MIT’s Industrial Liaison Program (ILP) can bring the intellectual power of MIT to your organization by providing a direct connection to the knowledge, experience and resources at MIT in these fields – giving you the ideas to stay ahead. For more information about how the ILP can put the resources of MIT to work for you, call us at 1-617-253-2691, e-mail us at liaison@ilp.mit.edu, or visit http://ilp-www.mit.edu.

MIT and Financial and Banking Industries

The Massachusetts Institute of Technology (MIT) is a leading center of research and education on topics important to the financial, banking, and related industries such as:

- Banks/Banking
- Computation, Analysis, Modeling
- Cryptography, Information Security
- Economics and Management
- Entrepreneurship, Venture Capital
- Global Development, Local Innovation Systems
- Policy Issues
- Social Networks, Collective Intelligence, Mobility

Below are brief descriptions of a selection of MIT centers, departments, groups, and labs conducting research and education in these areas. Please note that this is not a comprehensive summary of research being conducted at MIT in the topic areas listed above and the center or lab, etc., may fall into more than one category.

BANKS / BANKING

The purpose of the World Economy Laboratory (WEL) is to strengthen the links between the department and policy makers, central banks, and business economists. It is organized around two programs. The first, MIT-WEL, aims at developing relations with business economists, by strengthening the links between the MIT Department of Economics, policy makers, and business leaders. It is organized around two or three small annual meetings on specific topics of mutual interest. In the recent past, topics have included structural reforms in Europe, economic developments in India, and international liquidity. The second, the Central Banks–MIT Research Network, was started in 2006 and aims at developing relations with central banks. It finances policy-relevant research by students and junior faculty in the department. The meetings are attended by the heads of research of many central banks around the world, as well as faculty, and students working on international finance and macroeconomics policy issues.

COMPUTATION, ANALYSIS, MODELING

The goal of BigData @ CSAIL is to identify and develop the technologies needed to solve the next generation data challenges which require the ability to scale well beyond what today’s computing platforms, algorithms, and methods can provide. The aim is to enable people to truly leverage Big Data by developing platforms that are reusable, scalable and easy to deploy across multiple application domains. The approach includes two key aspects: First, collaborate closely with industry to provide real-world applications and drive impact; second, viewing the Big Data problem as fundamentally multi-disciplinary. The team includes faculty and researchers across many related technology areas, including algorithms,
architecture, data management, machine learning, privacy and security, user interfaces, and visualization, as well as domain experts in finance, medical, smart infrastructure, education and science.

The Center for Computational Research in Economics and Management Science (CREMS) advances knowledge about modeling in economics, finance, statistics, and management, bringing together researchers from disciplines such as econometrics, statistics, computer science, and operations research to focus on the algorithmic research and related software development that provide a basis for advanced modeling techniques. Research is focused on nonparametric modeling; robust statistics and data-mining; statistical learning; variable and feature selection; risk measurement and portfolio optimization in finance, data visualization, bioinformatics; and the analysis of health and drug surveillance data.

The Computation for Design and Optimization (CDO) is an interdepartmental Master of Science degree program that educates students in advanced computational methods and applications. The program provides a strong foundation in computational approaches to the design and operation of complex engineered and scientific systems. Through hands-on projects and a master’s thesis, students develop and apply advanced computational methods to a diverse range of applications, from aerospace to nanotechnology, from Internet protocols to telecommunications system design.

The Database Group (DBg) at MIT conducts research on all areas of database systems and information management. Projects range from the design of new user interfaces and query languages to low-level query execution issues, ranging from design of new systems for database analytics and main memory databases to query processing in next generation pervasive and ubiquitous environments, such as sensor networks, wide area information systems, personal databases, and the Web.

The Laboratory for Financial Engineering (LFE) is a partnership between academia and industry designed to support and promote quantitative research in financial engineering and computational finance. The principal focus of the LFE is the quantitative analysis of financial markets using mathematical, statistical, and computational models. The goal of LFE is not only to spur advances in financial engineering, but also to develop better ways to teach students and executives how to apply financial technology in corporate settings. LFE research projects are grouped into three areas: capital markets, risk management, and financial technology.

The MIT Information Quality (MITIQ) Program is dedicated to working with organizations to improve their ability to harness the power of information. To this end, the MIT Information Quality Program equips professionals with the understanding and means to significantly improve their organization’s information and to use that information as a core strategic tool.

The Operations Research Center (ORC) provides educational and research opportunities for students and faculty interested in this interdisciplinary field, which draws upon ideas from engineering, management, mathematics, and psychology to apply scientific methods to decision-making. The MIT ORC draws faculty from 8 different departments at MIT, including members from each school. ORC faculty contribute to a wide range of application domains such as flexible manufacturing systems; financial engineering services; air traffic control; transportation systems; public services, such as urban emergency systems; safety and risk analysis in air transportation; and more.

The System Dynamics Group was founded in the early 1956 by Professor Jay W. Forrester at MIT. System Dynamics discipline (within the Sloan School of Management; PhD concentration) combines the theory, methods, and philosophy needed to analyze the behavior of systems — not only in management, but also in such other fields as environmental change, politics, economic behavior, medicine, and engineering. Students study principles of systems, economic and industrial dynamics, and policy analysis, while doing additional work in economics, information systems, statistics, and political science.

The Mathematics Department at MIT is a world leader in pure and applied mathematical research and education. In pure mathematics, the department explores exciting current research directions in most of the major fields. The pure math group studies many aspects of algebra, analysis, geometry, mathematical logic and foundations, number theory, probability and statistics, and representation theory. In applied mathematics, the department looks for important connections with other disciplines that may inspire interesting and useful mathematics, and where innovative mathematical reasoning may lead to new insights and applications. The applied math group focuses on biology, combinatorics, computer science, scientific computing, numerical analysis, and areas of physical applied mathematics.

CRYPTOGRAPHY, INFORMATION SECURITY

The Computer Systems Security Group researches and builds secure, practical, and flexible systems. The group’s work spans operating systems, computer architecture, distributed systems, programming languages, and web browsers.

The Cryptography and Information Security Group (CIS Group) seeks to develop techniques for securing tomorrow’s
global information infrastructure by exploring theoretical foundations, near-term practical applications, and long-range speculative research. The group aims to understand the theoretical power of cryptography and the practical engineering of secure information systems, from appropriate definitions and proofs of security, through cryptographic algorithm and protocol design, to implementations of real applications with easy-to-use security features. Research examples include: Micropayments; Digital Signatures; Electronic Voting; Private Information Retrieval; etc.

The MIT Geospatial Data Center (GDC) is dedicated to large scale simulation, cyber physical security, big data, and holistic system data visualization. In 2010, the MIT Auto-ID Lab (including MIT GeoNumerics Group), MIT Center for Grid Computing, and MIT Intelligent Engineering Systems Lab were integrated, so as to be more responsive and to provide greater value-add to various engineering computation projects.

ECONOMICS AND MANAGEMENT

The mission of the Center for Biomedical Innovation (CBI) is to improve global health by overcoming obstacles to the development and implementation of biomedical innovation. CBI provides a safe and transparent environment for collaborative research among industry, academia, and government, and draws on the expertise of the MIT’s schools of engineering, science, and management, as well as the Harvard-MIT Division of Health Sciences and Technology (HST). CBI is focused on optimizing biomedical innovation through collaborative effort in several research areas, including: Safety assessment; manufacturing and distribution systems; economic, financial and regulatory risk management; and R&D redesign.

The MIT Center for Digital Business is focused on being the leading source of innovation, knowledge creation, dissemination and utilization, in management theory and practice for digital business. The Center has established a large-scale research program to investigate the latest trends and techniques in digital business and has worked with more than 50 corporate sponsors, funded more than 60 faculty and performed more than 75 research projects. The core of this program is the custom matching of sponsor companies with MIT faculty to form research teams that address issues that are relevant to both industry and academia. Broad areas of focus include digital marketing, digital productivity, digital services and the cloud.

The Center for Information Systems Research (CISR) conducts field-based research on issues related to the management and use of information technology (IT) in complex organizations. Established at the MIT Sloan School of Management in 1974, CISR’s mission is to develop concepts and frameworks to help executives address the IT-related challenges of leading increasingly dynamic, global, and information-intensive organizations. Research results are disseminated primarily through working papers, research briefings, an annual conference, and sponsor forums.

The Center for Real Estate (CRE) aims to improve the quality of the built environment through education programs that increase the skills, knowledge, and creativity of those in the real estate industry; through research which creates useful knowledge about real estate and leads to more informed professional practice; and through facilitating communication among members of the real estate community worldwide. CRE’s education programs include a one-year Master’s degree in real estate development, investment, and management; a summer institute of short professional development courses; and special seminars for industry and academic participants. Research covers a broad range of topics including real estate performance and financial returns, real estate capital markets, and globalization; issues in the management of corporate real estate; and property markets. The center also serves as a forum for the real estate industry.

The Institute for Work and Employment Research (IWER) is focused on the need for the work and employment field to broaden its perspectives and initiate a new dialogue over the changing nature of work and the implications of these changes for the policies and institutions that govern employment relations.

The Leaders for Global Operations (LGO) program is a collaboration among MIT Sloan School of Management, MIT School of Engineering, and industry partners. LGO program students receive two degrees in two years: either an MBA or a Master of Science in Management degree from MIT Sloan School of Management, and a Master of Science degree from one of eight participating departments in the School of Engineering. The program gives students a solid background in critical areas of manufacturing, including manufacturing processes, design and development, operations management, information technology, teamwork, leadership, change management, and systems thinking. The LGO community develops, designs, implements, and participates in a forward-looking, integrative engineering and management program that gives its partners the knowledge, tools, and support they need to strengthen, lead, and transform industry.

The MIT Sloan Fellows Program in Innovation and Global Leadership gives mid-career executives of exceptional promise the chance to enter this one-year MBA program to build knowledge, networks, global understanding, and their own personal leadership paradigms. The program is an intense immersion in a globally-oriented environment that gives
participants the rare opportunity to strategize with international colleagues. Participants elect to earn an MBA, a MS in Management, or a MS in Management of Technology in a one- or two-year format. All students in the MIT Sloan Fellows Program in Innovation and Global Leadership fulfill their research requirement with either a management research project within a small team or a master’s thesis, usually written individually or with a co-author.

The Department of Economics faculty is equally committed to graduate and undergraduate education and is at the forefront of both theoretical and applied economics. Its faculty has made pioneering contributions from theory to macroeconomics, to finance, to industrial organization, to international trade. The department’s scholars have received numerous awards, including four Nobel Prizes (Peter Diamond, the late Paul Samuelson, Robert Solow, and the late Franco Modigliani), and many are Fellows of the National Academy of Sciences, the American Academy of Arts and Sciences, and the Econometric Society. Many faculty members have served in various elected offices of the American Economic Association and the Econometric Society. Student dissertation topics span a wide range of issues in microeconomics and macroeconomics, and include economic theory, data analysis, and econometric methodology.

The Sloan School of Management is one of the world’s leading business schools — conducting cutting-edge research and providing management education to top students from more than 60 countries. The mission of the MIT Sloan School of Management is to develop principled, innovative leaders who improve the world and to generate ideas that advance management practice. MIT Sloan offers undergraduate, master’s, PhD, executive education and non-degree programs together with special seminars, conferences, and programs for alumni. The MIT Sloan faculty includes 108 full-time professors along with adjunct or visiting faculty; the student body consists of more than 1,100 graduates and undergraduates. MIT Sloan has 20,000 alumni, residing in 90 countries. More than 650 companies have been founded by MIT Sloan alumni.

ENTREPRENEURSHIP, VENTURE CAPITAL

The Martin Trust Center for MIT Entrepreneurship builds the entrepreneurial capacity of MIT students through education, nurturing, networking and celebration. MIT students and alumni use their entrepreneurship skills to found hundreds of companies each year, many using cutting-edge technologies developed in MIT labs or elsewhere. The Center team educates and develops leaders of successful high-tech ventures by offering best-in-class educational courses and executive programs powered by MIT’s leading-edge technology and business research.

The MIT Enterprise Forum builds connections to technology entrepreneurs and to the communities in which they reside. The Enterprise Forum produces programs and events about innovation, technology and entrepreneurship for an engaged community of thought leaders through a network of chapters worldwide. The MIT Enterprise Forum is a community of volunteers sharing resources, knowledge and a passion for entrepreneurship and wealth creation. The Forum collaborates with corporate and education organizations that connect technology entrepreneurs with resources, making the commercialization of technology faster and easier.

Student Group: The MIT $100K Entrepreneurship Competition is a leading-edge forum for students and researchers in the MIT community to act on their talent, ideas and energy to launch tomorrow’s leading firms. A year-long educational experience, the MIT $100K brings together a network of resources to help participants through the new venture construction process. The competition is structured across three contests: the Pitch Contest, the Accelerate Contest, and the Launch Contest. The winner of the Launch Contest takes home $100K. The Competition has facilitated the birth of over 160 companies with aggregate exit values of $2.5 billion captured and a market cap of over $15 billion. These companies have generated over 4,600 jobs and received $1.3 billion dollars in Venture Capital funding.

Student Group: The MIT Venture Capital & Private Equity Club (VCPE) is focused on providing its members with opportunities to learn about the venture capital and private equity industries, to interact with leading professional investors and business executives, and to develop relationships with members of the MIT community who share similar interests. The VCPE Club hosts a broad portfolio of activities which span venture capital, private equity, entrepreneurship, and the commercialization of MIT technologies. VCPE has established deep partnerships throughout MIT and with the local business and investing community, and has a proven track record of developing new projects, identifying and matching talent, and helping drive MIT-generated technology towards successful commercialization.

GLOBAL DEVELOPMENT, LOCAL INNOVATION SYSTEMS

The Abdul Latif Jameel Poverty Action Lab (J-PAL) serves as a focal point for development and poverty research based on randomized trials. The objective is to improve the effectiveness of poverty programs by providing policy makers with clear scientific results that help shape successful policies to combat poverty. J-PAL works with NGOs, international organizations, and others to evaluate programs and disseminate the results of high quality research. The researchers work on
issues as diverse as boosting girls’ attendance at school, improving the output of farmers in sub-Saharan Africa, racial bias in employment in the US, and the role of women political leaders in India.

The Global Entrepreneurship Lab (G-Lab) is an interdisciplinary project-based learning course that links teams of MIT Sloan MBA students with entrepreneurs in emerging nations. G-Lab focuses on developing markets in Latin America, China, India, and Southeast Asia, and on global health delivery in Africa. The students share their knowledge, experience, and research with these business owners, helping them to design market strategies, rethink practices and priorities, and devise solutions to specific challenges. Meanwhile, the students get intensive training in challenging global environments where they put to use the skills they have developed in business and global networking.

The Industrial Performance Center’s (IPC) interdisciplinary teams observe, analyze, debate and report on strategic, technological, and organizational developments in a broad range of industries and examine the implications for society and the global economy. The IPC often convenes key actors from the public, private and non-profit sectors to discuss the challenges and opportunities facing firms, industries, regions and countries in an increasingly dynamic, competitive, and global economy. The center’s research program is organized around the following themes: energy, globalization, innovation, and production.

The Legatum Center for Development and Entrepreneurship was founded at MIT on the belief that economic progress and good governance in low-income countries emerge from entrepreneurship and innovations that empower ordinary citizens. The Center administers programs and convenes events that promote and shape discourse on bottom-up development. The Center runs a highly competitive fellowship program for MIT graduate students who intend to launch enterprises in low-income countries. In addition, the Center convenes an annual conference, hosts lectures, and supports teams of enterprising men and women at MIT who are passionate about starting viable businesses in the developing world.

POLICY ISSUES

The MIT Center for Energy and Environmental Policy and Research (CEEPR) is dedicated to rigorous and objective empirical research on issues related to energy and environmental policy to support decision-making by government and industry. The results of the research are disseminated through publications, workshops, educational programs and other public outreach activities. Economics research at CEEPR is integrated with engineering and science in collaboration with faculty throughout MIT. The relevance and validity of the research is enhanced through cooperation with government and industry associates in countries around the globe. The center focuses on the following research areas: electricity restructuring; emissions trading; climate change; human welfare and the environment; investment, finance, and risk management.

The Center for International Studies’ Political Economy and Technology Policy program applies theories and methods from the discipline of political economy to examine issues in science and technology policy. The program focuses on the following areas: Emergent technologies; uncertainty and environmental decision-making; regulation and the management of business risk; and north-south financial and technology transfers. In each of the four clusters of activity, political economists from the social sciences work closely with MIT technologists at the Technology and Policy Program (TPP), with MIT humanists in the Science, Technology and Society Program (STS), with government, nongovernmental organizations, and private firms, and with academic partners at Cambridge University, the Stockholm School of Economics and Chalmers University, the Swiss Federal Institutes of Technology (ETH) and the University of Tokyo.

SOCIAL NETWORKS, COLLECTIVE INTELLIGENCE, MOBILITY

The MIT Center for Collective Intelligence (CCI) conducts research on how new communications technologies are changing the way people work together. CCI’s research draws on the strengths of many diverse organizations across the Institute including: the MIT Media Lab, the Computer Science and Artificial Intelligence Laboratory, the Department of Brain and Cognitive Sciences, and the MIT Sloan School of Management. CCI’s mission is to understand collective intelligence at a deep level in order to create and take advantage of the new possibilities it enables. Projects range from Collective Prediction to Measuring Collective Intelligence, to the Climate Collaboratorium to the Genome of Collective Intelligence.

The Human Dynamics Group studies how social networks can influence people’s lives in business, health, and governance, as well as technology adoption and diffusion. Today people leave digital breadcrumbs wherever they go, through smart phones, RFIDs, and more. The Human Dynamics group uses reality mining to ask how this data can be used to better organize companies, public health, and governance, by better understanding how social networks influence people when they make decisions, transmit information, adopt new technologies, or change behaviors. The group’s projects have already demonstrated the potential to dramatically improve the competitiveness of companies, and hint at the ability to revolutionize social environments.
The MIT Mobile Experience Lab seeks to radically reinvent and creatively design connections between people, information and places. Using cutting-edge information and mobile technology, the lab seeks to improve people’s lives through the careful design of meaningful experiences. The lab’s multi-disciplinary team researches and designs new technologies, carefully considering their impact on societies, spaces and communities. Project example: Future Banking (2011-12).

The Viral Spaces group at the Media Lab research is about facilitating discourse between real people in real places. It’s about technologies of connection—networks and computing that enhance the dialogue between people, both locally and at a distance. It’s about both interactions and transactions. It’s about making a future where a mobile device enhances the experience of that space as opposed to being a pocket window that bypasses it. Most often, work in viral communications has involved an ecological or systems approach that includes an assortment of fixed elements, such as displays and sensors in addition to mobile devices. Viral Spaces stresses the need for end-to-end, comprehensive designs. Research activities include optical and radio network architectures, protocols based on intentions rather than destinations (the Third Cloud), and applications that include retail transactions, information access, entertainment and support for social activity.