

CIMIT Innovation Congress 2006  
Exploring Trends & Innovations in Patient Care Technologies  
November 6-7, 2006

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Proceedings

## The CIMIT Innovation Congress – Convene. Collaborate. Learn.

CIMIT (Center for Integration of Medicine & Innovative Technology) hosted the 8<sup>th</sup> Annual CIMIT Innovation Congress in Boston on November 6-7, 2006. More than 400 attended the event, which included the CIMIT Exploratorium, clearly demonstrating the power of collaboration fostered through CIMIT partnerships.

### **CIMIT Exploratorium**

New this year, the *CIMIT Exploratorium* featured interactive modular displays and demonstrations of how novel products and procedures are creating smarter medical devices. Attendees had the opportunity to network with the physicians and scientists who are creating these new procedures and programs that are breaking through the boundaries of the healthcare delivery system. From the “operating room of the future” to connected health in the home, the CIMIT Exploratorium offered the chance to learn how multidisciplinary and multi-institutional collaborations are making a critical difference in accelerating the adoption of new cost-effective devices and procedures into clinical practice.

Demonstrations, robotics, videos and computer simulations were the impetus for extended discussion, networking exchanges and learning experiences, setting a lively and energized tone for the entire Congress.

More than 40 scientific posters were presented, highlighting many of the CIMIT-sponsored research projects currently under way.

The posters covered a range of scientific and medical topics, including “Micromirror-based 3-D Endoscopy, by Jonathan Bernstein, Ph.D.; “Extreme Cardiac Assist System,” by

Jennifer White, M.D.; “Markerless Motion-capture Techniques for Rehabilitation Interventions,” by Paolo Bonato, M.D.; “Continuous Cardiac Output Monitoring for Combat Casualty Care,” by Richard Cohen, M.D.; “Disposable Molecular Diagnostics: Microfluidic Laboratories for the Field,” by Catherine Klapperich, Ph.D.; and “Development of Biodegradable Elastomeric Scaffolds for Soft Tissue Engineering Applications,” by Cathryn Sundback, M.D.

Also, “Registered Image Guidance Improves Endoscopy,” by Kirby Vosburgh, Ph.D.; “Medical Device Plug-and-Play,” by Julian Goldman, M.D.; “Collagen-PRP Hydrogel Stimulates Healing of a Central Defect in the Canine ACL,” by Martha Meaney Murray, M.D.; and “Feasibility of Detecting Seizure Onsets in Ambulatory Patients, Initial Implementation,” by John Guttag, Ph.D.

### **General Session**

Opening the General Session, John A. Parrish, M.D., Director of CIMIT, welcomed the clinicians, scientists, engineers, business executives, healthcare providers, academic faculty and technologists, urging each to share ideas, knowledge and their quest for innovation. “We each contribute a perspective on the best ways to bring technology into healthcare and how to dramatically improve patient care,” said Dr. Parrish. “This conference is our opportunity to convene, form collaborations and renew

our passion for seeking out new and novel solutions to our most urgent healthcare problems.”

Leading off the presentations by national healthcare luminaries was Harvey V. Fineberg, M.D., Ph.D., who is president of the Institute of Medicine of the National Academies. In his keynote address, Dr. Fineberg posed questions about the appropriate development and effective implementation of medical technology in our healthcare system. With feedback from the audience, Dr. Fineberg discussed the “paradox of technology in healthcare,” categorizing medical technology as both under-utilized and over-utilized, expensive and affordable, misapplied and well orchestrated.

To reconcile these conflicting notions about medical technology, Dr. Fineberg recognized the need to create a healthcare system that will most effectively use technology. To accomplish this, he proposed that the patient must be at the center of our healthcare system, evidence-based medicine must be built into the practice from the beginning, and that the system should be value-driven, not just measured on cost and quality.

“We are very far from a healthcare system that best utilizes technology,” Dr. Fineberg noted. However, he also cited the work at CIMIT – looking at the patient and their clinical challenges and working from there to solve the problem – as an important perspective in developing medical technology. “We must see the continuum of healthcare, from behavioral changes to earlier clinical interventions, in order to best apply technology in healthcare. This is truly science applied to a purpose.”

A panel of noted healthcare experts from industry, academia and government offered perspective on innovation and what it takes to achieve breakthroughs. Citing reliance on individual providers, practices and hospitals to implement innovations, a lack of urgency on behalf of the consumer for more

affordable convenient and reliable quality care, and a void of criteria for reimbursement, Molly Coye, M.D., MPH, founder and CEO, HealthTech, stressed the critical need for translational research.

Dr. Coye urged a broader definition to encompass research “from bench to product,” which will lead to strengthened and accelerated clinical research. Dr. Coye added that there is a “cornucopia” of medical innovations in the marketplace and how medical professionals must find the most efficient to bring to the patient.

Bringing a business perspective to the panel, John Cullinane, chairman of LiveData, Inc., suggested that the adoption of electronic medical records will help hospitals and medical centers provide more efficient care and management of patients. Cullinane, who entered the health-care field after a successful career as a software executive, added that the use of sensors for such tasks as home monitoring of patients will be another way that medical institutions can save money while becoming more efficient.

Expanding on the topic, Richard Satava, M.D., of the Defense Advanced Research Projects Agency (DARPA), suggested an extension of the concept of electronic medical records. He suggested that a total body scan be taken of healthy young adults that would be part of their medical records. As patients aged and became ill, doctors would have a baseline against which to compare a patient’s body from the time when he was disease-free.

He called it a holographic electronic-medical representation, and he said it would be an electronic medical record that would enable health care providers to have an ongoing document of a person’s health history.

Citing how technology impacted the airline industry, Curt Selquist, group chairman of Medical Devices and Diagnostics for Johnson & Johnson, said that sensor systems could do for hospitals what the air-

traffic control system has done for air travel; describing how sensors could keep track of patients and the care they receive.

And, according to panelist Ellen Zane, president and CEO, Tufts-New England Medical Center, technical innovations, research advances and collaborative approach with medical schools and public private partnerships, will lead to healthcare innovation.

### **Concurrent sessions**

During a dozen breakout sessions, conference participants explored the progress being made in many of the clinical areas supported by CIMIT, including neurotechnology, cardiovascular disease, combat-casualty care and trauma care, simulation, minimally invasive surgery, patient safety and image-guided therapy.

The presentations and discussions throughout the Congress focused on current issues and trends that are driving sweeping changes in the healthcare system and the delivery of care.

For example, David Rattner, M.D., of Massachusetts General Hospital (“MGH”) and Chris Thompson, M.D., of Brigham and Women’s Hospital, reported they are making progress on a program called “surgery without scars.” Dr. Rattner explained how researchers are studying the feasibility of accessing internal organs through the mouth rather than the abdomen. Drs. Rattner and Thompson, pioneers in minimally invasive surgery, said they are studying the feasibility of removing the appendix using this innovative method.

“Robo-health in the Home” was discussed by a panel of entrepreneurs and medical professionals that included Colin Angle, CEO of iRobot Corp.; Deborah Theobald, CEO of Vecna Technologies; Kathy Duckett, home-care supervisor for Partners Home Care; Stephen Intille, Ph.D., of MIT; and Ron Newbower, Ph.D., of CIMIT.

Panel members agreed that monitoring chronic and elderly patients at home, rather than bringing them to medical centers each time they feel ill could save costs.

Duckett said that elderly patients respond well to electronic monitoring devices in the home as long as they don’t feel they are “being watched” by obtrusive technology.

A session on “Traumatic Brain Injury” was led by Marc de Moya, M.D., of MGH; Walter Koroshetz, M.D., of MGH; Kirby Vosburgh, Ph.D., of CIMIT; and Raul Radovitzky, Ph.D., of MIT. The panel described the challenges in understanding and treating traumatic brain injury, which is increasingly prevalent in US soldiers who survive bomb blasts.

Public policy in health care was discussed in a panel titled “Reforming Healthcare in Massachusetts,” which heard presentations by Thomas Glynn, COO of Partners HealthCare System; Thomas Trimarco, Secretary for Administration and Finance of the Commonwealth of Massachusetts; and James Hunt Jr., of the Massachusetts League of Community Health Centers.

Panel members said Massachusetts has earned national attention for its efforts to launch a form of universal healthcare for its citizens.

Glynn said that the state was able to move forward because both Gov. Mitt Romney and the Democratic leadership in the legislature were willing to work together in an effort to cut costs over a period of years.

A session titled “Exciting Models of Catalyzing Innovation,” focused on efforts to identify and develop innovative breakthroughs in healthcare.

The panel included Alex Slocum, Ph.D., MIT; Charles Cooney, Ph.D., a pioneer of the Deshpande Center at MIT; Jennifer Yael Ruse, Kaiser Permanente; Keith McCandless, of the Social Innovation Center; and Beverly Brown, Ph.D., of CIMIT.

A Slocum class at MIT has been active in developing a tool to aid in knee reconstruction as part of the work of CIMIT investigator Martha Meaney Murray, M.D. of Children's Hospital Boston.

Julian Goldman, M.D., and Nat Sims, M.D., both of MGH, reported progress on their efforts to create solutions in point-of-care technology relating to patient safety during a panel titled, "The Role of Point-of-Care Technology in Patient Safety."

Dr. Goldman is leading a national effort to develop "plug and play" standards for equipment in the operating room that will enable doctors, nurses and other medical personnel around the country adhere to the same set of operational guidelines as a means of increasing patient safety.

Dr. Sims discussed progress in the development of "smart infusion pumps," stating that patient safety is enhanced when medicine is distributed in devices with built-in error detection and controls.

### **CIMIT Forum and Awards**

The CIMIT Congress was concluded with a keynote presentation by William R. Brody, M.D., Ph.D., president of The Johns Hopkins University, during which Dr. Brody shared how "uncommon sense can lead to innovation."

His thoughtful speech, "Uncommon Sense and the Road to Innovation," provided an overview of the rewards of innovation, and brought perspective, humor and vision to the quest for innovation in healthcare.

Dr. Brody said that successful innovators are unconventional thinkers but more importantly, they are persistent and believe in their research. He reflected that, over the years, he has been surprised by the success of some scientists who had novel ideas that mainstream leaders did not immediately recognize.

"But the innovators persisted, and made great breakthroughs. So it would benefit all of us to look at all ideas with an open mind, because the innovative technology isn't always obvious," Dr. Brody said.

CIMIT officials recognized several teams and individuals for outstanding contributions.

The Edward M. Kennedy Award for Healthcare Innovation was given to the Image Guided Therapy team headed by Drs. Ferenc Jolesz and Ron Kikinis, both from Brigham and Women's Hospital.

Other members include Kullervo Hynynen, PhD; Daniel Kacher, MS; Karl Krissian, PhD; Nathan McDannold, PhD; Eigil Samset, PhD; Clare Tempany, MD; Kirby Vosburgh, Ph.D; Simon Warfield, PhD; and Carl-Fredrik Westin, PhD. Also recognized were administrative aides Katie Mastrogiacomo and Debra O'Shea Begley.

The first annual \$50,000 CIMIT-MIT Medical Engineering Fellowship went to Olumuyiwa Ogunnika, a graduate student in the Department of Electrical Engineering and Computer Science at MIT.

Dr. Parrish honored businessman Henry H. Meyer Jr. with the CIMIT Award for outstanding philanthropy.

Also recognized were donors William E. Braunlich and Warren B. Lammert, who are providing support through the Epilepsy Development Therapy Project for CIMIT's new program in neurotechnology.

More of the collaboration, learning and information exchange that was a hallmark of the 2006 CIMIT Innovation Congress can be found online at [www.cimit.org](http://www.cimit.org).

For more information, please call CIMIT Communications at (617) 643-3830.