Singaporean stakeholders over to this departure from tradition. According to the program's founding dean, Dr. Sandy Williams, "what really made this work was the government's commitment to the notion that they needed to shake things up, and they were willing to really push innovation through despite the fundamental conservatism that exists in any culture."

Dr. Williams knew that the Singapore biomedical enterprise wasn't the only likely beneficiary of such change, however, and saw the new collaboration as an opportunity to shake things up at home, too. Participating in this historic undertaking inspired him to think about the history of his own institution and what it means to be part of something important and new. After its founding in the 1930's, "Duke [medical school] went from improbable beginnings in the rural South to being a top global institution in just 20 years. Something very important must have happened, and I became interested in figuring out what that was." Dr. Williams decided a large piece of the puzzle was "simply the joy and enthusiasm of doing something new, of being a startup... There's an invigorating aspect for any organization participating in new endeavors, and we were able to recapture that enthusiasm at home through this work in Singapore."

Dr. Williams quickly realized that another benefit of being a startup is the freedom to take a fresh look at how things are done and the opportunity to construct better solutions. "Changing things at Duke is like turning a battleship, but we're small and nimble [in Singapore]. We can experiment with educational and research models that we could never try here and, when they work, we can bring them back home." The program at NUS, he explained, is like "a living laboratory that helps us here and there."

While such ambitious shake-ups may begin at the institutional level, the willingness of individual members of the Duke community to shake up their personal lives has also been an important factor in the partnership's success. For Duke to have an adequate presence on the ground, a significant number of Duke faculty and researchers would have to move their labs and their families to Singapore. "Our external communications department has used the word 'pioneers' a lot," Dr. Williams noted with a laugh. "Recruiting faculty from the U.S. to distant overseas locales can be a challenge. The flow has been in the opposite direction for so long, but it's becoming easier to convince people that their future might be better in Asia."

Still, the promise of adventure, the chance to be a participant in the start of something big and important, and the opportunity to perform research under the umbrella of a government that is showing an increasing enthusiasm to invest in biomedical research has convinced 18 Duke faculty so far to leave Durham for the exotic offerings of Singapore for much or all of the academic year. Notes Dr. Williams, "although some likely will stay out their initial five-year commitment and then return to the U.S., others almost certainly will remain much longer. From either locale, they are well-connected to other Duke colleagues through a variety of bridging programs."

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University-University Partnership

UMassOnline-CerEdu-CCEA

PARTNERS & OBJECTIVES

UMassOnline
David Gray, Chief Executive Officer; Chief Information Officer, UMass

Objective: To provide a university-level education to those in China who otherwise could not have attended a university; and to position UMassOnline and the University of Massachusetts (UMass) as the first foreign university authorized by the Chinese Ministry of Education to offer online degree programs in China.

Cernet Education Corporation (CerEdu)
Zhu Yidong, Vice Chairman

Objective: To demonstrate the efficacy of online instruction and to pave the way for other foreign universities to enter the China online market.

Chinese Continuing Education Association (CCEA)
Yan Jichang, Vice Chairman and General Secretary

Objective: To secure "China's place in the league of nations and [serve] the aspirations of [Chinese] students to achieve world class academic credentials."

MISSION

To provide a post-secondary education to citizens in China who otherwise may not have had the opportunity to attend a university.

PROGRAM

UMassOnline, CerEdu, and CCEA will offer online classes and degree programs to students through Tsinghua University in Beijing beginning in the spring of 2009. CCEA and CerEdu will market and support the courses and also identify targeted opportunities for UMassOnline to "really hit the ground running."

Location: Initially Beijing, expanding to 350 locations throughout China

Type of partnership: Education

Cross Border: Yes

Student Nationality: Chinese and other students studying in China

Curriculum/Research: The initial offering will consist of 40 online courses from within the UMassOnline degree and certificate program portfolio. The courses will be drawn from the areas of business, finance, accounting, management, instructional design, liberal arts, and English as a Second Language (ESL). UMassOnline courses are taught by the same faculty who teach at the University of Massachusetts' five campuses.

TIMELINE

2006: UMass Boston hosted the first China Forum. As a result of many years of relationship-building, the University of Massachusetts and Tsinghua University signed an overarching MOU at the conference.

2007: A second forum was hosted by Tsinghua University in Beijing, China. UMassOnline CEO David Gray attended and met with officials at CERNET and CCEA.

2008: An MOU was signed between UmassOnline, CerEdu, and CCEA granting UMassOnline the exclusive right to offer online classes in China for five years.

FUNDING

Annual Budget: N/A

Sources: The participating partners will contribute the initial funding. Over the long term, the university anticipates that the project will be self sustaining, with fee revenue and potentially grant revenue.

Is future funding dependent upon reaching certain milestones? No.

STRUCTURE

Current Partners and Sponsors: UMassOnline, the online learning consortium of the University of Massachusetts; CerEdu, which is a subsidiary of the Chinese Education & Research Network (CERNET), the second largest internet service provider in China and also the internet service provider for all Chinese higher education institutions; and the Chinese Continuing Education Association (CCEA), a cooperative between the Ministry of Education and Chinese Government. The CCEA is located on the campus of Tsinghua University and its employees work full-time for the university.

Governance Structure: An MOU has been signed between the three partners above. The agreement is annually renewable for a term of up to 5 years.

At the top of the partnership there is the leadership/management tier made up of UMassOnline's CEO, CERNET's Executive Vice President, and the Director of the Administration Office of Continuing & Professional Education at Tsinghua University, who serves as CCEA's representative. The Executive Director of the University of Massachusetts' China Institute also advises this group.

Underneath is a Technology Working Group that includes UMassOnline's Chief Technology Officer and officials from CERNET and a Program Development/Academic group that includes UMassOnline's Chief Academic Officer as well as officials from CERNET.

Decisions thus far have been worked out through information sharing and consensus-building; it is anticipated that this will continue to be the process.

Sunset Date: There is no planned sunset date.

Success Criteria: UMassOnline is taking a "crawl-walk-run" approach by rolling out the program to a smaller number of students (between 500 – 1,000) in the spring of 2009. "That will give us an initial sense of what kinds of issues we may confront—technology issues, language issues, tutoring requirements, cultural and pedagogical differences between American teaching styles and Chinese learning styles that will have to be bridged and reconciled," explained UMassOnline CEO David Gray.

PEOPLE

Organization: Through November 2008, the work has been incorporated into the responsibilities of UMassOnline's executive and managerial group.

Professors/Instructors: The five UMass campuses, through their divisions of continuing education, will be supporting the development of programs and services and will choose a staff member to be the point person. This is in keeping with the UMassOnline current model for online program development and management. An academic manager may be hired to be "on-ground" in China, but this is still a decision in progress.

Project and Staff Allocation: Li Feng, the newly hired China Program Coordinator, will coordinate the efforts of the team.

Administrative Staff: Information is not yet available.

Students/Target Audience: The target audience will initially focus on traditional aged college students (18 to 22) coming from the 69 universities that comprise CCEA (this includes Tsinghua University).

UMassOnline plans to offer online courses first and then certificate programs, which can be incorporated into degree requirements of the students' home campuses.

A secondary target audience is foreign students studying at Chinese universities. Again, it is anticipated that courses and certificates will assist these students in completing degree programs at their home campuses.

For the first run of courses beginning in the spring of 2009, UMassOnline will limit enrollment to 1,000 students or less. This will increase to a figure conservatively estimated at 5,000 or more students within a few years.

Institutional Affiliation: Tsinghua University and the 69 Universities that belong to the CCEA, as well as mid-career students not affiliated with a university (see below).

Education Level: Undergraduate and graduate students

Career Level: UMassOnline will develop specialized certificate programs directed at government officials, corporate mid managers, and teachers of English, who represent UMassOnline's typical target audience of working professionals.

ACCOMPLISHMENTS/MILESTONES

The partnership recently concluded a marketing survey to which 6,000 Chinese residents responded.

"We now have a much better handle on where the greatest demands will be and also [know] prospective Chinese students are very receptive to the idea of learning online," said Gray. "They may not completely understand what it means to pursue a course of study over the internet, but they're open to it, and that's huge."

SUMMARY

UMassOnline CEO David Gray responded to questions as to what he thought were the most important lessons to pass on to others forming partnerships in China:

"I think that it is really important to point out that the relationship groundwork was laid prior to UMassOnline announcing the relationship with the China Education Association and the Chinese Education and Research Network," said Gray. Gray was referring to the 25 years that UMass officials spent developing relationships in China, prior to signing the overarching MOU between Tsinghua and UMass.

"Building interpersonal relationships, those one-on-one trust relationships, getting folks comfortable that you're a person and an organization that can be relied upon to deliver, that you're going to be there…It is very important to the Chinese that you're not just in it for public relations purposes, that your commitment is genuine, that you're in it for the long haul, that you and they are jointly committed to having a successful partnership," concluded Gray.

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University-University Partnership

Senior Projects Center

PARTNERS & OBJECTIVES

Worcester Polytechnic Institute
Professor Yiming (Kevin) Rong, Program Director

Objective: To improve students' technical skills while exposing them to Asian culture, thus increasing their ability to compete in the global economy.

Huazhong University of Science and Technology
Professor Liang Gao, Program Co-Director

Objective: To expose students to Western culture and a broader, more creative real world problem solving experience than is typically available in Chinese universities.

MISSION

To complement students' technical engineering skills with business knowledge skills in the critical areas of globalization, innovation, entrepreneurship, and supply chaining.

PROGRAM

This program involves student exchanges between engineering seniors at Worcester Polytechnic Institute (WPI) in the U.S. and Huazhong University of Science and Technology (HUST) in China. After several weeks of working together remotely in preparation, the students travel to their host university to work in bi-cultural teams to solve real-world engineering problems posed by corporate sponsors. More than just an engineering training program, the program also provides a cultural immersion experience that benefits students personally as well as professionally.

Just this year, the program expanded to include students from Kyungpook National University (KNU) in Korea.

Location: Worcester, Massachusetts, USA; Wuhan, Hubei, China; and other industrial locations in China and the U.S.

Cross Border: Yes

Student Nationality: American, Chinese, and Korean

HISTORY

2005: Four WPI seniors went to HUST to work with 5 HUST students on two robot design projects designed by HUST professors.

2006: HUST students began traveling to WPI in addition to the WPI students traveling to HUST. The projects were now "real world" projects sponsored by corporate partners.

2007: Both 2006 U.S. corporate sponsors returned and another was added; 3 Chinese companies also joined as project sponsors. The number of students participating on both sides increased again.

2008: The project continued to grow with more students and corporate sponsors. The project was also expanded to Korea with 4 WPI students traveling to KNU and 2 KNU students traveling to WPI.

FUNDING

Sources: Funding for each team's in-country travel and lodging is provided by the corporate sponsor that developed the project that team is working on. The students' international airfare is covered by an NSF grant. Students cover other expenses on their own, including meals, spending money, and tuition at their home institutions.

Cost: Sponsorship costs corporate partners up to USD $1,500 in travel and lodging costs per project per year, plus the cost of developing the project the students work on.

Future Funding: May be from new grants from NSF or Department of Education, project fees from the corporate sponsors, or an endowment resource. Corporate sponsors decide year-to-year whether to remain involved in the program. Most current sponsors are repeat sponsors.

STRUCTURE

Current Partners: Worcester Polytechnic Institute (WPI), Huazhong University of Science and Technology (HUST), and Kyungpook National University (KNU).

Current Sponsors: There were seven corporate sponsors in 2008 sponsoring 3 projects completed at WPI, 6 completed at HUST, and 2 at KNU. Sponsors include Massachusetts companies Nypro, Saint Gobain Abrasives, Stanlok/REM, and New Age Technologies.

Sunset Date: None

Intellectual Property: Any IP developed is owned by the corporation sponsoring that project.

Success Criteria: Repeat and new corporate project sponsors being attracted to the program, students producing quality work that meets sponsor expectations; elevated number of student participants continuing their education in graduate school.

PEOPLE

Professors/Instructors: Currently 3 professors at WPI, 3 from HUST, and 2 from KNU are directly involved in the program.

Students: In 2008, 14 WPI students, 30 HUST students, and 6 KNU students participated. The number of participants has grown every year the program has been in existence.

ACCOMPLISHMENTS/MILESTONES

- All the corporate-sponsored projects have resulted in solutions that the companies have applied to their businesses to different extents.
- Students report that their experience working in China has been an advantage when job hunting. For at least 4 WPI students, the experience has led them to China-related career opportunities.
- Students have the opportunity to travel throughout their host country during their exchange and learn a great deal about the host nation and its culture—an experience that yields rich rewards both personally and professionally.
- Students participating in the program are significantly more likely to continue their engineering education with graduate studies. One third of the WPI participants go on to grad school while only approximately 25% of engineering students do so nationally. One goal of the program is to maintain or even increase this percentage.
- Students develop several critical skills and capabilities, such as project management, relationship management, responsive and quick decision-making, communication and coordination skills, and learn to deal with uncertainties, regional differences, and logistical difficulties.

SUMMARY

This unique program allows senior engineering students from the U.S., China, and Korea an opportunity to immerse themselves in a foreign culture while working as a team to develop real-world engineering solutions. Each year since 2005, several engineering students have participated in exchanges between WPI and HUST to spend seven weeks working in bi-cultural teams to solve engineering challenges. The program was expanded in 2008 to include student exchanges with Kyungpook National University (KNU) in Korea.

The challenges addressed by the teams are not merely academic exercises, however, as corporate sponsors work with WPI professor and program director Yiming (Kevin) Rong to develop a project that address a real-world challenge facing the company. The projects have been highly successful and have yielded solutions the companies have been able to put into practice.

While the partnership is highly educational, it is far more than just an engineering talent development partnership, as the international exchange aspect gives students an opportunity to experience a foreign culture. In addition to learning to work as part of a multi-cultural team, the students often have opportunities to travel in their host country after their project work is completed—often accompanied by their local project partners. This combination of technical and cultural education truly makes this program a standout.

Learning to work closely with colleagues from another culture is an invaluable asset in the modern workplace. While language is not a barrier in this particular project (all students selected must be fluent in English), the students learn a great deal about respecting another culture, understanding different ways of thinking, and communicating across cultures. Said one HUST student, “I learned how to represent myself, my idea, the work we have done, the results and conclusion of the project, and more importantly, the person I am.”

The program is also notable for the enthusiasm it has created both for engineering and for working in a multi-cultural environment. Both American and Asian alums of the program are significantly more likely to pursue graduate engineering studies, and many have parlayed their experience into international careers that likely would not have been accessible to them before—at least 4 WPI students have accepted jobs that will require them to work closely with colleagues in China and a number of HUST students have taken jobs with Western-invested companies in China.

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University-University Partnership

Singapore-MIT Alliance (SMA)

PARTNERS & OBJECTIVES

Massachusetts Institute of Technology
Dr. John Desforge, SMA Executive Director

Objective: To be more engaged globally, particularly in innovation-rich Asia, while developing innovative distance learning programs.

National University of Singapore
Dr. Hardy Chan, Singapore SMA Co-Director

Nanyang Technological University
Dr. Soon Fatt Yoon, Singapore SMA Deputy Director

Objective: To bring the U.S. university model to engineering programs in Singapore.

MISSION

"To attract and develop talented human capital for Singapore industries, universities, and research establishments;

Provide a platform for organizational learning that will raise the general level of all the partner institutions;

Create world-class educational programs and high-impact research initiatives in areas crucial to the growth of Singapore's economy;

Foster strong academia-industry-research institute linkages and collaborations providing the basis for an enduring and viable partnership;

Establish a standard for quality, diversity, integrity, commitment, and service to the global knowledge community."[4]

PROGRAM

MIT, NUS, and NTU have created a global model for long-distance joint training and research in engineering and life sciences. Resources of the three universities are pooled to provide students with a cross-national graduate education and research opportunities. Many classes are taught live on-site at MIT with students attending class simultaneously in Cambridge and in Singapore via a sophisticated distance learning program.

Location: Boston, USA and Singapore

Cross Border: Yes

Student Nationality: American and Singaporean

TIMELINE

1997: 25 MIT faculty members conducted an assessment of the engineering programs at NTU and NUS, having been invited to do so by MIT alum and Singapore Deputy Prime Minister Tony Tan. Among the recommendations was the "establishment of an alliance with a leading technological university that would include an interchange of faculty, students, and curricula to do research and offer post-graduate degree programs."

[4] Singapore-MIT Alliance website at *http://web.mit.edu/SMA/about/overview/index.htm*

1998: NTU and NUS signed an MOU with MIT to "create a new global model for long-distance engineering education and research."

FUNDING

Annual Budget: n/a

Sources: Government of Singapore and the two Singaporean university partners

Is future funding dependent upon reaching certain milestones? The current agreement guarantees funding will continue for 4 years as long as progress continues to be made toward key deliverables outlined in the agreement between the parties.

STRUCTURE

Current Partners: MIT, NUS, NTU

Governance Structure: Strategic direction is provided by a governing board comprised of members from MIT, NUS, and NTU, with the president of NUS serving as the chair. Other members include the provosts of NUS and NTU and representatives from Singapore's Ministry of Education, A*STAR, the Singapore Economic Development Board, and industries served by the program. Day-to-day decisions are made by Professors Dick Yue and Hardy Chan.

Intellectual Property: Five patents had been filed as of 2007

Ownership of IP: If IP is jointly developed by the partners, the revenue is shared between them. If it is developed solely by researchers from a single partner school, that school's protocol dictates the IP ownership and distribution of royalties.

Curriculum\Research: The degree programs and research cover a wide range of engineering and life sciences disciplines.

Research: 5 major research programs bring together faculty from the three schools, along with researchers from other institutions and industry, to tackle engineering challenges in the following fields:

- Manufacturing – Examines challenges specific to the manufacturing process, such as the design of supply chains, with an emphasis on emerging industries.
- Computational Engineering – Explores uses of modern high-power computing in engineering and business programming.
- Advanced Materials for Micro- and Nano-Systems – Researches new types of surface designs and materials in general. Applications include uses in semiconductors.
- Computation and Systems Biology – Fuses bioengineering with computation for applications in tissue biology.
- Pharmaceutical and Chemical Engineering – Concentration on molecular engineering in the pharmaceutical field.

21 smaller inter-university grant programs bring together faculty from the three schools to work on joint projects, facilitate faculty mentoring of students, and work with the academic programs.

Degree Programs: The Alliance offers three dual degree programs in the above specializations:

- Dual Masters granted by MIT and NUS or NTU;
- Masters-PhD consisting of an MIT Masters and a PhD from NUS or NTU; and
- A direct PhD program that earns a PhD from either NUS or NTU and a SMA certificate.

Sunset Date: The current contract expires in 2012, though the parties are in discussions about extending the engagement.

Success Criteria: Number of patents filed, publication of research in top journals, prizes and recognition won by the partners.

PEOPLE

Administrative Staff: Approximately 5 staff members at MIT with 20 in Singapore.

Professors/Instructors: Nearly 100 professors—roughly half from MIT and half from NUS and NTU

Students: About 85 students are currently enrolled in the collaboration's degree programs, roughly 25 of whom are PhD students. During the 10 years of the partnership, more than 800 degrees have been granted.

ACCOMPLISHMENTS/MILESTONES

- In 2007, the first 30 dual masters students graduated with joint degrees from MIT and either NUS or NTU. This was the first time MIT had awarded joint degrees with an institution in Asia.
- The program managers are very satisfied with the high quality of the students attracted to the program as well as how many of them choose to stay in Singapore after graduation despite a global market for their skills.
- After graduating from the program, student have built successful faculty careers in Singapore and the U.S.; have accepted jobs at consulting firms in the U.S. and London; have taken jobs with Procter & Gamble, Novartis, and the government of Singapore; and have started their own businesses, including consulting firms and a computer startup.
- The program has resulted in MIT developing an impressive distance learning facility that is shared by other MIT programs.

SUMMARY

The Singapore-MIT Alliance has been a 10-year experiment in bringing the U.S. engineering education model to Singapore. One of the most exciting aspects of this program, especially on the MIT side, has been the opportunity to experiment with distance education programs.

Many of the classes taught as part of the three degree programs offered through the partnership are taught at a distance—mostly from MIT's Cambridge campus. Students in Singapore view some classes via pre-recorded video, but most classes are taught in real-time simultaneously to students in the U.S. and Singapore through the use of telecommunication technologies. While the technological barriers to such a model have greatly diminished over the 10 years of the program, the 13 hour time difference continues to pose challenges. MIT's SMA Executive Director John Desforge admits that "we often bribe the students at MIT with breakfast," to get them to early morning sessions. In addition to being broadcast live, all of the distance-taught classes in the program are recorded and posted on-line along with lecture materials, slides, notes, and other support materials, thus providing students on both sides a rich study resource.

In the beginning, there was concern that the distance education model would not provide the same level of education available to MIT students studying on the MIT campus and that, despite the incredible talent of the students attracted the program, the model would prevent their fully performing to MIT standards. But, through a lot of hard work—including careful development of curriculum, development of distance learning technologies, and the dedication students and faculty alike have shown to overcoming geographic barriers—this fate has been averted. "Students would still prefer to be in class live," MIT Institute Professor and SMA Senior Faculty Advisor Thomas Magnanti says, "but their performance is indistinguishable."

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University-University Partnership

Tufts in India

PARTNERS & OBJECTIVES

Tufts University School of Medicine
Department of Public Health & Family Medicine and Tufts Medical Center
Dr. Harris Berman, Morton A. Madoff Professor of Public Health and Family Medicine and Vice-Dean of Tufts University School of Medicine

Objective: To expand globally-focused public health educational programs.

Christian Medical College, Vellore
Dr. Gagandeep Kang, Vice Principal of Research at Christian Medical College, Vellore and Adjunct Professor of Public Health and Family Medicine at Tufts

Objective: To expand state-of-the-art clinical, translational, and epidemiological research programs.

MISSION

To collaborate in developing and conducting world-class research and training in enteric infections and HIV/AIDS.

PROGRAM

Scientists from Tufts University School of Medicine in MA and Christian Medical College in India work together in India and in the U.S. to research enteric infections and HIV/AIDS and to train the next generation of physician scientists working to understand those diseases.

Location: Vellore, Tamil Nadu, India and Boston, Massachusetts, USA

Cross Border: Yes

Student Nationality: American and Indian

TIMELINE

1968: Tufts and CMC faculty discuss collaborative research on diarrheal disease.

1970s onwards: Tufts medical students go to CMC for clinical electives.

1988: Collaborative research in enteric infections was initiated with funding from the Rockefeller foundation. Training began of CMC fellows at Tufts and Tufts fellows at CMC.

2002: CMC trainees travel to Tufts for training in HIV or MPH degrees with funding from the NIH Fogarty International Center.

2004: Tufts and CMC signed an MOU to further research and educational collaborations.

2006: Tufts and CMC faculty collaborated to develop curriculum for an MPH program offered in Vellore. Tufts MD/MPH students spend up to 2 months studying at CMC.

FUNDING

Annual Budget: Approximately USD $1.6 million.

Sources: Most funding is in the form of NIH grants to individual PIs working within the collaboration. An anonymous private source is also funding a major computer database project, which will allow Tufts and CMC to share information more easily and digitalize the curriculum management at CMC.

Is future funding dependent upon reaching certain milestones? No, funding depends largely on individual PIs attracting funding for their work.

STRUCTURE

Current Partners: Tufts University School of Medicine Department of Public Health & Family Medicine and Tufts Medical Center, Division of Geographic Medicine and Infectious Diseases (Tufts) and Christian Medical College, Vellore (CMC).

Governance Structure: The two institutions have an MOU, but there is no formal governance structure—decisions are made by the researchers working on their individual projects under the umbrella of the collaboration.

Curriculum/Research: Laboratory and clinical research is performed on enteric infections and HIV/AIDS. The program has facilitated CMC offering a Masters in Public Health with a curriculum jointly developed by Tufts and CMC faculty.

Success Criteria: Publication of research, continuation of grant funding, and the ongoing interest of each side in continuing the collaboration.

Commercial Output: None yet, though studies directed at vaccine development currently underway could lead to a commercial product.

PEOPLE

Organization: Research projects are in the domain of individual PIs. The MPH co-developed by the two faculties is administered by CMC.

Administrative Staff: None

Professors/Instructors: Approximately 15 from Tufts and a similar number from CMC.

Students:

From Tufts: Approximately 6 medical students, 4 MPH students, and 2-3 post-doctoral fellows per year.

From CMC: Approximately 5 student trainees and 1 post-doctoral fellow per year.

ACCOMPLISHMENTS/MILESTONES

- Current joint annual grant funding of approximately $1.6 million.
- Over 11 faculty/students from CMC have completed training and 4 are currently in training.
- Numerous joint publications in international peer-reviewed journals.
- 3 grant proposals have been submitted and several others are planned over the next year
- 1-2 joint research workshops at CMC per year.

SUMMARY

For nearly forty years, Tufts and CMC have worked together to better understand important diseases endemic in India and around the globe. What began with a single Tufts researcher's interest in research being performed at CMC has blossomed into a major research collaboration and training program.

The keys to their lengthy and productive collaboration are clear to Tufts Vice Dean Harris Berman: "It's about people and relationships," he says. "The trust that builds over time between people with the same ideals working to answer the same questions" is what keeps the collaboration going.

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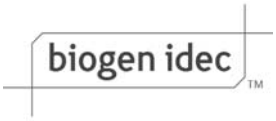

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Mass Insight Corporation
Building Innovation Partnerships

Mass Insight Corporation, based in Boston, Massachusetts, is a research and consulting firm that shapes talent and innovation-based economic development strategies, builds strategic alliances between higher education, industry, and government within the Commonwealth of Massachusetts, and seeks opportunities to connect Massachusetts' assets to the global economy. For 20 years, we have established partnerships that support the individual goals of industry and universities.

Through collaborative leadership initiatives, publications, policy research, and public opinion surveys, we help to shape public-private actions and public policy.

Mass Insight's Global Massachusetts 2015, a leadership initiative launched in 2006, has brought together major business groups, industry, and higher education leaders to identify national and international trends shaping major and emerging industry sectors. In collaboration with McKinsey & Company, Mass Insight released sector reports in life sciences, financial services, and IT that provide recommendations for building regional alliances and global partnerships in these key sectors.

As an outgrowth of this effort, Mass Insight launched a US-China-India initiative, designed to foster partnerships between university, industry, and government leaders in the US and Asia. These three partners – universities, industries, and governments – form what we refer to as the Innovation Triangle – industry leaders from financial services, life sciences, and clean energy, IT partners, university presidents, deans and academic experts, and elected officials joining together to shape new global partnerships and an agenda for the policies and investments required to support them.

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