

## **Cambridge–MIT Institute**

The Cambridge–MIT Institute Ltd. (CMI) is a strategic alliance between the University of Cambridge (CU) and MIT. Bringing together two of the world's great universities to build on the complementary strengths of each, CMI undertakes ambitious programs to enhance the competitiveness, productivity, and entrepreneurship of the UK economy.

The main strategic aims of CMI are to

- Engage in bold experiments designed to understand and improve knowledge exchange: testing key hypotheses, studying the innovations, and codifying and disseminating the outcomes;
- Set these experiments in the context of research programs aimed at creating important new ideas, developed with a consideration for use;
- Create educational materials and programs and educate a generation of learners with better skills and empowered to exchange knowledge;
- Improve the practice of knowledge exchange at the interface of university and industry;
- Support the more robust creation and growth of entrepreneurial ventures; and
- Influence government and industrial policy and practice in knowledge exchange.

### **Noteworthy Events**

#### **Knowledge-Integration Communities**

This year CMI launched four Knowledge-Integration Communities (KICs) in the areas of Silent Aircraft, Next Generation Drug Discovery, Pervasive Computing, and Communications Innovations. More KICs will follow next year. KICs aim to focus on ways of enhancing the knowledge exchange process between academia and industry to push forward research and increase the pace of innovation. They focus on new ideas in applied science, engineering, and broader technologies.

Each KIC is centered on collaborative research teams at Cambridge University and MIT, but also includes a wide-ranging field of complementary participants and activities. Combined participation by universities, public agencies, and industry enables the KICs to approach their domains holistically.

The Silent Aircraft Initiative was formally launched on November 10, 2004. This community will be working together, sharing knowledge and developing the design for an aircraft whose noise emissions would barely be heard above the background noise level in a typical built-up area. Air traffic protocol, new approach techniques, and other allied factors involved in aircraft noise are also being investigated.

The Pervasive Computing Community was launched on March 24, 2004. Richly peppered with computing and communication facilities, networked environments of the future will provide untethered, personalized, ubiquitous access to services in the environment of the user. This initiative will work on this kind of future, looking for

solutions to create a pervasive environment that needs to be dynamically reconfigurable, fault resilient, energy efficient, secure, and distraction free.

The launch of Next Generation Drug Discovery followed on March 25. This community will address the urgent and severe bottlenecks in therapeutics discovery and development. These bottlenecks have arisen as a consequence of the fundamental difficulty in understanding and predicting how complex living systems operate. The aim is to accelerate the integration of systems biology thinking and techniques into the UK pharmaceutical and biotechnology industries.

The Communications Innovations Institute launched on June 16, 2004, and will be promoting the progress of the entire communications industry. The two key areas to be developed are a better understanding of the communications industry value chain, resulting in road maps to possible futures, and the demonstration of new enabling and disruptive technologies that have the power to transform the communications sector.

### **Other Events of Note**

The UK's National Audit Office (NAO) completed a review of the process of establishing CMI. Executive director Michael Kelly appeared before the Parliamentary Committee of Public Accounts for a question and answer session regarding the NAO Report (available at <http://www.nao.gov.uk/>) and its implications for UK public policy. The resulting Report by the Committee of Public Accounts, published on June 24, 2004, highlights CMI's "early successes in education and knowledge transfer" and acknowledges that its work "has potential for major impacts on the UK economy." The complete report can be found on the web at <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmpublicacc/502/50202.htm>.

The Undergraduate Research Opportunities Program was translated to Cambridge University, and in a pilot program during the summer of 2003, 36 Cambridge undergraduates were offered the chance to swap the classroom for a research lab. They worked on a range of challenges, ranging from the best ways of immobilizing contaminated land to welding the next-generation Airbus.

## **Educational Programs**

### **Undergraduate Education**

This year, 28 MIT students and 28 CU students participated in the undergraduate student exchange. The exchange continues to be successful in illuminating the strengths and challenges faced within each university's educational system, some of which CMI is addressing through its educational research projects. Planning for a fundraising effort is underway at both universities to ensure that adequate funding exists for the exchange beyond the end of CMI.

An additional call for proposals in education resulted in two funded projects in transferable skills and pedagogical innovation scheduled to begin in fall 2004.

CMI also sponsored the development of CMI Enterprisers, formerly known as CMI Connections, a unique and intensive weeklong course for UK undergraduate students to develop their entrepreneurial skills. Sixty undergraduate entrepreneurs from CU, Newcastle, Surrey, Warwick, and MIT attended the fourth CMI Enterprisers event in January 2004 at Van Mildert College in Durham, UK. The program was adapted by CMI from the MIT LeaderShape program.

The next Enterprisers program will run again from July 19 to 24 in Edinburgh. It is increasing in popularity, with over 92 applicants for 8 MIT spots. This event is moving toward sustainability as progress is being made for sponsorship with regional development agencies and participating universities covering an element of student costs. CMI is also actively seeking industry support for this endeavor.

### **Graduate Education**

The following two new CMI-sponsored master's programs have been approved by the University of Cambridge to begin in academic year 2005:

- *Computational Biology*. This aims to introduce students to bioinformatics and other quantitative aspects of modern biology and medicine. It will also provide grounding in business management and the management of technology and innovation.
- *Nano- and Microtechnology Enterprise*. This program is aimed at scientists and engineers seeking to study the latest scientific advances and develop an understanding of business, management, legal, and regulatory issues related to developments in micro- and nanotechnology. It will provide an overview of the commercial potential of these emerging technologies and offer an understanding of the underpinning science, while also providing an introduction to the management of technology and innovation.

One new master's program, in Chemical Engineering Practice, was added to the roster for academic year 2004. This program is aimed at chemical engineers seeking the advanced and durable skills required by companies in which rapid change and the ability to work with developments in other disciplines is the norm. Candidates receive an education both in advanced aspects of chemical engineering practice and in essential areas of business administration such as technology policy, company formation, finance and management, global economics, and sustainable development. It combines advanced training at both MIT and at the University of Cambridge together with two intensive industrial "Practice School" periods, designed to develop professional problem solving and leadership skills.

These programs join three existing master's programs in BioScience Enterprise, Technology Policy, and Engineering for Sustainable Development, running since academic year 2003.

## **Executive Education**

The two-day program “Managing Innovation Strategically” ran at the end of October with 16 delegates from nine organizations. MIT instructors, both in person and via video link, delivered approximately one-third of this program.

Also in October, Phil Condit of Boeing delivered a distinguished lecture for CMI. This lecture was delivered to a capacity crowd in Room 8-404 at MIT and simulcast in Room E51-376, at CU, and on the web to a total of over 300 attendees. In April, John Sterman from MIT Sloan delivered an additional distinguished lecture on Systems Dynamics for CU audiences.

The Latest Developments in Lean Thinking course attracted 11 delegates. Fourteen and 12 delegates attended two other courses between February and April respectively. A free Information Technology videoconference also occurred during the past year.

## **Research Programs and Industry**

### **Commercialization**

CMI’s earliest research grants are nearing completion and a number of invention disclosures have already been filed to date at MIT and the University of Cambridge. CMI is working with the research teams and the universities to help commercialize these new technologies or attract further funding to continue the research efforts.

The second year of the CMI-sponsored Praxis program was extremely successful in impacting the business process of UK technology transfer. Praxis is a program of training courses offered to people working in UK university technology transfer offices. Uniquely, senior technology transfer staff from MIT’s Technology Licensing Office and Cambridge’s Research Service Division lead the courses, along with other senior UK technology transfer staff who volunteer to pass on their skills and experience to more junior staff.

The value of the Praxis program was recognized by the UK government in November 2003, when Praxis was awarded £355,000 from the Department of Trade and Industry to expand itself into a self-sustaining organization, ready to meet the market demand for an increased number and range of courses.

### **Assessment**

With the aid of Jonathon Cummings, CMI launched an Online Project Assessment System (OPAS.) OPAS allows project investigators in both KICs and legacy projects to submit their six-month reports to CMI via the web. It also contains an embedded survey on knowledge exchange planned to further allow the extraction of best practice from project collaborations. All projects are now on a standardized March and September reporting cycle. CMI reviews these projects twice annually to monitor progress and to offer assistance in the arenas of public relations, education, knowledge exchange, public

policy implications, intellectual property and commercialization, survivability beyond CMI funding, and industrial relations.

Research on students attending Enterprisers showed that the program creates enduring improvements in entrepreneurial self-efficacy with related strengthening of pre-entrepreneurial awareness, including the exploration of ideas for starting companies. William Lucas and Sarah Cooper's MIT Sloan working paper no. 4489-04 further detailing these findings is available at <http://ssrn.com/abstract=568383>.

### **Special Interest Groups**

CMI is inviting industry leaders to become involved in a series of new special interest groups. These groups will initially be focused on industries such as travel and leisure, retail and supply chains, construction, passenger transportation, the health sector, and manufacturing.

The aim is to bring industry and academia together in a new environment where members can exchange opinions and discuss industry issues, work on identifying, quantifying, and prioritizing some of the key issues facing industrial sectors, and look for potential solutions. New techniques are being developed to engage business with universities where at present there is no existing track record of a working relationship but great potential exists.

It is intended that each of the special interest groups will

- Create self-sustaining links with industry and academia,
- Maximize collaboration and experimentation at a pre-competitive level, and
- Maintain a strong culture of 'cross sector' activities.

The groups will also

- Encourage feasibility studies and investigations into industry challenges,
- Develop a feedback mechanism that will steer and stimulate future research, and
- Provide guidance on future government policy for science, technology, and business.

### **Knowledge Exchange Activities**

An additional call for proposals in knowledge exchange resulted in 12 funded projects scheduled to begin in fall 2004. These projects include some studies, but most are activities to exchange knowledge in the context of university/industry relations. Several will provide additional support to CMI's KICs as they pursue two-way knowledge transfer between industry and academia.

## **Entrepreneurship**

CMI sponsored the MIT \$50K Global Start-up Workshop (GSW) in Cambridge, UK, with 200 delegates from over 40 countries attending. Jointly organized by students from Cambridge University Entrepreneurs and MIT \$50K, the GSW used the experience of MIT and CU students to help delegates from all over the world run better business plan competitions. CMI also sponsored the May 2004 CU £50K business plan competition, a venture capital conference, and the Entrepreneurship Gala in London.

## **National Competitiveness Network**

The third annual CMI Summit, “Entrepreneurship in the UK,” took place in Newcastle upon Tyne. Over 200 delegates attended the event, which dealt with the encouragement and development of national and regional entrepreneurship. The next summit will be cohosted by the Scottish Institute of Enterprise in Edinburgh in November 2004.

The National Competitiveness Network (NCN) also developed several CDs that illustrate CMI programs. Joining last year’s publication of “Cultures of Innovation: Biotechnology and the Race for Success” is a disc prepared for the 2004 Summit on MIT’s Entrepreneurship Development Program, Connections (now Enterprisers) and Praxis programs. Further NCN CDs disseminate lectures given by Bob Langer on “Lessons from the Langer Lab” and Rebecca Henderson’s series on “Developing and Managing a Successful Technology and Product Strategy.”

## **Science Enterprise Centres Workshops**

CMI organizes quarterly hands-on workshops jointly with the UK Science Enterprise Centres and NCN to share best practice on how to improve competitiveness, productivity, and entrepreneurship in the UK. These workshops, held at different universities across the UK, always involve someone with an MIT connection and perspective and explore issues ranging from e-teaching to introducing enterprise education into the undergraduate curriculum.

## **Future Plans**

As CMI enters its fifth year, discussions are underway regarding a possible Phase 2. Under the advice of CMI’s Board of Directors and Advisory Board as well as that of the UK government, CMI 2 would plan to attract substantial funding from industry, in addition to any funding that may be forthcoming from UK government agencies and departments.

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*More information about the Cambridge–MIT Institute can be found on the web at <http://www.cambridge-mit.org/>.*