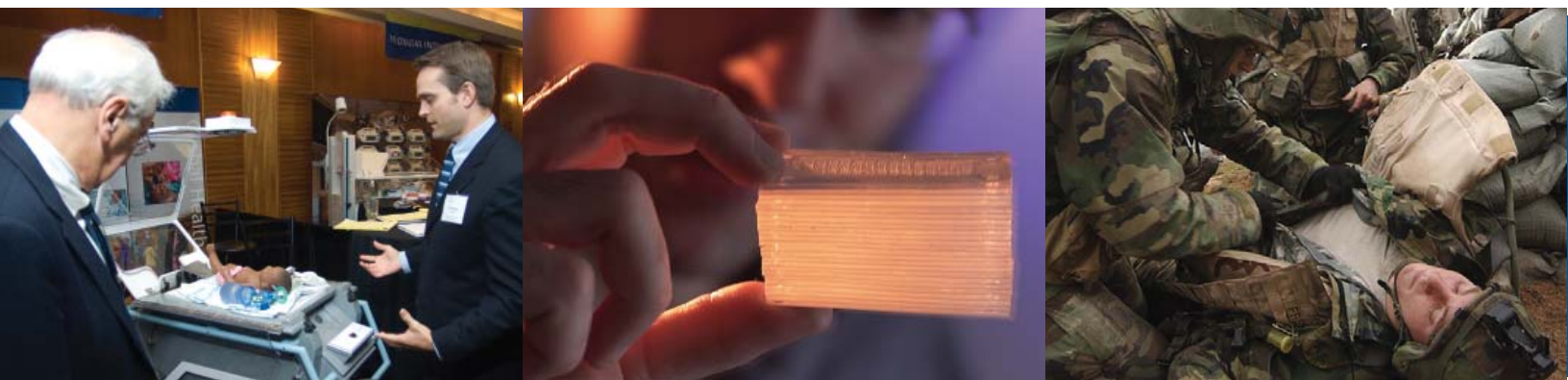


CIMIT[®]

Center for Integration of Medicine
& Innovative Technology

Transforming Healthcare through Technology



2007 Annual Report

“CIMIT has made significant strides in transforming healthcare through technology. In 10 years we have supported over 270 Principal Investigators and their collaborators, more than 14 new devices or procedures are already in clinical practice, 16 more are currently in clinical trials and many more are in the pipeline. Over 7000 patients have been treated in the operating rooms of the future, 10 companies have been formed or redirected into healthcare, over 40 companies are actively involved in our industry liaison program and 150 million dollars in additional research funding from other sources has been enabled because of the 50 million dollars awarded in grants by CIMIT.

The CIMIT community is a vibrant and powerful network connecting many of the most brilliant scientists, engineers and clinicians in Boston. Our mission is based on the core belief that better health care for people worldwide is within our reach, and that technology can and should be part of the solution.”



John A. Parrish, MD
CIMIT Executive Director

CIMIT is a proven and successful model for initiating and accelerating translational medical research in the domain of devices, procedures, and clinical systems engineering. Our approach is based upon four assumptions:

- ▶▶ With active effort, sophisticated technology from other industries can be applied in healthcare to improve the quality and safety of patient care.
- ▶▶ Early-stage, high-risk, high-reward ideas have little access to funding.
- ▶▶ Solving many of the problems in healthcare today is best achieved through active collaboration between the clinical and engineering research communities.
- ▶▶ Facilitation and coaching at every stage of the innovation cycle adds value, produces better outcomes and yields better researchers.



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CIMIT Overview

Mission & Vision

To improve patient care by facilitating collaboration among scientists, engineers and clinicians to catalyze the discovery, development and implementation of innovative technologies, emphasizing minimally invasive approaches.

A non-profit consortium of the Boston teaching hospitals and engineering schools, CIMIT fosters interdisciplinary collaboration among world-class experts in medicine, science and engineering, in concert with industry and government, to rapidly improve patient care.

Seeking out and identifying those entrepreneurial clinicians and engineers from among the over forty thousand doctors and twenty thousand technologists who work at the CIMIT consortium institutions is what makes CIMIT unique. Finding the women and men who have the potential to innovate through multidisciplinary collaborations is one way the CIMIT community is able to rapidly move ideas from bench to bedside.

CIMIT provides innovators with resources to explore, develop and implement novel technological solutions for today's most urgent healthcare problems. CIMIT is dedicated to helping develop medical technology that will help both military and civilian patients.

Transforming Healthcare through Technology

Today's challenges in healthcare cannot be met by researchers working alone in their specialties. Dramatic change in diagnostics and treatments for complex diseases and medical conditions requires technological readiness and imaginative leaps – transformative improvements not incremental advances.

CIMIT founders created a new paradigm in translational research, a model for innovation connecting the clinical and academic research communities: a network of scientists in medicine, biology, chemistry, mathematics, engineering, physics and industry, each with a passion to reach beyond traditional research and deliver revolutionary outcomes.

Nearly ten years ago, a few highly motivated Boston-area physicians became convinced that the breakthroughs in modern technology could, and should, deliver more effective solutions for unmet needs in patient care. New tools and technologies for healthcare were taking too long to be developed and integrated into medical practice. And, with the guidance of forward-looking clinical champions, technologies in entertainment, communications and defense systems could be put to work in medicine. With the support of the four founding institutions, these visionaries created CIMIT, a new kind of consortium designed to accelerate the pace of research and

Consortium Institutions

Brigham and Women's Hospital*

Massachusetts General Hospital*

Massachusetts Institute of Technology*

The Charles Stark Draper Laboratory*

Beth Israel Deaconess Medical Center

Boston Medical Center

Boston University

Children's Hospital Boston

Harvard Medical School

Newton-Wellesley Hospital

Partners HealthCare

International Alliances

University of Manchester, UK

*Founding Members

development by leveraging technological expertise – from industry or academia – for targeted medical applications.

CIMIT Values

CIMIT is a vibrant community of highly motivated collaborating entrepreneurs who learn from each other and identify gaps in healthcare where known and emerging technologies can solve clinical problems.

Innovation

Use the most advanced scientific technologies from academia and industry to develop new diagnostics and treatments that will have a positive impact on patients' lives.

Collaboration

Access a broad spectrum of individuals' talents by convening and supporting diverse and productive teams.

Integrity

Seek the highest ethical standards in what we say, in responsibility for what we do, and in responsiveness to people around us.

Entrepreneurialism

Encourage initiative and risk-taking. We understand that having a major impact on health care requires appropriate partnerships with business and industry.

Excellence

Strive for superior results. It is a promise we make to each other, a spirit that unites our individual skills and talents into a single supportive and dynamic culture.

Compassion

Dedicate ourselves to serving the needs of patients by always seeking solutions that improve patient safety and reduce suffering.

Respect

Value the individual skills and perspectives of our diverse collaborators in academia, industry and clinical care, and of the patients we serve.

CIMIT Priorities

Seek solutions to unsolved clinical problems by integrating the solution-rich environment of engineering and science centers and the problem-rich environment of our clinical stakeholders.

Build a strong and vibrant CIMIT community by actively working to improve patient care through early stage devices, procedures and clinical systems.

Contribute to improved patient care through innovative leadership practices that reward performance through teamwork.

Achieve financial sustainability by diversifying funding sources, and employing financial and operational best practices.

Support CIMIT investigators by creating and sustaining an efficient operational and management system to advance the CIMIT mission.

Founding CIMIT

The Four Horsemen. At the earliest days of what would evolve into CIMIT was an idea. Four innovative clinicians shared a desire to advance the use of technology for minimally invasive surgery in their respective disciplines of radiology, obstetrics, gastroenterology and general surgery. These visionaries became known as The Four Horsemen – Steve Dawson, MD, Keith Isaacson, MD, Norm Nishioka, MD and David Rattner, MD.

All were deeply embedded in clinical practice, each confronting a similar challenge: how to develop more advanced endoscopic tools, imaging devices and other novel technologies that each could utilize in their individual specialties. Innovators by nature, these future leaders were revolutionaries for their time. They wanted to explore a non-traditional approach to research – building teams of clinicians and engineers to solve complex medical challenges.

“Medicine must look beyond its traditional borders, take the good from other disciplines and apply those ideas to healthcare,” is how Steve Dawson described their shared beliefs.

Word spread and before long, these Four Horsemen attracted others who believed in the power of a multidisciplinary approach to solving complex medical challenges. Soon, their weekly meetings became the Forum, a place where like-minded entrepreneurial clinicians could explore novel approaches to engineering-based solutions.

“We had ideas on how to use technology better and how to cross disciplines, as everything in medicine was very silo-oriented. Through this group we began to reach outside our own traditional boundaries and cross-train each other,” is how David Rattner described the early days leading to the founding of CIMIT.

Together these four crafted the initial roadmap – a proposal for a multidisciplinary consortium designed to transform healthcare through technology. It would become the framework for the CIMIT model.

Establishing the Consortium. Emerging out of a MGH-sponsored taskforce on the Future of Medicine led by John Parrish, MD and Ronald Newbower, PhD was a similar concept for a “place where ideas and people could meet, form teams and receive financial support to achieve their goals.”

Their concept envisioned an organization to provide seed funding for early-stage, high-risk ideas leveraged by the experience of commercialization experts to facilitate the progress of these newly formed multidisciplinary teams. Dr. Parrish’s reputation as a successful creator of multidisciplinary, technology-based research consortia and his track record for attracting industry and government support, enabled the creation of a new organization focused on translational research — CIMIT. The joining of these two efforts by experienced clinical champions and innovative visionaries gave CIMIT its start.

Organizational Structure

The technology-rich, Boston-area community of medical device companies and industrial laboratories offers a unique competitive advantage. By integrating talented and inquiring minds from academia, healthcare, engineering labs, scientific research facilities and industry, together with superb medical and graduate students, CIMIT creates a culture of innovation.

CIMIT's methodology involves convening experts from relevant disciplines, facilitating interaction between clinicians, engineers and others throughout the cycle of innovation, and funding research initiatives to revolutionize patient care. CIMIT embraces all technology-based approaches (new or adapted technology) and actively facilitates the efforts of each multidisciplinary team to ensure barriers are not insurmountable. Through CIMIT the pace from bench to bedside is accelerated.

CIMIT encourages entrepreneurial innovation through its Programs. Focused in the areas of greatest opportunity for technology to make transformational change in the current paradigm of patient care, CIMIT Programs offer an insider's view of the future of medicine – where and how technology has the potential to transform healthcare in the not-too-distant future.

The CIMIT Program structure supports, organizes and enables the facilitation of interdisciplinary translational research. By harnessing the novel technologies of electronics, material sciences, optics, computational mathematics, and systems engineering, CIMIT teams of scientists, physicians and engineers accelerate the development and adoption of new tools and techniques for specific areas of medical research.

Boston Medical Device Industry

Massachusetts leads the nation in venture capital investment in life sciences companies, particularly for medical device companies. Manufacture of medical devices also contributes to the economic health and vitality of the Commonwealth.

Massachusetts is headquarters for over 300 biotechnology firms and more than 200 medical device companies. This growing sector attracts world-class scientists, engineers, and technology workers. Through its economic links with electronics, metal and plastics manufacturers, hospitals and financial institutions, the medical device sector contributes \$5.5 billion to the economic health and vitality of the Commonwealth.

Boston has the highest concentration of top-ranked teaching hospitals, research laboratories, universities and researchers from private industry.

Each year these academic medical centers and universities attract \$1.4 billion in federal research funds that help drive the \$24.3 billion in economic activity generated by the academic-based research community.

At the center of these two vibrant sectors is CIMIT, a consortium of the teaching hospitals, engineering schools and science laboratories of greater Boston.

CIMIT is the only network connecting the over 40,000 physicians and 20,000 engineers of these world-class institutions. By finding and funding the most innovative entrepreneurs from this vibrant community, CIMIT accelerates the cycle of discovery, development and implementation of innovative technologies that can and will benefit patients.

Innovation Leadership

Program Leaders form the clinical nucleus of the CIMIT community. Program Leaders are visionaries, subject matter experts, accomplished innovators, mentors and compassionate clinicians. An authority on a given medical specialty, a Program Leader serves as head coach for the teams of investigators within each program area, imparting advice and offering encouragement as the researchers explore the science for which they have received a CIMIT grant.

Program Leaders also recruit new researchers into the CIMIT community. Years of personal experience make it easy for these talented physicians to spot the potential of a young clinician who has what it takes to become a successful innovator. Each actively cultivates the next generation by helping form multidisciplinary collaborations, providing expert guidance on overcoming the barriers to innovation and when necessary, offering access to a national network.

As key participants in the Innovation Leadership team, Program Leaders challenge CIMIT to pursue emerging areas of clinical need, where devices and other technologies could make a powerful difference in the standard of care.

Site Miners are unique to the CIMIT network. They seek out, encourage and engage emerging innovators who show a passion for transforming patient care through technology. Boston's teaching hospitals are a mecca for creative, passionate doctors, technologists and clinical researchers. So how does CIMIT find and fund those clinicians with the most promising ideas? Through its network of Site Miners.

Appointed as faculty within each consortium institution, Site Miners understand the unique complexities and cultures of their organization. They help innovators successfully navigate through any organizational challenge that might arise. A Site Miner is a scout, mentor, project manager, dealmaker, visionary and reality tester. These individuals are quiet leaders, who network with other Site Miners to connect clinicians and engineers who might not otherwise meet. Knowing the best and brightest scientists and technologists who have a passion for healthcare, or finding those up and coming engineers whose novel technologies could match the needs of a clinical researcher, is how these technology-oriented Site Miners help CIMIT form and fund multidisciplinary collaborations.

The CIMIT community relies on the skills and expertise of many. Supporting this novel approach to translational research is a team of commercialization and business experts who are the full-time **CIMIT Facilitators**.

Entrepreneurial by nature, CIMIT Facilitators are cross-trained in multiple disciplines. All are experienced in crossing organizational boundaries. Each has achieved significant career success before joining CIMIT. Facilitation services help researchers overcome many of the barriers to successful innovation, including managing regulatory issues, developing prototypes, securing second and third round funding through grant writing (SBIR, STTR and foundations), seeking out potential collaborators, making connections with industry, addressing intellectual property issues, and more.

2007 Year in Review

Strategic Goals & Accomplishments

Clinical Programs – Enhance the clinical environment and contribute to the ongoing missions of our academic medical centers by developing innovative research programs that integrate the solution-rich environment of engineering and science centers and the problem-rich environment of our clinical stakeholders.

- Support consortium institutions by funding projects in key program areas that will advance the standard of patient care
- Nurture and mentor clinical and scientific investigators in collaborative, multidisciplinary research
- Actively seek out career-development opportunities for young clinicians

Accomplishments

- ▶ Awarded \$5 million in grants. Solicited over 200 proposals; funded 67 projects and fellowships
- ▶ Created Young Clinicians Award program designed to support early-career clinicians. Awarded five grants of \$50,000 each
- ▶ Created CIMIT/MIT Medical Engineering Fellowship
- ▶ Established two new CIMIT Programs: Neurotechnology and Global Health
- ▶ Reinvigorated Clinical Systems Innovation Program, identifying paradigm altering approaches to delivering care in the right place and at the right time
- ▶ Advanced several new CIMIT Learning Laboratories – Neonatal Intensive Care Unit, Medical Device Plug-and-Play and Ambulatory Practice of the Future initiatives

Seed funding is only one of the benefits of a CIMIT grant.

Equally important is the expertise of our facilitators who help researchers move projects forward. Facilitators coach, make connections, help write and obtain second round funding, think through novel approaches to intellectual property protection or introduce the research scientist to the right industrial partner at the right time along the innovation pathway.

Convening, Facilitating, Collaborating – Build a strong and vibrant CIMIT community.

- Advance CIMIT mission through active collaboration and facilitation of multidisciplinary project teams
- Engage industry partners through a robust and growing Industry Liaison Program
- Support Principal Investigators and project teams by facilitating their efforts to transcend traditional barriers to innovation; including legal, regulatory, intellectual property, and technology-transfer challenges
- Mentor innovative investigators in their pursuit of funding from non-traditional (non-NIH) sources

Accomplishments

- ▶ Hosted several VC Summits, specialized convening forums designed to facilitate a new network of commercialization specialists and clinical innovators
- ▶ Facilitated the ongoing work of over 151 collaborations, guiding and coaching progress along the pathway to commercialization

- ▶ Convened over 45 CIMIT Forums, experimenting with innovative programming and outreach to new audiences using webcasts
- ▶ Welcomed five new companies into the Industry Liaison Program
- ▶ Supported three applications for SBIR grants
- ▶ Hosted two delegations from Australia to explore potential collaborations

Leadership – Contribute to improved patient care through innovative leadership practices and actively developing leadership skills of emerging clinical leaders.

- Convene high-profile events that attract healthcare, technology, academic and other opinion leaders
- Advise on and publish best practices in translational research innovation
- Develop clinical champions and CIMIT evangelists through the CIMIT Program Leader and Site Miner teams
- Create and sustain ways to engage stakeholder participation

Accomplishments

- ▶ Convened over 80 international leaders of innovation for a 2-day symposium, *Models of Collaborative Medical Innovation*; cohosted with Wellcome Trust
- ▶ Attracted over 650 attendees to CIMIT Innovation Congress 2007; a 2-day conference and exploratorium showcasing leading-edge technology innovations in simulated care settings
- ▶ Hosted a symposium on Traumatic Brain Injury, convening national and regional experts to explore potential research collaborations to address this important national issue
- ▶ Joined a national collaboration, spearheaded by the Veterans Administration and the Department of Defense, to design the Hospital of the Future
- ▶ Continued leadership role in the Innovation Learning Network, a national network of healthcare innovators
- ▶ Collaborated with Harvard Business School in developing a case study on the CIMIT Model

Financial Sustainability – Increase fundraising and strengthen performance through teamwork, using financial and operational best practices to achieve long-term viability of the consortium.

- Retain and expand current stakeholder support
- Seek and secure financial support for CIMIT Programs through philanthropic unrestricted giving and non-profit grants (foundations)
- Diversify sources of revenue to maximize the pool of funds available for research grants

Accomplishments

- ▶ Secured annual funding from key stakeholders—federal agencies and consortium institutions
- ▶ Exceeded philanthropy fundraising goals

- ▶▶ Established relationships with foundations supportive of innovation and experimental convening
- ▶▶ Generated over \$130,000 in unrestricted sponsorship of the CIMIT Innovation Congress 2007

Infrastructure – Build, support and sustain an efficient operational and management system to support and advance the CIMIT mission.

- Strengthen CIMIT's organizational structure through best practices in leadership and teamwork
- Realign the CIMIT Facilitation core team to complement strategic and programmatic priorities
- Increase awareness and visibility of CIMIT to advance mission and strategic priorities

Accomplishments

- ▶▶ Revitalized the Science Review Process to strengthen the quality of proposals and improve operational efficiency
- ▶▶ Conducted bi-annual Investigator Survey; collecting data and feedback
- ▶▶ Implemented new project management processes
- ▶▶ Achieved 2% overall cost-savings in core budgets through efficiency and teamwork

Transforming Healthcare through Technology

Program Overview

CIMIT Programs represent a balanced portfolio of multidisciplinary and inter-institutional research projects in every phase of innovation—from idea to adoption into clinical practice. Directing these programs are clinical champions, each a nationally-renowned specialist in an emerging area of medical innovation.

CIMIT Programs

- **Biodetection & Sepsis Control**
- **Biomaterials & Tissue Engineering**
- **Cardiovascular Disease**
- **Clinical Systems Innovation**
- **Global Health**
- **Image Guided Therapy**
- **Minimally Invasive Surgery**
- **Neurotechnology**
- **Optical Diagnostics**
- **Simulation**
- **Trauma & Casualty Care**

Program Leaders form the clinical nucleus of the CIMIT innovation community—a vibrant and powerful network connecting many of the most accomplished scientists, engineers and clinicians in Boston.

Biodetection & Sepsis Control

IMPROVING CAPABILITIES IN THE DETECTION AND THERAPY OF SERIOUS INFECTIONS IN INDIVIDUALS AND THE POPULATION

Jeffrey A. Gelfand, MD, MGH

Naturally occurring infectious diseases and bioterrorism emergencies have the potential to cause shock- and sepsis-related fatalities. The ability to screen people efficiently for a wide variety of infections could significantly limit the devastating impact of an epidemic or bioterrorism incident on civilian or soldier populations.

CIMIT's Biodetection & Sepsis Control Program leverages CIMIT's extensive network of academic institutions and government agencies to develop novel technologies capable of detecting infection, screening antigens or developing vaccines.

CIMIT Supported Solutions

- ▶▶ Developing new diagnostic techniques using interdigitated electrode technology and microfluidic detectors for early diagnosis of HIV/AIDS
- ▶▶ Using microfluidic technology for early detection and diagnosis of avian influenza and other infectious diseases
- ▶▶ Developing a rapid, sensitive test to detect sepsis and allow early treatment to minimize or eliminate the spread of infection
- ▶▶ Developing a novel technique for removing infectious agents from the blood quickly and efficiently

Papers Published in 2007

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Biomaterials & Tissue Engineering

HELPING SOLVE ORGAN SHORTAGES THROUGH THE CREATION OF “LIVING REPLACEMENT STRUCTURES”

Jeff Borenstein, PhD, Draper Laboratory
Joseph Vacanti, MD, MGH

Nearly one hundred thousand Americans are waiting for a life-saving organ transplant. Thirty thousand patients a year need a new kidney, and while treatments like dialysis can buy time, on average, one in four die before receiving a transplant. This severe organ shortage could be mitigated if a viable substitute for human tissue could be found.

Tissue engineering is a complex challenge. An interdisciplinary field, innovations in tissue engineering seek to apply the principles of engineering and life sciences in the pursuit of biological substitutes that restore, maintain, or improve tissue function.

CIMIT's Biomaterials & Tissue Engineering Program is working to create “living replacement structures” for organs, tissue, and neural repair.

CIMIT Supported Solutions

- ▶▶ Invent and implement Micro-ElectroMechanical Systems (MEMS) to build complex organs, such as kidneys and livers, and biocompatible replacement tissues for organ repair
- ▶▶ Design a small, improved kidney dialysis device to improve a technology that had not progressed in more than thirty years—and lead to a kidney-dialysis machine small enough to be worn around a patient's waist

“Aided by a CIMIT grant, I began a program in tissue engineering that included the development of a completely novel platform for tissue engineering. This led to the creation of a multidisciplinary team including our laboratory, Jeff Borenstein's laboratory at Draper and Roger Kamm's laboratory at MIT. The results of this effort have been scientifically successful and are now reaching the stage of early commercialization.”

Joseph Vacanti

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Cardiovascular Disease

REDUCING DEATHS AND DISABILITY FROM HEART DISEASE AND STROKES THROUGH IMPROVED DIAGNOSIS

Ahmed Tawakol, MD, MGH
Tom Brady, MD, MGH

The leading cause of death and disability in the developed world, Cardiovascular Disease affects millions of people of all ages and frequently requires expensive and invasive treatments. Most advances in treating heart disease have focused on drug interventions and lifestyle changes. Technological innovations to date tend to concentrate on treating structural cardiovascular disease which requires creative methods of diagnosis and innovative procedural therapy.

Heart disease costs the United States billions of dollars every year, yet much of the biology is still not understood. By continually evaluating the complex set of conditions cardiac patients experience, CIMIT investigators seek novel approaches to diagnosis and minimally invasive therapy.

CIMIT's Cardiovascular Disease Program is working to develop novel methods for the identification of and therapy for patients at highest risk for developing myocardial infarction and stroke.

CIMIT Supported Solutions

- ▶ Advance optical coherence tomography, a highly sensitive, advanced imaging tool able to detect vulnerable plaques which may rupture, triggering many heart attacks and strokes
- ▶ Develop safer, minimally invasive treatments and procedures to replace diseased aortic heart valves, post heart attack mitral valve regurgitation, and early detection of cardiac arrhythmias

Papers Published in 2007

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** also listed under Optical Diagnostics Program*

Clinical Systems Innovation

MAKING PATIENT CARE SAFER, MORE ACCESSIBLE, MORE EFFICIENT, AND LESS COSTLY ACROSS THE ENTIRE CONTINUUM OF CARE

Jay Schnitzer, MD, PhD, MGH

Clinical healthcare environments are demanding, fast-paced, and complex. The barriers to innovation are significant, including the need to avoid disrupting ongoing day-to-day activities.

CIMIT's model of developing clinical innovation "learning laboratories" across the continuum of care—from the hospital to the home—provides venues for technology and process innovation to address these challenges in realistic settings. It also provides a controlled environment to measure the impact of change.

The Clinical Systems Innovation Program is CIMIT's on-the-ground initiative to improve and advance the systems that support clinical care in real-world healthcare settings. CIMIT helps clinicians and institutions craft novel approaches to implementing a complex new care pathway or designing a new facility or better process, usually incorporating new technology.

CIMIT Supported Solutions

- ▶ Establish partnerships between clinicians, technologists, and industry partners to define and develop innovative technologies and systems to enable elders to live independently in the home and to ensure care continuity across healthcare settings
- ▶ Develop alternative models of low acuity care beyond the physical confines of the hospital that preserve the relationships between

CIMIT Learning Laboratories

Operating Room of the Future, a state-of-the-art surgical space developed at MGH in which advanced technologies are used to increase efficiency and safety for staff and patients.

BASIS initiative, a BWH operating room of the future, from which 16 new operating rooms will incorporate design and processing efficiencies.

BIDMC Emergency Department of the Future, an innovative physical facility with advanced informatics capabilities, supported by CIMIT, to create a physiologic monitoring and pain management surveillance system.

Neonatal ICU of the Future at Children's Hospital, an initiative to design a state-of-the-art unit that combines cutting edge technology, non-invasive monitoring and testing.

Ambulatory Practice of the Future, an innovative physical space redesign leveraging process re-engineering, redefinition of team roles, remote physiologic monitoring and virtual outreach for patient-centric care at MGH.

Medical Device Plug-and-Play initiative, a national collaboration promoting the adoption of open standards for medical device interoperability to benefit patient safety and healthcare efficiency.

patients and their care teams and seamlessly integrate into provider workflow and information systems

- ▶▶ Develop and pilot new and effective technologies for integrating wearable physiologic sensors, short-range communication, and knowledge-management software and display
- ▶▶ Create deployable, flexible, affordable, robust systems for managing the monitoring, tracking and location of large numbers of patients in unconventional settings outside the walls of existing medical facilities, such as large-scale emergencies
- ▶▶ Establish device interoperability standards that enable medical device integration for safety and clinical decision-making, produce complete and accurate electronic health records, and create error-resistant systems

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**also listed under Minimally Invasive Surgery*

Global Health

PROVIDING PROGRAMS TO HELP THOSE IN EMERGING NATIONS HELP THEMSELVES

Kristian Olson, MD, MPH, MGH

Delivering healthcare to patients in austere environments calls for innovative approaches. Over challenge is to apply proven problem-solving capabilities to the design and development of medical devices and technologies specifically targeted to improving care in underserved patient populations, both at home and abroad. A “setting-driven” approach integrated with clinical training enables better technology solutions for developing countries. By utilizing existing local resources, both human and industrial, there is less reliance on medical product importation.

CIMIT’s Global Health Program is focused on developing instruments, equipment and training programs for low-resource settings.

CIMIT Supported Solutions

- ▶ Create and leverage a multidisciplinary network to identify available medical resources and advocate for non-traditional solutions to high-impact problems
- ▶ Use locally available “replacement parts” in the design and manufacture of life saving devices (infant incubators) to help sustain life
- ▶ Design and launch a program that teaches how to use an existing “low-tech” device to open the air passages of asphyxiated newborns
- ▶ Teach midwives and mothers about techniques for pre- and post-natal safety, simple approaches that they can teach others in their communities
- ▶ Support the development of point-of-care technologies to enhance field-based diagnosis of conditions ranging from HIV to avian influenza

Image Guided Therapy

PROVIDING HIGH RESOLUTION, THREE-DIMENSIONAL IMAGES OF THE OPERATING FIELD IN REAL TIME FOR MINIMALLY INVASIVE PROCEDURES

Ferenc Jolesz, MD, BWH
Ron Kikinis, MD, BWH

Imaging techniques like X-ray and MRI are invaluable for treating a wide variety of illnesses and injuries. The challenge remains to shorten the lapse of time between image acquisition and procedure. Patient preference for minimally invasive surgery makes real-time imaging information vital.

Image Guided Therapy techniques help improve therapeutic outcomes. By providing precise ways to “visualize” intra-procedural anatomical changes in real time, Image Guided Therapy helps clarify a surgeon’s understanding of the patient’s anatomy and enables minimally invasive procedures to be performed inside solid organs. Guided by real-time imaging, surgeons can make decisions based on accurate data—sometimes the crucial difference between life and death.

CIMIT’s Image Guided Therapy Program is focused on providing precise high-resolution, three-dimensional ways to “visualize” intra-procedural changes in real time, allowing minimally invasive surgery to be performed on solid organs that would otherwise require traditional surgical procedures.

CIMIT Supported Solutions

- ▶▶ Design and construct the first advanced, image-guided operating room, which incorporates multiple state-of-the-art imaging systems such as 3T MRI, PET/CT, and optical imaging (AMIGO Project)
- ▶▶ Develop noninvasive, focused ultrasound treatment for ablation of brain tumors and uterine fibroid tumors
- ▶▶ Advance novel approaches like MRI-guided cardiac ablation, an effective treatment for heart rhythm abnormalities

Papers Published in 2007

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Minimally Invasive Surgery

MAKING SURGERY SAFER, AND RECOVERY FASTER AND LESS PAINFUL FOR PATIENTS

David Rattner, MD, MGH

Minimally Invasive Surgery decreases risk and shortens post-surgical recovery time. Improved minimally invasive techniques, like laparoscopic surgery, are most effective when the tools are flexible, sophisticated, and incorporate advanced imaging techniques.

New devices, better optics and creative multimodal approaches to disease management have set the stage for the next phase of less invasive surgical therapy.

CIMIT's Minimally Invasive Surgery program is focused on making surgery safer and more precise, exploring the next generation of less invasive surgical therapy. Recent projects involve developing tools and procedures for Natural Orifice Translumenal Endoscopic Surgery (NOTES), which could make surgery completely free of incisions, while drastically reducing the chances of infection, pain, and disability. Through NOTES, many complex surgeries could eventually become outpatient procedures.

CIMIT Supported Solutions

- ▶ Novel surgical procedures performed through the mouth and other natural orifices, making surgery virtually incision-less and painless for patients
- ▶ Convening experts at the national level, funding high-risk ventures and promoting information sharing across disciplines to encourage medical device development
- ▶ Developing a minimally invasive procedure that uses the patient's own blood components mixed with a biodegradable gel for enhanced repair of knee injuries

Papers Published in 2007

Broadhurst MS, Akst LM, Burns JA, Kobler JB, Heaton JT, Anderson RR, Zeitels SM. Effects of 532 nm pulsed-KTP laser parameters on vessel ablation in the avian chorioallantoic membrane: implications for vocal fold mucosa. *Laryngoscope*. 117(2):220-5, 2007.

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**also listed under Clinical Systems Innovation*

Neurotechnology

FINDING MORE EFFECTIVE, MINIMALLY-INVASIVE WAYS TO PREVENT, DETECT AND TREAT NEUROLOGIC DISORDERS

Steven Schachter, MD, BIDMC

One in five Americans suffers from a neurological disease. Epilepsy alone affects four to six million Americans. Many neurological diseases are usually diagnosed in their advanced stages, and treatments tend to be palliative rather than curative, leaving patients debilitated for years. One in three patients with epilepsy continues to have seizures, which may be fatal or cause serious disability.

New engineering techniques coupled to recent discoveries in neuroscience could dramatically improve patient quality of life. Potential benefits include reversing or ameliorating a variety of neurological diseases and making earlier diagnosis possible.

CIMIT's Neurotechnology Program is focused on developing novel approaches to diagnosis and treatment that integrate the expanding field of neuroscience with the rapidly evolving technologies of the applied sciences.

CIMIT Supported Solutions

- ▶▶ Develop a device that can detect the early-onset of epileptic seizures and abort them before symptoms occur
- ▶▶ Design and construct a wearable, wireless, sensor-network to monitor motor recovery in stroke patients
- ▶▶ Develop protocols for transcranial stimulation and deep brain stimulation for depression therapy

Papers Published 2007

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Optical Diagnostics

REDUCING PAIN, DISCOMFORT AND DEATHS BY DEVELOPING MINIMALLY INVASIVE TOOLS AND PROCEDURES EFFECTIVE AT DIAGNOSING DISEASES

Gary Tearney, MD, PhD, MGH

Early diagnosis is critically important for effective therapy. Studies have conclusively shown that the earlier a disease is diagnosed, the greater the patient's chance of recovery. Current diagnostic techniques for many diseases, however, are often invasive and inefficient. Certain types of cancer, like esophageal cancer, are diagnosed through repetitive random biopsies. Other diseases leave markers that are not feasible to access surgically, like the vulnerable plaque that can indicate heart disease.

CIMIT's Optical Diagnostics Program seeks to make diagnosis efficient, effective, and non-invasive. Projects like Optical Coherence Tomography (OCT) and Optical Frequency Domain Imaging (OFDI) make it possible to identify precancerous lesions or arterial plaque at very early stages.

CIMIT Supported Solutions

- ▶▶ Reduce deaths by developing tools effective at diagnosing diseases
- ▶▶ Explore new optical methods of gaining information from tissue, including research on a three-dimensional miniature endoscope
- ▶▶ Develop an Optical Frequency Domain Imaging (OFDI) procedure, to obtain essential data from large sections of the esophagus and coronary arteries

Papers Published in 2007

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**also listed under Cardiovascular Program*

Simulation

Steve Dawson, MD, MGH

PROVIDING REALISTIC TRAINING TOOLS FOR CLINICIANS TO AVOID PRACTICING PAINFUL, RISKY PROCEDURES ON PEOPLE

Whether the medical practitioner is a new resident, a young battlefield medic, or an experienced surgeon, the traditional method of learning a new skill is to observe or read about a new technique, then attempt it on a patient. Contemporary technology is making it possible for physicians and caregivers to practice certain techniques on simulators. However, these simulators are rarely sophisticated enough to provide a realistic experience that factors in the psychological pressures and the multiple medical issues of a true procedure.

CIMIT's Simulation Program is focused on creating realistic training tools so that doctors, medics and first responders can practice on a mannequin in a simulated trauma setting. Projects like COMETS, an interactive, full-body trauma casualty system that is programmed to react autonomously to an extensive range of situations, allow medics and first responders to access and practice treatments involving complex medical conditions in a field setting.

"Our vision is that medical students, interns and residents will train on smart mannequins to master basic diagnostic and surgical techniques, which will make young doctors smarter and more confident."

Steve Dawson, MD

CIMIT Supported Solutions

- ▶▶ Design and build a physiologically realistic mannequin to train first responders to perform chest tube insertion and prevent a leading cause of trauma deaths
- ▶▶ Develop a mechanical system to train surgeons to perform laparoscopic surgery
- ▶▶ Create an interactive, full body-trauma casualty system (computer programmed to behave autonomously and spontaneously) to provide realistic training for army medics
- ▶▶ Design a powerful and interactive tool for real-time incident preparedness, training, and coordination of efforts between medical responders, hospitals, local, state, and federal agencies
- ▶▶ Develop a straightforward, realistic smallpox inoculation training system that accurately replicates the feel and responses of traditional smallpox inoculation

Papers Published 2007

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Trauma & Casualty Care

PREVENTING DEATHS IN THE CRITICAL MINUTES FOLLOWING TRAUMA

George Velmahos, MD, PhD, MGH

Trauma care has improved dramatically. A victim with near-fatal injuries who reaches the

"I envision an era when critically injured patients in shock are saved, even if found in a remote location because paramedics are equipped with a high-tech sensor that detects internal abdominal bleeding. A new, life-saving injection of a gaseous material increases pressure at the site of bleeding to stop the loss of blood—and the patient is stabilized for transport to the nearest hospital. For obvious reasons, this project is very important to the Department of Defense."

George Velmahos, MD, PhD

hospital alive is likely to survive. However, little progress has been made to treat patients in the critical period before they reach a treatment facility. As a result, most traumatic deaths occur in the prehospital setting and before any meaningful medical intervention becomes available. Translational research efforts are targeting the early phases of injury in order to develop novel therapies and interventions for prehospital and early in-hospital trauma care.

CIMIT's Trauma & Casualty Care Program works to facilitate projects that enable first responders to stabilize patients at the site of the casualty, offering critical care to the patient rapidly and

effectively. Several projects aim to explore solutions to stop internal and external bleeding as well as improve resuscitation and survival.

CIMIT Supported Solutions

- ▶▶ Develop new tools for first-responders that can quickly detect and reduce internal bleeding
- ▶▶ Develop a method of rapidly lowering the body's temperature in the first moments of injury to help keep patients alive
- ▶▶ Connect the prehospital ambulance and in-hospital trauma teams by telemedicine

- ▶ Explore fluidless resuscitation as a method of decreasing mortality and organ failures
- ▶ Implement a process to establish the comparative benefit of new treatments in trials with trauma patients

Papers Published in 2007

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CIMIT Invests Early in Emerging Leaders

The Young Clinician Awards help clinicians find that extra time to advance their research careers.

In 2007, five emerging leaders were awarded Young Clinician grants: Yolonda Colson, MD, PhD, Brigham and Women's Hospital; Michael Davidson, MD, Brigham and Women's Hospital; James Ellsmere, MD, Beth Israel Deaconess Medical Center; Daniel Kohane, MD, PhD, Massachusetts General Hospital; and Audrey Chung Marshall, MD, Children's Hospital Boston.

For Dr. Ellsmere, the grant was crucial to pursue a dual career goal of clinical care and research. "Junior surgery faculty have a tendency to become heavily loaded with clinical care responsibilities, and put their research interests on a back burner," said Dr. Ellsmere, who is working on a novel device to effectively manage the care of patients after gastric bypass surgery. "The Young Clinician funding enabled me to set aside time to focus on device development, and I look forward to several future projects building on the success of this work."

Dr. Marshall is developing a fetus-positioning device to enable minimally invasive *in-utero* cardiac intervention for babies with congenital heart disease. "The Young Clinician Award has given me the resources that makes it easier to pursue my ideas in a very exploratory way," said Dr. Marshall. "Because I am usually with patients, the grant has provided flexibility in terms of time and budget. And it has made it easier to find collaborators and attract others to join me in this research."

CIMIT's commitment to education has helped clinicians not only to launch research projects, but to disseminate information and share the learning.

Dr. Davidson, a cardiac surgeon at Brigham and Women's Hospital, is working on percutaneous repair of damaged heart valves without the need for open-heart surgery. His Young Clinician Award enabled him to cross-train with surgeons from Boston and Cleveland to learn new techniques. "The experience enabled me to learn from others, and I am trying to pass that knowledge along to other doctors at BWH," said Dr. Davidson. He said that surgeons and cardiologists could learn from each other in the rapidly growing field of minimally invasive surgery.

Grants & Awards

CIMIT provides critical seed funding for investigators whose research may be considered too embryonic or high-risk by traditional funding sources. Consistent with CIMIT's mission, grants are awarded to investigators conducting translational research projects focused on novel, technology-driven solutions to urgent healthcare problems.

CIMIT grants enable individual investigators or multidisciplinary teams to explore emerging technologies, develop systems to improve healthcare facilities or processes, or create novel approaches to managing a specific disease. CIMIT awards support the career development of investigators, young clinicians, and graduate students whose interests align with the CIMIT mission.

CIMIT encourages grant proposals by teams that reach across member institutions and whose novel ideas may lead to technologies that can benefit several medical disciplines. In particular, CIMIT seeks innovative approaches that can benefit soldiers, civilians and populations in austere settings. Proposals must be collaborative, multidisciplinary and specific about how the work will lead to improved patient care. In 2007, CIMIT received over 200 proposals, of which 67 projects were funded.

In their own words . . .

CIMIT has provided our team with the seed funding necessary to initiate the development of a device that is now proving to be valuable. The one-year funding enabled us to launch this project. We now have enough momentum to determine if the device will indeed be useful for basic biology or for diagnostics. This is catalytic funding!

Proposal Evaluation Criteria for all CIMIT Grants:

- Programmatic fit within an existing CIMIT Program, or desirable expansion to an important new area within the CIMIT mission (CIMIT does not fund projects in drug development, information-technology areas, basic research, or clinical trials)
- Collaborative nature of the project (interdisciplinary and inter-institutional)
- Potential for significant positive impact on the career of the investigators
- Innovation
- Intellectual property opportunities
- Viable exit strategies for the project, including future alternative funding sources, contacts with industry, licensing and venturing opportunities
- Probability of clinical adoption, if the project is concluded successfully
- Proposed project is not likely to be funded by another established funding mechanism (CIMIT does not fund projects for which corporate sponsorship or federal support is appropriate)
- High likelihood the project could benefit from the assistance of CIMIT facilitation support
- Potential to improve the standard of care and benefit patients

Proposals are peer-reviewed for scientific quality and fit with the CIMIT mission. Submitted through an open request for proposals, all proposals are evaluated by a scientific review committee comprised of internal and external expert reviewers. At the conclusion of the scientific,

technical, programmatic and patient benefit evaluations, all proposals are ranked and submitted to the executive director for final funding decisions.

In their own words . . .

The professional collaborations and knowledge gained through CIMIT has positioned me for career advancement.

CIMIT Science Grants

Science Grants recognize early-stage, interdisciplinary and inter-institutional research projects for improving patient care, with emphasis on diagnosis, intervention and peri-procedural systems. Three types of science grants help innovators with proof of concept or proof of principal. In 2007, CIMIT made awards in three categories: Small (up to \$40,000), Medium (up to \$100,000) and Large (up to \$250,000).

CIMIT Clinical Systems Innovation Grants

Clinical Systems Innovation grants (up to \$100,000) are awarded to teams seeking to address a specific need at a CIMIT healthcare institution. These grants are designed to help the institution re-think its approach to implementing a complex care pathway or design a new facility or process.

Career Development Awards

Career Development Awards (up to \$50,000) allow an individual with established expertise in one medical or technical area to acquire knowledge in a second medical or technical area; experience that will allow the clinician to make unique subsequent interdisciplinary contributions. A mentor must be identified in the new area. Together, the applicant and mentor present an educational curriculum to acquire the additional knowledge base and a description of the benefits likely to be enabled by this training.

Working Group Grants

Working Groups are interdisciplinary and inter-institutional teams formed to explore emerging areas of new health care technology. These grants (up to \$25,000) help new teams investigate a novel idea. Working Groups seek to understand current solutions, determine new approaches being developed by industry, and evaluate other areas of opportunity. When the team determines there is a potential area of exploration, the Working Group may apply for subsequent CIMIT grants or other funding sources to prove the concept.

Clinical Fast-Forward Grants

Jointly funded by the sponsoring hospital and CIMIT, Clinical Fast-Forwards help clinicians bring promising new clinical techniques from other sites (national or international) to CIMIT Consortium member institutions. Grants in this category must involve direct patient care. Clinical Fast Forwards seek to change the way care is delivered. The grant provides funding up to \$25,000 to help the innovative clinician travel and learn at a leading center, practice the new skill or technique in a laboratory setting, and obtain proctoring when performing the initial clinical cases at a CIMIT site.

Young Clinician Awards

Established as a pilot program in 2007, this new award is funded by industry. A generous gift from Johnson & Johnson provided the funding for the first year of this award. The Young Clinician Award recognizes outstanding clinicians, early in their careers, who are engaged in the development of breakthrough medical devices and technologies.

Medical Engineering Fellowships

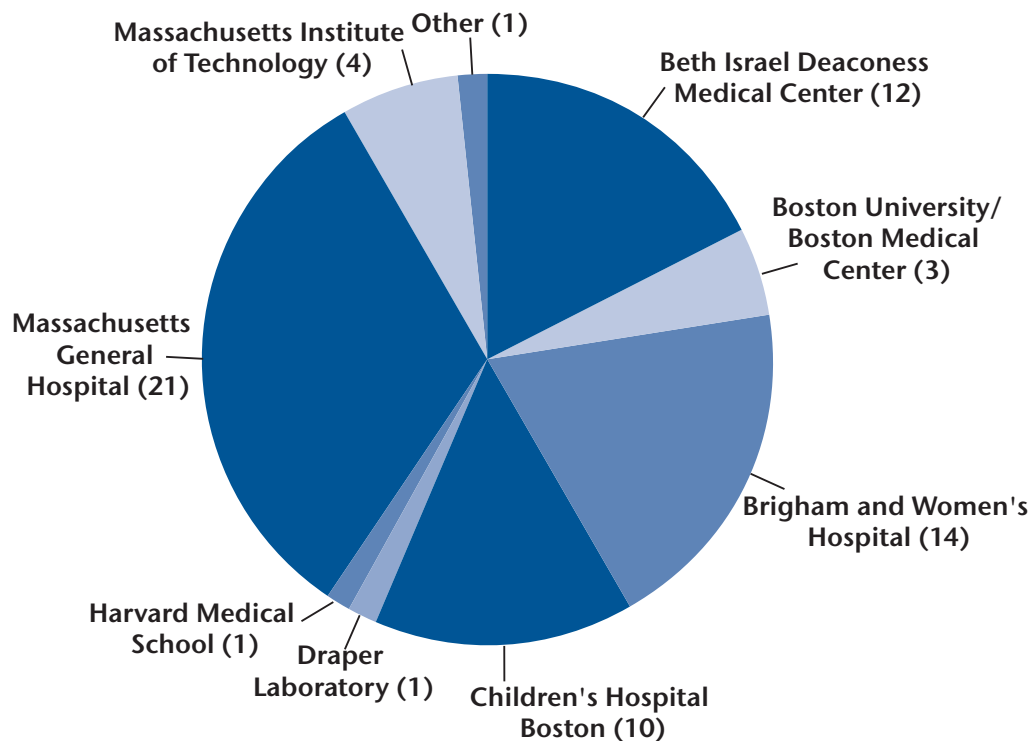
Jointly funded by MIT and CIMIT in 2007, this new fellowship offers multi-year support for graduate engineering students to work in highly innovative yet classically under-funded areas of healthcare research.

In their own words . . .

The biggest value of CIMIT is the ability to generate preliminary data for future grant applications. It can be difficult to get cutting edge and innovative work funded without some form of supporting data, and CIMIT's early stage investments have really paid off.

Number of Grants in 2007

*by Consortium Institution
67 Projects and Fellowships*



Measuring Impact

CIMIT concentrates on early stage, high-risk ideas—projects in the first phase of innovation. Success is evaluated through a variety of benchmark measures recognized by both academia and industry.

In their own words . . .

CIMIT is the first—and only—organization focused solely on bringing clinicians, engineers and scientists together; encouraging them to collaborate and find innovative technological solutions to important healthcare problems; and supporting them at every step of the way, from concept through implementation.

Delivering Results by Improving Patient Care

In Use/Patient Care	Patients Referred to Date	Other Benefits
Laser Treatment for Vocal Cord Dysplasia and Papillomatosis	500	Inpatient to Outpatient Treatment
MR Guided Brachytherapy of Prostate Cancer	480	Fewer complications; quicker return to work
Uterine Fibroid Surgery with Focused Ultrasound	136	Shorter hospital stay
Reorganizing Patient Care and Workflow in a Minimally Invasive Surgery Operating Room at MGH	3,688	Non-operative time compared to standard OR is 40% less
“Surgical Laboratory” Suite of Operating Rooms for Testing New Devices and Procedures at BWH	3,510	Methods of improved tracking and decision-making
Distraction Osteogenesis for Jaw Reconstruction	125	No ICU time; no bone graft
TeleStroke	780	Real-time diagnosis can minimize disability
Laparoscopic Obesity Surgery	700	Fewer post or peri-operative complications, reduces stay from 3-5 days to 1 day
Laparoscopic Uterine Fibroid Surgery	600	Return to work in 1 week instead of 6 weeks
Laparoscopic Nephrectomy	175	
Real-Time Incident Preparedness Simulator (RIPS)		Communities and first responders can simulate disaster scenarios
Radianse RFID Tracking Systems		Commercially available; used in 29 hospitals
LiveData Operating Room Dashboard		Commercially available
Allergy Documentation and Alert in Operating Room		30% error rate reduced to 10% within a few days of implementing system

Procedures in Clinical Trials	Patients Entered Into Trials	Observed Benefits to Date
OCT for Vulnerable Plaque	85	Minimally invasive detection prior to catastrophic event
OCT for GI Endoscopy	800	Minimally invasive detection superior to biopsy
Seizure Prediction and Vagus Nerve Stimulation	6	
Omniguide Laser System for Tumor Ablation	1	
Using Fine Needle Aspiration and Genomics for Early Detection of Lung Cancer	62	Earlier diagnosis will improve care and outcomes
Real-time ER Breath Analysis for Early Diagnosis of Infectious Disease	20	
eVisits in the Ambulatory Practice of the Future	100	Now going into patient care
Portable Gait Evaluator and Biofeedback Intervention Tool	28	
Initiation of a Near-Infrared Imaging Platform in Women with Ovarian Cancer	16	Sub-mm tumors detected (8 to 10 cells)
Video Rate OCT for Early Diagnosis of Glaucoma	23	Licensed for further development and commercialization
Video Rate OCT for Early Diagnosis of Age-related Macular Degeneration	2	Licensed for further development and commercialization
Remotely Monitored Inhaler to Predict and Prevent Asthma Attacks	400	Allows time-sensitive intervention
Sentinel Lymph Node Mapping of Breast Cancer Using Invisible NIR Fluorescent Light	Initiating April 2008	
Sentinel Lymph Node Mapping of Human Lung Cancer	Initiating April 2008	
Motion Tolerant Respiration Monitor	Initiating April 2008	
Hand Washing and Compliance Training	Initiating April 2008	

Devices and Procedures in the Pipeline

- » A portable abdominal insufflator (usable by first responder) to treat trauma-induced abdominal bleeding in the field
- » Wearable real-time blood pressure sensor that can recognize reduced cardiac output before blood pressure begins to fall
- » Optically-guided laser therapy for esophageal cancer
- » A portable device to treat hypothermia in the field using warmed inhaled mist
- » Tissue engineered tooth and jaw replacement
- » Novel negative pressure ventilator useful in the field or home
- » Breath analysis for instant diagnosis of certain infectious diseases
- » Real time MRI-guided cardiac ablation to treat arrhythmias
- » Indwelling intrapericardial catheter for long-term access and therapy
- » Local incorporation of anti-neoplastic agents into surgical resection margins
- » Rapid optical diagnosis of early-stage glaucoma and macular degeneration
- » Implanted lung assist device
- » Surgery without incisions: natural orifice transluminal endoscopic surgery
- » Non-surgical repair of meniscus or ACL
- » Wide-field, high-resolution imaging for detection of non-melanoma skin cancers
- » Cardio-port for minimally invasive, intracardiac beating heart surgery
- » Endoscopic fiberoptic device and biodegradable scaffolds for minimally invasive closure of tracheoesophageal fistulas
- » A handheld electrical impedance probe for the assessment of neuromuscular disease
- » Three dimensional ultrasound imaging of testicular perfusion
- » Percutaneous biopsy and implantation catheter device for autologous myocardial tissue transplantation into myocardial infarction scar
- » “Smart” wearable emergency triage monitor
- » Fetal positioning device for use during ultrasound-guided, percutaneous in utero cardiac intervention
- » Controlled release technology to prevent tracheal stenosis
- » Transcatheter mitral valve repair with adjustable artificial chordae
- » Blood pressure measurement by touch (“bioglove”)
- » Remotely monitored inhaler to predict and prevent asthma attacks
- » Optical frequency domain interferometry to determine cerebral aneurysm rupture risk
- » Wearable wireless sensor network to monitor motor recovery in post stroke patients
- » Percutaneous, image-guided cochlear implantation
- » Photochemical tissue bonding – a nanosuture approach to vascular repair
- » Tissue engineered pulmonary valves
- » Photochemical repair of vocal chords

Developing World-Class Innovators

During 2007, CIMIT reached out to all current and past recipients of CIMIT grants to collect data on the success of their research and to survey their satisfaction with CIMIT facilitation services. One hundred investigators responded (55% response rate) to the written survey; forty investigators participated in follow-on 1:1 personal interviews.

- 96% report that CIMIT funding helped secure second round funding from other sources. 69% report that the CIMIT grant absolutely made the difference in securing additional funding
- 73% report that the CIMIT grant was critical to their research; it would not have happened without CIMIT funding
- 22% of all CIMIT investigators have benefited from in-kind contributions (connections made by CIMIT with industry and other sources)
- 98% report that their careers have definitely benefited through the CIMIT network
- Areas of facilitation that investigators value most are: networking: finding and connecting with potential collaborators, inter- and intra- institutional connections; access to other clinical collaborators; developing device prototypes

CIMIT projects involving multiple institutions	2007	Cumulative through 2007
2 consortium institutions	32	167
3 consortium institutions	7	19
4 consortium institutions	0	5

Multi-institutional collaborations are a hallmark of CIMIT. In 2007, 65% of all projects funded represented collaborations of 2 or more institutions, an increase from 25% in 1999.

Metrics

History **10 years**

Projects Funded **460**

Peer-Review Publications **500+**

Invention Disclosures **200+**

Invention Disclosures Filed for Patent **75+**

Patent Applications Generated **200+**

Patents Issued **30+**

Licenses **10+**

Companies Formed or Redirected Into Healthcare **10+**

Patients Benefiting from CIMIT-Supported Devices & Procedures **11,000+**

Building a Vibrant CIMIT Network

At the epicenter of one of the world's most intellectually stimulating communities, CIMIT fosters and nurtures interdisciplinary collaboration among world-class experts in medicine, science and engineering, in concert with industry and government to rapidly improve patient care.

The CIMIT network is unique. Program Leaders are nationally recognized experts in their fields, frequently serving in leadership positions of the most highly respected professional medical societies. The CIMIT Industry Program collaborates closely with national and regional biotechnology and medical device membership organizations. These relationships help investigators connect with commercialization experts whose experience can guide their innovative ideas into opportunities for product development. And, through its strategic affiliations and regulatory affairs network, CIMIT facilitates connections with key leaders of government agencies and other international academic centers.

The CIMIT Innovation Congress is where the network comes to life. This annual convening event brings together innovators and entrepreneurs from across the globe. Participants include leaders from academic medical centers, government, universities, non-profit organizations, military, industry, law firms, small business, venture capital and other healthcare providers and payers.

In just two years, CIMIT has expanded its reach nationally and internationally, attracting participants from over 8 countries and 21 states. By 2007 total attendance at the Innovation Congress reached 650, including 244 first time attendees.

Whether through convening events like the CIMIT Innovation Congress or forming strategic affiliations, CIMIT leverages its greater Boston network worldwide.

The CIMIT Innovation Congress attracts

Industry

Sony
Johnson & Johnson
Olympus Surgical America
BioSTAR
IBM
Medtronic
Boston Scientific
GE Imaging
GE Research
InTouch Health
Image Stream Medical
Philips
TNCO Inc.
Smith & Nephew
Stethographics, Inc.
IDEO
iRobot
Intel/Digital Health
Analog Devices
Samsung
SRI International
Siemens
Avancen
Karl Storz
Getinge
BodyMedia
LiveData

Hospitals and Academic Medical Centers

Massachusetts General Hospital
Brigham and Women's Hospital
Children's Hospital Boston
Boston Medical Center
Beth Israel Deaconess Medical Center
Newton-Wellesley Hospital
Mayo Clinic
Johns Hopkins
Cleveland Clinic
Tufts NE Medical Center
NY Presbyterian
NYU Epilepsy Center
Kaiser Permanente
University of Manchester, UK

Government

NIH
FDA
Department of Defense
Veterans Administration
Office of Naval Research
TATRC
Army MRMC
National Health Service UK

Non-profit Community

Innovation Learning Network
Wellcome Trust
Bio21/Melbourne

Soldier Medicine

High technology devices and systems are enabling new approaches to characterize and manage acute care, rehabilitation, trauma and disease. By funding early-stage, high-risk ideas for patient care, CIMIT encourages its project teams to seek solutions that benefit soldiers, civilians and populations in austere environments.

In the early days, CIMIT gained a reputation for innovation through its Simulation and Clinical Systems Innovation initiatives. Since that time, CIMIT has become a national leader in new systems for patient safety, caregiver training, and systems designed to deliver care in the most appropriate and efficient setting. While the technical and medical practice skill sets for these improved processes apply equally to civilian and military medicine, CIMIT emphasizes the unique needs of the soldier.

CIMIT has a diverse and growing portfolio of projects that benefit soldiers.

Devices for Screening & Diagnostics

- Improve tools for triage
- Image for base-lining and classifying traumatic brain injury (TBI) and post traumatic stress disorder (PTSD)
- High field MRI for differentiating TBI from PTSD
- Detection/characterization of infection
- Serum screens for TB, HIV, and other infectious disease
- Early detection of hemorrhage
- Identify post-acute patients at risk of heart attack/stroke
- Systems and monitoring devices to help manage large numbers of casualties

Therapy

- Treating the soldier patient at point of injury for abdominal hemorrhage
- Improving intravenous access for drug delivery
- Designing new systems to characterize and mitigate traumatic pain
- Predicting seizure onset in traumatized patients to initiate therapy
- Quantifying benefits of novel surgery (reduced infection rate, faster recovery)
- Localizing therapy in the brain non-invasively with focused ultrasound
- Exploring ways to mitigate TBI (laser stimulation, transcranial magnetics)
- Improving vaccines
- Moderating inflammatory response to traumatic injury (cooling and pharmacologic therapies)

Rehabilitation

- Introducing longitudinal imaging approaches to manage TBI care
- Using nerve function sensors to stage therapy
- Evaluating brain-body interface characterization for TBI, prosthetic therapies

Training and Improved Care Systems

- Realistic trauma simulators for medic and first responder training
- Systems for improved care safety (hand washing compliance)

Supporting Translational Research

What makes CIMIT unique – and effective – is the in-house team of full-time experts who facilitate the complex process of introducing technological innovations into healthcare. This highly experienced, multidisciplinary team provides support and specialized expertise to investigators in intellectual property protection, patents and licensing, technology implementation, small business grant process, regulatory issues, fundraising, commercialization, and much more.

The goal of all CIMIT Facilitators is to leverage the strength of their backgrounds in business, law, intellectual property protection and product development. They also serve as a magnet to attract innovative thinkers and help investigators move novel ideas from bench to bedside. These activities are led by individuals with substantial experience acquired during previous professional positions; skills and insights that make them uniquely suited to address the issues arising along the commercialization pathway.

CIMIT invests heavily in sustaining this powerful, dedicated, facilitative team of experts supporting the clinical and engineering champions who lead its programs and site mine the consortium institutions for novel opportunities to improve patient care through technology. The CIMIT Facilitators are an integral part of the CIMIT mission and form its innovation support infrastructure. These functions exist to enhance its mission to accelerate the pace of innovation by actively facilitating the investigators progress through a highly customized plan, including:

- Connecting project leaders with individuals or teams that offer complementary skills to meet a unique need. These may be people who never would have met under normal circumstances. Strong applications for funding arise from these connections.
- Bringing in appropriate industrial resources, technologies, or prototyping skills at whatever stage they are needed.
- Funding prototype development to prove a concept or to allow animal or human studies. Such prototypes add value and plausibility to any subsequent licensing efforts.
- Guiding and supporting project leaders through the challenges of obtaining needed regulatory approvals and protection of any IP for subsequent licensing.
- Helping obtain follow-on funding for the next phase of work beyond the pilot stage, including potential philanthropy.
- Assisting with business planning, reimbursement analysis, connections with licensees or investors, and other requirements in the launch of a given technology in healthcare.
- Helping solve administrative problems with IP management, contract negotiation, grants administration, regulatory compliance, and more.
- Facilitating connections between investigators and the Department of Defense to explore potential “dual use” capabilities of new technologies
- Educating clinicians about device development and commercialization by sponsoring programs and courses in concert with engineering schools and business schools.

Education & Convening

CIMIT provides a rich, varied environment for the cross-fertilization of ideas and information among leaders and students in medicine, science, engineering and industry. CIMIT Education & Convening is responsible for the CIMIT Forum, courses at MIT and Harvard Business School, the CIMIT Innovation Congress, and various topic-specific symposia.

Mission

To educate and motivate investigators, encourage the exchange of ideas and information, promote collaboration between diverse communities, and provide an arena where interdisciplinary discussion can lead to breakthroughs.

Objectives

- Create an “architecture of participation” environment for CIMIT where “convening entrepreneurs” can experiment across disciplines and institutions
- Design and utilize the CIMIT Forum to assess techniques for stimulating speakers, moderators and audience
- Foster an environment where participants expect to be interactive and challenged
- Engage new audiences
- Harness the wisdom of participants to solve problems, foster innovation and think differently

2007 Accomplishments

- ▶ Created a series of podcasts to market the CIMIT Forum
- ▶ Managed *Driving Change in Healthcare*, the annual CIMIT Innovation Congress. 650 physicians, engineers, scientists, business executives, government officials and students attended
- ▶ Collaborated with the Harvard Business School in a multidisciplinary course, involving students from the schools of Business, Medicine, Arts and Sciences, Engineering, Law, Government and Public Health. Student teams selected six CIMIT projects, assessed and developed plans for translation to commercialization
- ▶ Created the CIMIT blog, registering over 3,000 individual viewers and over 800 regular readers
- ▶ Supported MIT/CIMIT 2.75 Medical Engineering Course, which produced an award-winning device

Lessons Learned & Plans for the Future

New media presents opportunities to reach new audiences and engage them in new ways with the CIMIT community. Through the CIMIT blog, podcasts and CIMIT-related wiki's, we are beginning to leverage information and ideas presented at the CIMIT Forum. These advances represent an exciting evolution of culture change.

In 2008, we will be experimenting with Adobe® Connect™, a secure, flexible web communication system to develop a series of web-based communication tools for training, web conferencing, and online convening.

Industry Liaison

Industry Liaison Program (ILP)

Industry's gateway to innovation and collaboration is CIMIT's Industry Liaison Program (ILP), a member-based, structured approach connecting industry and the world-class innovators funded or supported by CIMIT. ILP members benefit from customized services to ensure successful collaboration, accelerate the technology development process, and more quickly impact patient care. The ILP is an efficient route to finding the people, places and expertise needed for successful technology development and implementation in healthcare.

Small Business Program (SBP)

Through the Small Business Program, eligible ILP members can leverage CIMIT's rich network and expertise to identify and apply for government funding for product development and commercialization. CIMIT has a proven track record in facilitating applications for funding for Small Business Innovation Research (SBIR) grants from the Department of Defense and NIH. The SBP provides education on the SBIR process, identifies the clinical champion or co-investigator, contributes to the business and commercialization plans and assists with writing grants.

Mission

To support CIMIT mission by building relationships with industry that catalyze collaborations with CIMIT investigators so as to accelerate the technology development and its effective application to patient care.

Objectives

- Focus on industry partnership needs of investigators
- Promote small business technology development
- Establish and manage multi-company collaborative initiatives
- Assist non-medical technology companies with developing healthcare applications
- Establish a pathway for strategic alliances

2007 Accomplishments

- » Hosted more than 150 company visits to explore opportunities for collaboration
- » Sustained more than 40 active member companies, including five new members, industry contributions of cash and in-kind support totaling more than \$250,000
- » Developed the first signed Memorandum of Understanding to collaborate on technology development with an international company
- » Facilitated the application of three small business grants with investigators and small business members, one of which was awarded
- » Showcased more than 70 demonstrations in the CIMIT Exploratorium
- » Facilitated Working Groups for the NICU of the Future Program at Children's Hospital, helping to establish collaboration around light and sound innovation
- » Supported the CIMIT Neurotechnology Program by establishing collaborative relationships with companies in that field
- » Represented CIMIT at a variety of conferences, including AdvaMed, MassMEDIC, Illuminating Engineering Society, TransMed Partnership Forum and American Telemedicine Association

Lessons Learned & Plans for the Future

CIMIT attracts a diverse group of companies, each with unique needs and goals. In response to this changing dynamic, ILP plans to offer more targeted membership benefits for companies seeking specific services from CIMIT. In addition, ILP will continue to support CIMIT investigators by working with program leaders to establish, maintain or expand industry involvement in their programs.

The Small Business Program will host a series of Roundtables during 2008 to educate both the small business and CIMIT Principal Investigator communities about the goals, process and lessons learned from SBIR/STTR grant submissions. During these meetings, we will provide materials related to the proposal submission process as well as a listing of upcoming solicitations that have high potential for collaborative partnership between CIMIT and small businesses.

Development & Fundraising

The key to sustaining CIMIT's innovative investigators is a flow of adequate funding from numerous sources. The Development team works to secure support from a wide variety of constituencies including consortium member institutions, public and private foundations, and philanthropic gifts. This group works with CIMIT's Program Leaders and investigators to identify, cultivate and solicit prospective donors for their specific initiatives. Additionally, CIMIT is continually exploring a variety of revenue-generating opportunities including conferences, symposia and courses that foster relationships with ever-expanding audiences.

Mission

To provide a continuous, increasing stream of diversified funding support through the engagement of consortium member institutions, foundations, industry, small businesses, venture philanthropists, venture capitalists and other individuals for CIMIT core activities and programs to accelerate the impact of technology on patient care.

Objectives

- Achieve a fundraising goal of \$800,000
- Create a graduate student fellowship program at MIT
- Establish relationships with foundations committed to innovation
- Launch a volunteer advisory council with goals of ambassadorship and philanthropy
- Increase membership in CIMIT Friends, our annual giving society
- Inform donors on the impact of their generosity

2007 Accomplishments

- ▶▶ Raised \$849,000; exceeding revenue goal by 6%
- ▶▶ Established MIT/CIMIT Medical Engineering Fellowship program granting one 2-year award
- ▶▶ Successfully secured a \$250,000 gift for the Simulation Program from the VHA Health Foundation
- ▶▶ Opened discussions with Kauffman Foundation
- ▶▶ Expanded our relationships with the venture capital and entrepreneurial communities; hosted the second annual Venture Capital Summit focused on cardiac health

Lessons Learned & Plans for the Future

The Office of Development worked with an external consultant to evaluate CIMIT's readiness to establish a volunteer advisory council and strengthen philanthropic giving. Currently, serious conversations are underway with a prospective chair for our first CIMIT Advisory Council; filling that important position will aid in the recruitment of a group of influential, committed Advisors to assist in reaching our FY08 goal of \$1 million. CIMIT's focus on technology as a component of medical research makes a compelling case not only for philanthropic gifts but also for support from those individuals and groups who seek opportunities to interact with our international network.

Technology Implementation

Technology Implementation is a core resource dedicated to maximizing the deliverable benefits derived from funded translational research projects, programs, and initiatives. By working closely with the technology licensing offices of CIMIT consortium institutions, this team emphasizes intellectual property protection and capabilities developed by CIMIT projects.

Mission

Enhance the CIMIT mission by working individually with each potential and funded investigator to explore the specific impact on patient care anticipated by a particular new technology.

Objectives

- Help the investigators and their institutions create and manage their intellectual assets to maximize the value of their patent portfolio and to share equitably in the commercial success of their discoveries and inventions
- Create and integrate new business and investment models that will deliver these breakthroughs to all patients who need them at the lowest possible cost and the shortest possible time
- Support the technology transfer and licensing functions of each member institution and actively assist in the process of transforming invention disclosures into intellectual assets, and individual patents into powerful patent portfolios
- Identify ideal candidates for public-private partnerships, seek the most appropriate sources of translational support and funding alternatives, design cooperative relationships that will validate the safety and efficacy of the concept, and accelerate the widespread acceptance of new standards for patient care
- Anticipate and address pathway to commercialization issues

2007 Accomplishments

- ▶▶ Reengineered CIMIT's approach to facilitating technology implementation by developing a network of subject matter experts available to our investigators as needed, including consultants, business school students, entrepreneurs, venture mentors, pro bono legal resources, and grant writers
- ▶▶ Identified ten high-priority, high-impact projects for targeted strategic and financial investment
- ▶▶ Facilitated Global Health Program Leader efforts to collaborate with a non-profit design and product development firm to build looks-like, works-like prototypes of a low-cost isolette (infant incubator)

Lessons Learned & Plans for the Future

CIMIT plays a significant role in funding early stage innovations, mentoring Principal Investigators, and providing a pathway for implementing their innovations to improve patient care. Facilitation is at the core of the successful process that CIMIT has established to bridge many of the gaps that exist in the translation process - between clinical and engineering expertise and among academic medical research, government and industry.

Finance & Research Administration

The CIMIT Finance team has primary responsibility to support the executive director in the fiscal management of the consortium. In addition, this team provides support to stakeholders including financial reporting and guidance regarding strategic financial decisions. The Finance team has responsibility for the administration of sponsored funds requested, received and awarded by CIMIT and is the administrative point of contact office for Principal Investigators and staff across the collaborating institutions.

Mission

To support the CIMIT mission through strategic financial planning and management.

Objectives

- Obtain funding through guidance on proposal preparation
- Provide fiscal planning, management and support
- Compliance
- Human Resources

2007 Accomplishments

- ▶▶ A balanced FY07 budget
- ▶▶ Supported the launch of 52 science projects across 8 institutions, facilitated the administration of 15 Career Development and Working Group Awards
- ▶▶ Completed and closed final reports for the CIMIT/DOD Cooperative Agreement I, totaling \$30.93M

Lessons Learned & Plans for the Future

Operational efficiencies enable CIMIT to more expeditiously support new ideas that become funded CIMIT projects. The same efficient systems allow CIMIT to offer a full range of facilitative in-kind assistance to these multidisciplinary collaborations. As part of our ongoing continuous improvement processes, we plan to evaluate the benefit of alternative computer services or programs that are low cost, high efficiency options to current Finance Office operations. In particular we will be looking for ways to leverage technology to support the administration of science proposal, award tracking and other project management options.

In 2008, we plan to seek the assistance of a financial consultant to review current processes and reports, and offer recommendations for process improvement.

Liaison Office & Government Relations

The work of CIMIT is supported by Government agencies, including the Department of Defense. CIMIT is committed to meeting the needs of all its stakeholders. CIMIT is also committed to facilitating and supporting its investigators as they propose new methods of care that require involvement of their home institutions, apply for and receive funds or support from Government agencies, or need to prepare for Governmental review, e.g., for FDA approval.

Mission

To engage and support consortium members, national and international affiliates, and the Federal Government; and to support CIMIT investigators in relation to these entities. To investigate, initiate and nurture new relationships, and assess the value of potential new members, affiliates and other activities with CIMIT member institutions.

Objectives

- Foster and facilitate ongoing relationships with CIMIT consortium members and stakeholders
- Establish and document metrics of success
- Negotiate and evaluate Regulatory Affairs consulting agreement; serve as entry for investigators to regulatory consultation services
- Assist investigators in preparation for briefings and presentations to stakeholders
- Plan/host strategic meetings by interested parties/stakeholder leadership
- Coordinate government interaction/relations of CIMIT
- Plan and host an international seminar on models of innovation

2007 Accomplishments

- ▶▶ Completed agreement with leading Washington law firm, specializing in FDA regulatory issues for pro bono support of CIMIT investigators
- ▶▶ Hosted numerous visits of stakeholder leadership, and other interested national and international parties
- ▶▶ Prepared briefs for stakeholders, including Federal Government, Department of Defense, consortium members, and international foundations
- ▶▶ Planned and executed successful international seminar, *Models of Collaborative Medical Innovation*, facilitated by Harvard Business School
- ▶▶ Provided CIMIT support for Harvard Business School case, entitled Center for Integration of Medicine and Innovative Technology (CIMIT)
- ▶▶ Hosted planning meetings with Health Facilities Planning Agency (Department of Defense/Veterans Administration)

Lessons Learned and Plans for the Future

CIMIT investigators are successful in innovative research and design that does change the delivery of care to the wounded soldier and to society at large. The measures of success are broad and important. International collaborations as well as academic analysis of success in conjunction with Harvard Business School faculty further define present and future value of CIMIT.

Strategic Communications & Marketing

Strategic Communications & Marketing supports CIMIT investigators by increasing visibility of CIMIT and by cultivating support from new audiences, stakeholder leadership, public opinion leaders, media, business, industry, foundations and others. Strategic Communications & Marketing is responsible for all external and internal communications, public relations and www.cimit.org

Mission

To promote awareness and understanding of CIMIT's priorities, programs, people, policies, projects, procedures and accomplishments through effective proactive, reactive and interactive communications via marketing, media/communications and general outreach.

Objectives

- Create and execute an integrated communications plan to increase visibility with both internal and external audiences
- Advise Program Leaders, Site Miners, investigators and staff on marketing strategies that can increase awareness and support fundraising
- Create and execute a strategy for using www.cimit.org effectively
- Seek out and secure opportunities to promote CIMIT locally and nationally
- Lead and execute a proactive media relations strategy

2007 Accomplishments

- ▶ Designed and executed an integrated multimedia, conference marketing campaign. Registered 244 new attendees
- ▶ Established a new model for collecting investigator metrics and evaluating customer satisfaction. Achieved 65% response rate, establishing benchmark data on performance metrics
- ▶ Introduced several new publications including Catalyst (quarterly newsletter), CIMIT Newswire (monthly electronic communication for research community), and Forum Report (weekly recap of CIMIT Forum presentation)
- ▶ Created brand and identity standards to support CIMIT identity and visibility initiatives
- ▶ Achieved increased awareness of CIMIT through media exposure; generating feature articles in Boston Globe, Boston Business Journal, Nature, Indus Business Journal, Mass High Tech, MIT Technology Review, Science Daily, Boston.com, New England Cable News, Fox 25-TV, Chronicle, NPR and others
- ▶ Enhanced search engine optimization features of cimit.org, improved site navigation

Lessons Learned & Plans for the Future

CIMIT is a complex concept to explain to new audiences. CIMIT has substantial goodwill with current audiences. Building awareness and brand value is a long-term strategy.

The Strategic Communications goal is to build a strong brand and promote the vision of CIMIT leaders, individual projects and signature initiatives. This team can advance the CIMIT mission by methodically educating new audiences and expanding awareness with the media so that philanthropy and industry programs can attract and engage new supporters.

Operations

CIMIT's internal operations require effective and efficient administrative support of CIMIT's complex activities. The hiring of administrative staff for ever-changing duties is a challenge. Even though CIMIT is a consortium entity, all administrative activities must comply with MGH and Partners' policies. By sharing tasks and cross-training staff, the operations group is able to fulfill its role on a very lean budget.

Mission

To maintain and enhance the smooth and efficient staff administrative functions in support of CIMIT projects and leadership.

Objectives

- Develop mechanisms for the support staff to increase production, cohesiveness and teamwork
- Increase the efficiency of the team by taking advantage of their talents to specific tasks and needs of the group
- Efficiently manage backfill of employee vacancies and space allocation
- Proactively improve management of non-salary office expenses

2007 Accomplishments

During 2007, the support staff contributed significantly to several high-profile initiatives including the Innovation Congress and the science review process. More emphasis on career development within and outside the CIMIT organization is valued by staff and has greatly reduced turnover. This team supports an ever-increasing volume of projects and special events. Continuing education programs have been introduced to help staff achieve goals.

Lessons Learned & Plans for the Future

CIMIT must continue to provide support, appreciation and education to this team. We must never take for granted this group of truly talented people.

In the year ahead, continued emphasis will be placed on further upgrading of the skill level of staff through training and development as well as effective recruitment for new needs.

Financial Highlights

Year in Review – 2007

CIMIT is a careful steward of its financial resources. Operating on a fiscal year calendar (October 1, 2006–September 30, 2007), CIMIT derives its funding from a variety of sources including consortium member institutions, government agencies, foundations, industry, philanthropy and gifts of CIMIT Friends. For FY2007, total funding was \$12.12 million.

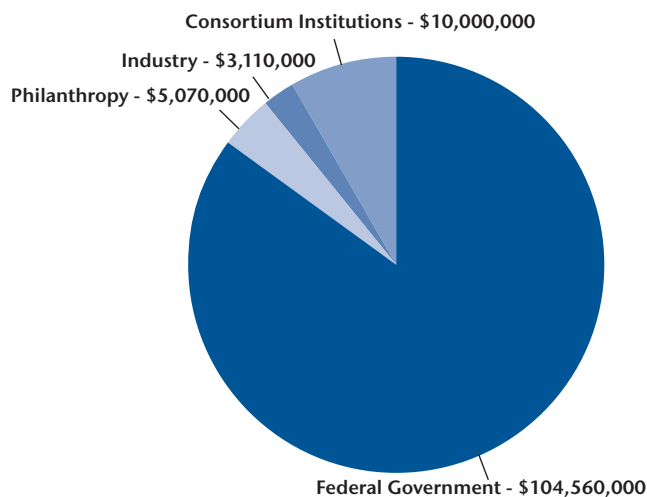
CIMIT awards monies to support innovation in healthcare through its grant programs. Moreover, CIMIT supports research scientists through facilitation of their work, educational programming and a variety of convening initiatives. Less than ten percent of funds support administrative operations.

Sources and Uses of Funds

	2006	2007
Sources of Funds		
Federal Government	\$11,250,000	\$11,040,000
Philanthropy	\$1,070,000	\$840,000
Industry	\$280,000	\$240,000
Total	\$12,600,000	\$12,120,000
Uses of Funds		
Innovation Project Grants	\$5,110,000	\$4,918,378
Innovation Leadership	\$3,390,000	\$3,625,744
Research Services (Facilitation)	\$2,930,000	\$2,604,599
Administration, Operations, Finance & Compliance	\$610,000	\$705,153
Total	\$12,040,000	\$11,853,874

Sources of Funds 1998-2007

Total=\$122,740,000



Annual Report of Giving

Making a gift to CIMIT is very important and rewarding. Through your gift, you can help support innovation in healthcare. Your contribution provides the means for leading-edge, collaborative research and career development grants for the scientists, clinicians and engineers who have a passion for transforming healthcare through technology. Moreover, donor gifts help build a growing and vibrant CIMIT community through education and convening.

The following individuals have given \$250 or more during 2007.

John Abele
Richard Anders
Gabriela Apiou, Air Liquide - Centre de Recherche Claude-Delorme
Henry M. Bell, Smoky Mountain Simulation Services
Reginald Birngruber, Air Liquide - Centre de Recherche Claude-Delorme
Robert E. Brissette, Boston Endo-Surgical Technologies, Inc.
Beverly A. and Robert A. Brown*, CIMIT
Izi Bruker, Johnson & Johnson
Dean Calcagni, Foster-Miller
Jeffrey B. Cooper*, CIMIT
John Cullinane, LiveData, Inc.
Brit and Alexander V. d'Arbeloff*
Bonnie Day*, CIMIT
Arthur DiMartino, TechEn, Inc.
Paul Fallon, TRO Jung/Brannen
Linda and Jack M. Gill*
Olga and John Guttag*
Adi Guzdar, Aguzdar Consulting
Elisabeth Hager, Balan Biomedical, Inc.
Jacob Kain, Engberg Anderson Design Partners
Colleen M. Kigin*, CIMIT
Harvey Kirk, Steffian Bradley Architects
Richard Kobus, Tsoi/Kobus & Associates
Komal Koya, Baxter International, Inc.
Richard Moberg, Moberg Research, Inc.
In Mun, HCA
Bob Nimon, Genesis Planning
James Norris, STERIS Corp.
Donna D. and Ronald S. Newbower*, CIMIT
Lynn Osborn*, CIMIT
Stephen Ovren, The MRI Centers of New England
Paul Pandiscio, Johnson & Johnson
John A. Parrish*, CIMIT
Dawn Querns, CIMIT
Andrew Reeve, Harris Corporation
Elaine Richardson*, CIMIT
Jeff Rollman, Harris Corporation
Allison Salke, Tombolo, Inc.
Ward Sanders, STERIS Corp.
L. Dennis Shapiro, Arzak Corporation
Dexter Smith, John Hopkins University
Peter Steiger, Optasia Medical, Inc.
Mark Sullivan, Mark Sullivan Architects
Vera Tice, Tice Consulting Group
Kirby Vosburgh*, CIMIT
Mike Wootton, Celerant Corporation
Raymond Zambuto, Technology In Medicine

**Founders of CIMIT Friends*

Corporations and Foundations

The Argosy Foundation
Epilepsy Therapy Development Project
Pfizer International Inc.

Boston Scientific
VHA Health Foundation

A Look to the Future

The CIMIT community is a vibrant and powerful network of world-renowned academic research institutions and technology enterprises. Recognized as one of the innovation capitals of the world, Boston is home to a medical and research sector that attracts \$1.4 billion in federal research funds each year.

CIMIT is the one organization that connects the scientists and innovators of these world-class institutions, encouraging inter-institutional collaborations and providing seed funding for novel ideas.

During 2008, CIMIT will leverage the power of this network by announcing several strategic alliances with other world-class academic medical centers and industry. Building upon lessons learned in the Operating Room of the Future project, CIMIT is collaborating with the Department of Defense and Veterans Administration in their Hospital of the Future initiative.

CIMIT will announce a \$2 million commitment of financial and facilitation support for one high-profile project that has the potential to revolutionize patient care.

Also during this 10th anniversary year, CIMIT will introduce new opportunities in convening — through virtual experience and the more traditional Tuesday CIMIT Forum.

And, CIMIT will be supporting the important work of our investigator community by funding novel ideas for early-stage, high-risk, multidisciplinary research in devices and procedures.

The future is bright, the opportunities are plentiful, and CIMIT has the network of extraordinary leaders ready to meet these challenges. Together the CIMIT community can and will drive change in healthcare through technology and deliver exceptional patient care in the right place and at the right time for both soldier and civilian populations.

Vision 2012

In the domain of devices, procedures and clinical systems innovation, CIMIT's mission is to improve healthcare by seeking, selecting and supporting teams of clinicians and technologists.

We serve the patients of the future by facilitating the efforts of clinically-based investigators.

Strategic Goals 2012

- Initiate one or two major, high profile strategic projects where CIMIT can have a major impact on improving patient care
- Leverage the CIMIT model through three to four major strategic alliances with industry, foundations or international organizations
- Encourage innovative research programs that improve the clinical environment
- Enhance our sustainability by diversifying CIMIT's sources of funding
- Advance our mission globally by seeking affiliations with like-minded centers of innovation worldwide.