

Alumni/ae returning to Boston to celebrate 35th anniversary

More than 60 alumni/ae have been working for a year to plan HST's 35th anniversary celebration on September 23-25.

"The anniversary weekend will showcase only a fraction of the tremendous accomplishments of HST alumni/ae," said HST Director Martha L. Gray, PhD '86. "We are thrilled that so many have agreed to return to share their work and have a good time."

The heart of the weekend will be a symposium that features more than 20 distinguished HST alumni/ae, who will speak about their own work and demonstrate the tremendous impact that HST alumni/ae have in advancing human health through their work in medicine, research, education, business and government policy.

Two poster sessions will provide opportunities for faculty and students to share their own work and the work taking place in HST research centers, programs and laboratories.

Farish A. Jenkins, Jr., PhD, Professor of Anatomy in HST at HMS, will once again regale attendees with a memorable address.

All members of the HST community are
(continues on p. 15)

HST (r)evolution

celebrating 35 years of bench to bedside

Friday, September 23

4:30-7:30 pm Reception/Poster Session
New Research Bldg, HMS

Saturday, September 24

7-8 am Continental Breakfast

8 am-4 pm Alumni/ae Symposium
New Research Bldg, HMS
Lunch Keynote Speaker:
Farish A. Jenkins, Jr., PhD

4-6 pm Exhibit of HST Research
Centers and Programs

7:30 pm Gala Celebration
Sheraton Boston

Sunday, September 25

Closing Brunch

Symposium Participants

Chris Goh Bardon, MD, '98
Howard Bernstein, MD, PhD, '89
Dennis Choi, MD '78
Shaun Coughlin, MD '82
George Daley, MD '91, PhD
Allan Detsky, MD '78
Jennifer Elisseeff, PhD '99
Shai Gozani, MD '94, PhD
David Ho, MD '78
Leann Lesperance, MD '95, PhD '93
Jeffrey D. Macklis, MD '84
Joseph Madsen, MD '81
Mark McClellan, MD '92, PhD (unconfirmed)
Rebecca Richards-Kortum, PhD '90
Mark Saltzman, PhD '87
Barbara L. Smith, MD '83, PhD
Vikas Sukhatme, MD '79, PhD
James Tananbaum, MD '89
Jack Tsao, MD '97
Susan Voss, PhD '98
George Wodicka, PhD '89

\$50K competition's winning team includes HST students

Two HST students are members of Balico, the team that received top honors in the MIT \$50K Entrepreneurship Competition on May 9. This is the fourth year in a row that a biomedical device company has won the Robert P. Goldberg Grand Prize of \$30,000 in start-up money. It is also the second year running that HST students have participated in the winning team.

Baruch Schori, President and CEO of Balico, is a master's candidate in the Biomedical Enterprise Program. MEMP student Kathleen Sienko is Balico's VP of Research and Operations.

Balico is a medical device company that has designed a wearable, vibrotactile balance aid that will benefit individuals whose primary sensing systems are affected by disease or old age. At least half of the U.S. population is affected by a balance or vestibular disorder sometime during their lives. Balico is a privately held medical device company that will develop and commercialize a wearable vibrotactile balance aid that accurately senses and displays body tilt to help reduce the risk of falls. Balico's platform technology, VibeAid,

(continues on p. 15)

Gilchrest to speak at graduation

Barbara A. Gilchrest, MD (HMS '71), Professor and Chairman of Dermatology at the Boston University School of Medicine and also Chair of the HST Visiting Committee at MIT, is the speaker at HST's 34th Commencement Exercises.



Barbara Gilchrest

Gilchrest has a distinguished history of research and service. She received her bachelor's degree in mathematics from MIT in 1967 and graduated *cum laude* from HMS in 1971. She com-
(continues on p. 15)

'Bye, Carol!

Though we know that all good things must come to an end, it is with very mixed feelings that we bid farewell to **Carol Campbell**, a valued member of the HST family who is retiring on June 17 after working at MIT for 34 years.

Carol began her tenure at HST in 1991, when she served as administrative assistant to Roger Mark, MD, PhD, then director of the Division. Since 1999, Carol has served as administrative assistant in external relations, organizing events, the newsletter, mailings, and providing support for people inside and outside HST.

Yet with all that she has accomplished at HST, it is Carol's warmth and kindness that will be most missed, her profound effect on the people—faculty, students, staff and friends—whose lives she touched. We wish Carol a happy and full retirement with her husband, Bob, and their many friends and relatives, whom we know will keep her busy—as always.

— *The Editors*

New center turns discoveries into novel treatments

A new NIH-funded project—headed by HST professor Isaac S. Kohane, MD, PhD—will use informatics to translate medical discoveries into actual treatments.

Known as I2B2 (Informatics for Integrating Biology and the Bedside), the National Center for Biomedical Computing is based at Partners HealthCare System. This initiative is a \$20 million, five-year project designed to enable physicians to translate relevant findings and hypotheses into therapies.

The I2B2 Center will focus on four major diseases known to be associated with complex genetic defects: diabetes mellitus, asthma, hypertension and Huntington's disease.

Kohane believes that a project like I2B2 may lead to the next generation of medical breakthroughs and discovery.

"We will finally have a way to blend huge volumes of clinical research and phenotypic data with genomic research data and apply that knowledge to patients and finally make individualized, preventative medicine a reality for many diseases with a genetic basis," he said.

Directors'

• notes •

As the academic year comes to a close, we like to pause for a moment to reflect on our accomplishments and challenges and to establish our goals for the coming year.

This year we have 79 students in eight programs receiving 82 degrees (seven more than last year's high). This is the largest and most diverse class in our history. Our applicant pool continues to humble all of us involved in admissions: two Rhodes Scholars, two *USA Today* top 20 US scholars, and three who were ranked number one in their undergraduate engineering programs at Johns Hopkins, Northwestern and Stanford. At the time of this writing, it appears that our yield will continue to be exceptional—75 percent of our PhD admits, 90 percent of our master's degree admits, including 100 percent of our BEP admits—rates of which we are most proud. The MD admissions are still in progress, but nine of 10 MD-PhD offers have been accepted.

Five fantastic new faculty have joined the ranks of HST during the academic year: Elfar Adalsteinsson, PhD; Sangeeta N. Bhatia, MD '99, PhD '97; David E. Cohen, MD, PhD '87; Collin M. Stultz, MD, PhD '97; and Jagesh V. Shah, PhD '99.

We are establishing clearly identified HST research space at MGH, Children's Hospital, and BWH. And, we are especially excited that we have an unprecedented opportunity to

bring together all HST research on the MIT campus into Building E25 and to establish a true headquarters for our program.

This combination of extraordinary students, a growing faculty, and clearly identified HST space positions us well to strengthen our mission and to increase our impact on translational education and research. And it calls for a celebration!

As you have seen elsewhere in this issue, thanks to the hard work of more than 60 alumni/ae, HST is planning a wonderful 35th anniversary celebration the weekend of September 23-25. This weekend promises to showcase the very best of HST—the great people who are a part of this family and the extraordinary work in which they are engaged. As we think about our goals for the coming academic year, there is nothing more important to us than to strengthen the ties of the HST family and to work together to leverage the extraordinary human and financial resources that we have to help educate outstanding minds, cultivate leaders, create knowledge and generate preventive, diagnostic and therapeutic innovations to advance human health.

So, please mark your calendar for September 23-25, check out the event's website (hst.mit.edu/35/), and register to join us for this very special milestone.

Martha and Joe

The Connector

Volume 19 • Number 3

Editor: Walter H. Abelmann, MD

Managing Editor/Designer: Becky Sun

Editorial Assistant: Carol A. Campbell

Contact Information:

Harvard-MIT Division of
Health Sciences and Technology
77 Massachusetts Ave., E25-519
Cambridge, MA 02139-4307
P: (617) 253-4418 F: (617) 253-7498
E: hst@mit.edu <http://hst.mit.edu>

Editorial Board:

Patricia A. Cunningham
Sang Kim (MD '07)
Andrew D. Levin (MEMPh)
Pamela McGill
Catherine Modica
Konstantina Stankovic, PhD '98, MD '99
Betsy Tarlin
James C. Weaver, PhD

Ex officio

Joseph V. Bonventre, MD '76, PhD
Martha L. Gray, PhD '86

The Connector is a quarterly publication of the Harvard-MIT Division of Health Sciences and Technology. The staff and board of The Connector would like to thank the HST alumni, faculty, staff, and students who contributed to this issue. Please send reports of your recent activities and personal news to the above address or email. Previous issues of The Connector can be found at <http://hst.mit.edu>.

BYRNE JOINS HST AS FACULTY

The Division is delighted to welcome **Thomas N. Byrne, MD** to the HST faculty.

Byrne is currently Visiting Clinical Professor of Neurology and Health Sciences and Technology at HMS and MGH, and Senior Lecturer in the Department of Brain and Cognitive Sciences (BCS) at MIT. He formerly served as Clinical Professor of Neurology, Neurosurgery and Internal Medicine at Yale University School of Medicine.

Upon arriving in the Boston area last December with his daughter and his wife—MIT



Thomas M. Byrne

President Susan Hockfield, PhD—and having known about HST previously, Byrne immediately offered to participate in HST. He said that HST is the natural place for him to champion his belief that MIT undergraduate and graduate students

are excited by the field of medicine and should have the opportunity to learn about it.

Byrne has already begun actively contributing to this effort by teaching in several HST courses cross-listed with BCS and by mentoring both undergraduates involved in HST's BioMatrix program and HST MD students who are considering neuro-clerkships.

His research focuses on the clinical aspects of cancer involving the nervous system, including primary brain tumors and the neurological complications of cancer and anticancer therapies. In addition to mentoring and teaching, he will participate in HST's Athinoula A. Martinos Center for Biomedical Imaging.

AVORN PROMOTED TO PROFESSOR

Jerome Avorn, MD has been promoted to Professor of Medicine at HMS and BWH. A member of the HST affiliated faculty, Avorn is an internist, geriatrician and pharmaco-epidemiologist, whose research focuses on adverse effects of drugs and their prevention.

SOMA WEISS DAY

The 65th Annual Soma Weiss Medical and Dental Students Research Day was held at HMS on April 14. The 121 posters displayed presented basic as well as clinical research, and a larger number than ever dealt with fieldwork

on health problems, disease and delivery of health care, predominantly in underdeveloped countries. Eighteen of the posters were authored by HST students.

At the plenary session, which was introduced by Dean Joseph Martin and chaired by Thomas M. Michel, MD, PhD, Professor of Medicine and Chair of the Student Research Committee, **Viviany R. Taqueti (MD '07)** was one of the four students giving oral presentations. She reported on "T-bet Controls Migration, Effector Function and Homeostasis of Pathogenic CD8⁺T Lymphocytes in Myocarditis." This work was done in the laboratory of **Andrew H. Lichtman, MD, PhD**, HST affiliated faculty and Associate Professor of Pathology at HMS and BWH. A native of Brazil, Taqueti was recently awarded a Paul and Daisy Soros New American Fellowship, comprising a stipend and half off two years' tuition.

The keynote speaker was Howard Hiatt, MD, Professor of Medicine at HMS and Co-Chief of the Division of Social Medicine and Health Inequalities at BWH. In his talk titled "The Changing Face of 'Real Research,'" Hiatt presented highlights of his own career, which spans 50 years and comprises basic research, clinical investigation, and finally quantitative focus on the shortcomings of health care delivery, both in the U.S. and in underdeveloped countries.

COMJEAN WINS INFINITE MILE AWARD

Bernd Comjean, HST Fiscal Officer, has won a 2005 Infinite Mile Award from the Office of the Provost and the Office of the Associate Provost and Vice President for Research. The Infinite Mile Awards Program is



Bernd Comjean

a means to recognize exceptional employees or employee teams who work within MIT departments, labs, and centers, and provide an exemplary service to the organization.

His nominating letter states: "By consistently going the extra mile, Bernd has earned tremendous respect and the trust from all his colleagues. Bernd expertly handles a myriad of issues, ensuring the smooth operation of financial

arrangements for research, teaching, student support, and administration at both MIT and Harvard. And with Bernd, it's not just about the numbers—he cares for these issues in a way that promotes the mission of HST and its stakeholder institutions."

HST truly appreciates Comjean's commitment to providing clear, thoughtful and professional financial services to our entire community. Congratulations!

LANGER NAMED INSTITUTE PROFESSOR AT MIT

Robert S. Langer, ScD, Professor of Health Sciences and Technology, as well as the Kenneth J. Germeshausen Professor of Chemical and Biomedical Engineering at MIT, has been named Institute Professor, the highest honor awarded by the MIT faculty and administration. Langer is a world authority on tissue engineering and drug delivery systems, a field in which he has pioneered work at the interface between engineering and life sciences.

Speaking with MIT's weekly newspaper *Tech Talk*, President Susan Hockfield, PhD stated that this appointment "recognizes the enormous scale, scope and importance of his contribution to MIT and the larger society. His pioneering work at the interface between engineering and the life sciences has opened up entirely new directions for biomedicine."

This spring, Langer also won the nation's richest prize for medicine and biomedical research, the \$500,000 Albany Medical Center Prize, in recognition of his work with polymers, implantable drug delivery devices and tissue engineering.

Langer is an active HST faculty member, participates in teaching and serving on many committees. Most importantly, he has opened his laboratory to countless students in both the MD and MEMF programs and has been a highly appreciated mentor and research supervisor.

THREE ELECTED TO ASCI

Two HST alumni and one HST faculty member were elected to membership in the American Association for Clinical Investigation this spring.

William Hahn, MD, PhD '92, Assistant Professor of Medicine at HMS and DFCI;

Roger J. Hajjar, MD '90, Associate Professor of Medicine at HMS and MGH;

Isaac S. Kohane, MD, PhD, the Lawrence J. Henderson Associate Professor of Pediatrics and Health Sciences and Technology at HST, HMS and Children's Hospital Boston.

HST's graduates first dental student

On June 6, the first student admitted to HST in conjunction with the Harvard School of Dental Medicine will receive her HST graduation certificate.

When Rachel L. Forbes was applying to HSDM in the fall of 2000, she heard about a new agreement that HSDM had with HST to offer qualified candidates the option of taking the HST MD preclinical curriculum instead of the New Pathway MD curriculum. A biomedical engineering major from Boston University, Forbes was intrigued by HST's



Rachel Forbes

quantitative, scientifically rigorous MD curriculum, and accepted the offer to interview for the program. In spite of the fact that she was still recovering from major surgery, Forbes aced her interview and became HST's first dental student!

She completed the first two years of the HST MD preclinical curriculum, fitting in a number of dental preclinical courses as well, then moved on to the Dental School for two years of clinical training. In addition, she completed a thesis in the laboratory of Julie Glowacki on cartilage tissue engineering.

Forbes found the HST MD curriculum interesting and challenging, with much material applicable to dental medicine. She loved the HST microbiology and pathology courses, and credited the latter for her superior understanding of cancer in the dental pathology

course. She noted that HST prepared her very well for her dental school curriculum. There were some scheduling issues in trying to juggle the two curricula, requiring diplomacy and some difficult choices.

We can't imagine a finer pioneer than Rachel Forbes, however, who handled these issues with grace, ingenuity and a fair degree of good humor, and who excelled in so many ways in the HST MD curriculum.

After receiving the Doctor of Dental Medicine degree on June 9, Forbes is headed for post-graduate training in Endodontics at the Tufts University School of Dental Medicine. She continues to live in Stoneham with her husband, Jason Kroll, and their three cats, and looks forward to a career combining clinical dentistry and teaching.

— Patricia A. Cunningham

HST MD students receive research awards

HST is proud of the MD students who have been won research awards from the Howard Hughes Medical Institute (HHMI) and the Doris Duke Charitable Foundation.

HHMI's Medical Fellows Program supports a year of full-time biomedical research training for medical and dental students. Approximately 60 students a year are selected for the program; this

year, eight of the 17 HMS students who received the award are enrolled in HST.

The Doris Duke Charitable Foundation Clinical Research Fellowships are one-year awards promoting practical hands-on clinical research for medical students. Five HMS students received awards this year, two of whom are in HST.

Howard Hughes Medical Institute

NAME	RESEARCH ADVISOR	AREA OF RESEARCH
Julia Chu (MD '07)	Robert Sackstein, MD, PhD	Hematology / Dermatology
Steve Corsello (MD '07)	Todd R. Golub, MD	Pediatric Oncology
Paul Dieffenbach (MD '07)	Mel B. Feany, MD, PhD	Pathology
Theo Marentis (MD '07)	Joseph Vacanti, MD	Pediatric Surgery
Sonali Mukherjee (MD '07)*		
Haley Naik (MD '06)	David Soybel, MD	Surgery
Ton Pinar (MD '07)	David M. Livingston, MD	Charles A. Dana Division of Human Cancer Genetics
Jonathan Schoenfeld (MD '07)	Glenn Dranoff, MD	Cancer
Suzana Zorca (MD '07)	Karin Hoffmeister, MD	Hematology

* declined in order to accept Collins Scholarship

Doris Duke Charitable Foundation

Felipe Jain (MD '06)
Proposes to do a translational research project on Parkinson's disease with Dr. Emad Eskander of MGH Neurosurgery.

Jennifer Son (MD '06)
Proposes to do translational research in pediatric heart failure. Dr. Jane Newburger, associate cardiologist-in-chief at Children's Hospital, will be her clinical mentor.

HST Graduates

Master of Engineering Biomedical Engineering

.....

Patty Pei-Chang Chen

Diamond Bar, CA
Future Plans: Life Science Research Asst., Department of Pathology, Stanford Medical School; Candidate for the MD degree, UC-San Francisco

Margaux Erin Daly

Palm City, FL
Future Plans: Research Analyst, CNA Corporation, Alexandria, VA

Janet Hsiao

Redlands, CA
Future Plans: Undecided

Master of Science Biomedical Enterprise Program

.....

Hong Hocking Cheng

Toronto, Canada
[also receiving MS in Management of Technology from Sloan School]
Future Plans: undecided

James Beall Graham

Linwood, NC
Future Plans: Associate, McKinsey & Co., Boston, MA

Chad Holland

Racine, WI
[also receiving MS in Management of Technology from Sloan School]
Future Plans: Marketing, Medtronic's Endovascular Group, Santa Rosa, CA

Masters of Science in Health Sciences and Technology

.....

Abigail Susan Haka

East Lansing, MI
Future Plans: Postdoctoral Fellow, Cornell Medical School, New York

Sripriya Natarajan

Baltimore, MD
Future Plans: Candidate for the MD Degree, Yale School of Medicine, New Haven, CT

Master of Science Biomedical Informatics Program

.....

Fangxue He

Beijing, China
Future Plans: Position as bioinformatics scientist

Daniel Todd Rosenthal

Tampa, FL
[Also receiving a Masters in Public Health from the Harvard School of Public Health]
Future Plans: Residency in Internal Medicine, George Washington University Hospital, Washington DC

Reejis Stephen

Kollam, India
Future Plans: Undecided

Jennifer Yiling Sun

Lexington, MA
Future Plans: Product Manager, PatientKeeper, Brighton, MA

Alexander Turchin

Brookline, MA
Future Plans: Faculty, Division of Endocrinology, BWH

Yunyu Zhang

Changzhou, China
Future Plans: Undecided

Master of Medical Science Clinical Investigator Training Program

.....

Alireza Atri

North Reading, MA
Future Plans: Faculty, Department of Neurology, MGH

Jennifer Ruth Brown

Wantagh, NY
Future Plans: Faculty, Department of Medical Oncology, Dana-Farber Cancer Institute, Boston

Bernard S. Chang

Newton, MA
Future Plans: Assistant Professor of Neurology, HMS

Philip Lawrence De Jager

Brussels, Belgium
Future Plans: Faculty, Department of Neurology, HMS and BWH

Alexandra Degenhart

London, UK
Future Plans: Clinical Fellow, Radcliffe Infirmary, Oxford, UK

Bradford Clark Dickerson

Medford, MA
Future Plans: Faculty, Departments of Neurology at MGH and BWH

Amy Debra Fleischman

Hartsdale, NY
Future Plans: Faculty, Department of Endocrinology, Children's Hospital Boston

Heather Leah Gornik

Evanston, IL
Future Plans: Faculty and Physician, Cardiovascular Department, Cleveland Clinic, Cleveland

Allen Jeremias

Duesseldorf, Germany
Future Plans: Interventional Cardiology Fellow, BIDMC

Jagmeet P. Singh

Newton, MA
Future Plans: Staff, Cardiac Arrhythmia Service, MGH

Jeffrey I. Zwicker

Brookline, MA
Future Plans: Faculty, Division of Hematology-Oncology, BIDMC

Doctor of Dental Medicine

.....

Rachel Leigh Forbes

Jersey City, NJ
Future Plans: Postgraduate training, Tufts University School of Dental Medicine, Boston

Doctor of Medicine

.....

Francis Joseph Alenghat

Homewood, IL
[Also receiving PhD from Harvard University]
Future Plans: Internship and residency in Internal Medicine at BWH

Christina Louise Boulton

Woodland, CA
Future Plans: Internship and residency in Orthopedic Surgery at MGH

Scott Dexter Boyd

Winnipeg, Canada
Future Plans: Internship and residency in Pathology at Stanford University Programs

Martin Damien Burke

Manchester, MD
[Also receiving PhD from Harvard University]
Future Plans: Assistant Professor of Chemistry at University of Illinois-Urbana

Eric Chi-Kin Chang

San Jose, CA
Future Plans: Internship in Surgery at MGH; Residency in Neurosurgery at MGH

Megan Purcell Coffee

Maplewood, NJ
Future Plans: Internship and residency in Internal Medicine at MGH

Christopher William Connor

Retford, UK
[Also receiving PhD in MEMP]
Future Plans: Internship in Internal Medicine at Mt. Auburn Hospital, Cambridge, MA; Residency in Anesthesiology at BWH

Andrew Eugene Hermann Elia

Santa Barbara, CA
[Also receiving PhD from Harvard University]
Future Plans: Internship in Internal Medicine at BWH; Residency in Radiation Oncology at Harvard Radiation Oncology Program, Boston, MA

HST Graduates

Christina Wilbert Fidkowski
Grand Rapids, MI
Future Plans: Internship in Internal Medicine at BIDMC; Residency in Anesthesiology at MGH

Grant Edward Garrigues
San Diego, CA
Future Plans: Internship and residency in Orthopedic Surgery at Duke University Medical Center, Durham, NC

Deborah Sternlight Goddard
Los Angeles, CA
Future Plans: Internship in Pediatrics at MGH; Residency in Dermatology at UC-San Francisco

Heather Elspeth Gunter
Edmonton, Canada
Future Plans: Internship in Internal Medicine at MGH; Residency in Neurology at University of Pennsylvania, Philadelphia

Colleen Marie Hanna-Slagle
Sargent, NE
Future Plans: Internship and residency in Pediatrics at Baylor College of Medicine, Houston

John Matthew Higgins
Boston, MA
Future Plans: Internship and residency in Pathology at BWH

Kevin Sam King
Albuquerque, NM
Future Plans: Internship and residency in Diagnostic Radiology at University of Texas SW Medical School, Dallas

Kumaran Kolaivavelu
Clinton, IL
[Also receiving PhD in MEMP] Future Plans: Internship and residency in Internal Medicine at BWH

Amy Cheng Ting Lee
Toledo, OH
Future Plans: Internship in Internal Medicine at BWH; Residency in Neurology at UC-San Francisco

Larissa Janeen Lee
Derby, KS
Future Plans: Internship in Internal Medicine at MGH; Residency in Radiation Oncology at Harvard Radiation Oncology Program, Boston

Shana Erin McCormack
Cleveland, OH
Future Plans: Internship in Pediatrics at MGH; Residency in Ophthalmology at UC-San Francisco

Robert Edward Mittendorff II
McLean, VA
[Also receiving SM from MIT] Future Plans: Internship and residency in Emergency Medicine at Stanford University Programs, Stanford

Gabriela Motyckova
Opava, Czech Republic
[Also receiving PhD from Harvard University] Future Plans: Internship and residency in Internal Medicine at MGH

Wojciech Henry K. Przylecki
Gaithersburg, MD
Future Plans: Internship and residency in Plastic Surgery at BWH

Eric Garland Sheu
Dunwoody, GA
Future Plans: Internship and residency in General Surgery at BWH

Joshua Marc Shulman
Fort Lauderdale, FL
Future Plans: Internship in Internal Medicine at MGH; Residency in Neurology at Partners/Harvard Combined Program, Boston

Kurt Arnold Smith
Garland, TX
Future Plans: Internship and residency in Emergency Medicine at University Hospital, Cincinnati

Annemarie Stroustrup Smith
Watchung, NJ
Future Plans: Residency in Pediatrics at Mount Sinai Hospital, New York

Hien Thanh Tran
Westminster, CA
[Also receiving PhD from Harvard University] Future Plans: Internship in Internal Medicine at Mt. Auburn Hospital, Cambridge, MA; Residency in Dermatology at NY University School of Medicine, New York

Thanh Nga T. Tran
Las Vegas, NV
[Also receiving PhD in MEMP] Future Plans: Internship in Internal Medicine at BWH; Residency in Dermatology at MGH

Kavid Nik Udomypanyan
Newbury Park, CA
Future Plans: Internship at Santa Clara Valley Medical Center, San Jose, CA; Residency in Emergency Medicine at UC-Los Angeles

Vladimir Vinarsky
San Francisco, CA
Future Plans: Internship and residency in Internal Medicine at NY Presbyterian / Columbia Presbyterian, New York

Nikhil Wagle
Oradell, NJ
Future Plans: Internship and residency in Internal Medicine at BWH

Sarvenaz Zand
Northridge, CA
Future Plans: Internship at Carney Hospital, Boston; Residency in Dermatology at UC-Davis Medical Center, Sacramento

Susan Xiuqing Zhao
Beijing, China
Future Plans: Internship and residency in Internal Medicine at MGH

Hao Zhu
Denver, NC
Future Plans: Internship and residency in Internal Medicine at UC-San Francisco

Doctor of Philosophy Medical Engineering/ Medical Physics Program

.....

Christopher William Connor
Retford, UK
[Also receiving MD from HMS] Future Plans: Internship in Internal Medicine at Mt. Auburn Hospital, Cambridge, MA; Residency in Anesthesiology at BWH

Abigail Susan Haka
East Lansing, MI
Future Plans: Postdoctoral Fellow, Cornell Medical School, New York

Christopher Allan Hartemink
Fort Myers, FL
Future Plans: Research Scientist, Guidant Corp., St. Paul, MN

Thomas Heldt
Neuwied, Germany
Future Plans: Postdoctoral Associate, Laboratory for Electromagnetic and Electronic Systems, MIT

Tony Hong-Tyng Ko
San Jose, CA
Future Plans: Postdoctoral position, Stanford University

Kumaran Kolaivavelu
Clinton, IL
[Also receiving MD from HMS] Future Plans: Internship and residency in Internal Medicine at BWH

Andrew David Levin
Evanston, IL
Future Plans: Candidate for the MD degree at HMS

Michael A. Ohliger
Philadelphia, PA
Future Plans: Candidate for the MD degree at HMS

Patrick L. Purdon
Chula Vista, CA
Future Plans: Undecided

Jonathan Sidney Thierman
Piedmont, CA
Future Plans: Candidate for the MD degree at HMS

HST Graduates

Ricky Tsee-Wai Tong

Hong Kong
Future Plans: Candidate for the MD degree at HMS

Thanh Nga T. Tran

Las Vegas, NV
*[Also receiving MD from HMS]
Future Plans: Internship in Internal Medicine at BWH; Residency in Dermatology at MGH*

Griffin M. Weber

Ithaca, NY
Future Plans: Candidate for the MD degree at HMS

Belinda Yap

Malacca, Malaysia
Future Plans: Postdoctoral Research at HMS

Ernest Nanjung Yeh

Hong Kong
Future Plans: Candidate for the MD degree at HMS

**Doctor of Philosophy
Speech and Hearing
Bioscience and Technology
Program**
.....

Laura C. Dilley

Independence, MO
Future Plans: Postdoctoral Research Associate, Psychology Department, Ohio State University

Raymond Lee Goldsworthy

Lexington, KY
Future Plans: Research and Product Development, Sensimetrics, Somerville, MA

Annika Karin Karlsson Imbrie

Providence, RI
Future Plans: Technical Specialist, Intellectual Property Group at Ropes & Gray LLP, Boston

Michael Kaige Qin

Bloomfield Hills, MI
Future Plans: Research, Naval Submarine Medical Research Laboratory, Groton, CT

Irina S. Sigalovsky

Newton, MA
Future Plans: Pursuing faculty position, Boston

Annette Mercedes Taberner

Miami, FL
Future Plans: Postdoctoral Fellowship at the Broad Institute of MIT and Harvard

**Doctor of Science
Medical Engineering/
Medical Physics Program**
.....

Christopher Edward Carr

Seattle, WA
Future Plans: Postdoctoral position

AWARDS

FOLKERT WINS MIT'S HIGHEST STUDENT AWARD

Radiological Sciences Joint Program student **Michael Folkert** won the Karl Taylor Compton Prize at MIT Awards Convocation in May. The Compton Prizes are given "in recognition of excellent achievements in citizenship and devotion to the welfare of MIT [and] reflect outstanding contributions to the MIT community as a whole, sustained over a significant number of years."

FELLOWSHIPS FROM THE MIT GRADUATE STUDENT OFFICE

HST received no fewer than four of the fellowships given out annually by MIT's Graduate Students Office; both new and renewal fellows are among our group:

Joaquin Blaya (MEMP) won one of the two William Asbjornsen Albert Memorial Fellowships given annually to a graduate student conducting research in any phase of modern science and engineering.

Xiaomin Mou (SHBT) won one of the two Chyn Duog Shiah Memorial Fellowships given annually to a graduate student of Chinese ancestry.

David O'Gorman (SHBT) won a renewal of the Zakhartchenko Fellowship, for graduate students performing research in one of three areas, including "Time as a basic energy of the universe."

Fabio Thiers (SHBT) won a renewal of the Hugh Hampton Young Memorial Fund Fellowship, for a candidate with exceptional personal and character strengths whose research objectives would have a positive impact on humanity.

MIT TEACHING AWARDS

At MIT's Awards Convocation, both faculty and graduate student teachers won Graduate Student Council Teaching Awards. HST affiliated faculty **Valerie J. Pronio-Stelluto, MD**, Instructor in Medicine at HMS and BIDMC, won a faculty teaching award for her tireless and inimitable work as instructor for ICM 201: Introduction to Clinical Medicine. MEMP student **Martin Zalesak** was recognized for his work as TA of HST.583: Functional Magnetic Resonance Imaging: Data Acquisition and Analysis. In a separate award, Professor **Denny Freeman, PhD** of HST and EECS is this year's winner of the Bose Award for Excellence in Teaching, an award established in 1990 to recognize outstanding contributions to undergraduate education by the faculty of MIT's School of Engineering.

HST FACULTY AWARDS

The winners of the 2005 HST faculty awards go to **Robert F. Padera, MD '00, PhD '98**, winner of the Irving M. London Teaching Award; and **Andrew J. Oxenham, PhD**, winner of the Thomas A. McMahon Mentoring Award. About 50 nominations were received for this year's awards, which will be presented at HST's June 6 graduation ceremony.

NEPHROLOGY SUMMER GRANT

M. Minhaj Siddiqui, MD '06 was awarded the American Society of Nephrology Student Scholar Grant for this summer. He will be working with Dr. Gary Curhan at the Channing Laboratory at BWH. Siddiqui will study the impact of drinking different beverages on nephrolithiasis.

Forum 2005

At the Plenary Session of the 18th annual HST Forum held on March 31, Martha L. Gray, PhD welcomed current students, faculty, alumni, newly admitted students, and members of the Advisory Council Committee. She then introduced Dean of HMS Joseph Martin, MD, PhD, who—in turn—introduced Susan Hockfield, PhD, the new president of MIT.

Hockfield expressed her pleasure that her portfolio includes HST, the longest-running continuous collaboration between two leading universities, a model for other institutions.

HST Professor Lee Gehrke, PhD then introduced keynote speaker Stephen Burley, MD, DPhil, Chief Scientific Officer and Senior Vice-President of Research of Structural GenomiX, Inc. Gehrke reviewed Burley's remarkable educational, scientific and industrial career, which led him from the University of

Western Ontario (BSc Physics), as a Rhodes Scholar to Oxford (DPhil), to HST (MD '87), fellowship in chemistry at MIT, medical ("Hemi-Doc") residency at BWH, Professor at the Howard Hughes Medical Institute, Investigator at Rockefeller University, and then—as a world-famous crystallographer—to Structural GenomiX, Inc., a drug discovery company utilizing a genomics-driven, high-throughput, structure-based platform to increase the efficiency and effectiveness of the drug discovery process.

In his talk, "Structure Guided Drug Discovery," Burley reviewed his recent work. He described the integrated SGX target-to-lead platform that combines high-throughput X-ray crystallography with a fragment-based approach to lead identification/optimization.

"The proprietary FAST(tm) (Fragments of Active Structures) process exploits crystal-

lographic screening to detect, visualize, and identify small ligands (MW 150-200) that are bound to the target protein. Each member of the FAST(tm) fragment/scaffold library was chosen to be amenable to rapid chemical elaboration at two or three points of chemical diversity and using high-throughput organic synthesis.

"Initial lead optimization involves using our knowledge of the co-crystal structure of the target-fragment complex and advanced computational chemistry tools to guide synthesis of small focused linear (one dimensional) libraries. These linearly elaborated fragments/scaffolds are then evaluated with *in vitro* biochemical and cellular assays and co-crystallography. Thereafter, optimal variations at each point of chemical diversity are combined to synthesize focused combinatorial (two- or three-dimensional) libraries that are again examined with assays and co-crystallography. (The number of distinct compounds accessible with the fully elaborated FAST(tm) fragment/scaffold library is comparable to the age of the universe in minutes.) These focused combinatorial libraries typically contain multiple novel compounds of low molecular weight (<350) that bind the target protein at low nM IC50 and already display considerable selectivity.

"Thereafter, compound series are prioritized for further medicinal chemistry and compound development efforts using the results of *in vitro* and *in vivo* ADME and *in vitro* toxicology studies in concert with structural information. Successful applications of the FAST(tm) fragment-based lead discovery/optimization process were presented for both protein kinases (Syk and Gleevec-resistant BCR-ABL) and proteases (Factor VIIa)."

HST Director Joseph V. Bonventre, MD, PhD concluded the session.

photos by Ralph Lindenfeld



(top) HMS Dean Joseph Martin, HST Director Martha L. Gray, MIT President Susan Hockfield, and HST Director Joseph V. Bonventre. (left) HST alumnus Stephen Burley was the keynote speaker at this year's Forum. (right) Alexander Turchin, a Biomedical Informatics student, discusses with HST Professor Robert Lees his poster on the a software tool that can identify patients by analyzing physician notes.

The following is a sample of student research presented at the 2005 HST Forum. All HST programs were represented in the 75 posters, reflecting a wide spectrum of research. For a complete list of abstracts of the posters presented, see hst.mit.edu/forum. The poster session was underwritten by a generous grant from the Guidant Foundation.

WALKING VS. RUNNING IN SPACE

MEMP student **Christopher E. Carr**, working with Professor Dava J. Newman, PhD in the MIT Department of Aeronautics and Astronautics, asked the question: "When is running more efficient than walking in a space suit?" Recognizing that the time astronauts can spend exploring a planetary surface is limited—in-part—by the supply of oxygen, he analyzed the energy cost of movement with and without space suits across different gravitational environments, using data from 18 energetics studies of suited and unsuited locomotion. Running in space suits was found to be more efficient at all levels of gravity than walking in space suits. It was proposed that space suit legs may act as springs during walking.

ASSESSING PACLITAXEL IN VARIOUS TYPES OF CLOTS

MEMP student **Andrew D. Levin**, working with Elazer R. Edelman MD, PhD, Professor of Health Sciences and Technology at the Harvard-MIT Biomedical Engineering Center, reported that "Thrombosis Modulates Arterial Drug Distribution from Drug-eluting Stents." The transport and retention of Paclitaxel, a drug used in drug-eluting endovascular stents to reduce restenosis, were assessed in clots of different blood components. It was found that the binding and retention of Paclitaxel increased linearly with the red cell fraction. At physiological hematocrits, clots retained three times the amount of Paclitaxel in surrounding solutions. Clot geometry and position relative to struts and vessel walls also determined the retention and release of the drug by the clot.

FASTER, CHEAPER AND THINNER ENGINEERED TISSUES

Theodore Cosmo Marentis (MD '07), with Dr. Joseph P. Vacanti, John Homans Professor of Surgery at MGH, reported on "Microfabrication Methods for Rapid Prototyping of Soft-Photolithography Molds for Biocompatible/Biodegradable Tissue Engineering Scaffolds."

The aim of this project was to improve the effectiveness and efficiency, and to reduce the cost, of existing techniques of growing living tissues on biocompatible/biodegradable

polymer scaffolds, made of silicon and seeded with cells to produce tissue engineered organs. Marentis succeeded in developing a double molding technique that permits features to be patterned on both sides and significantly thins the scaffolds. The newly established processes reduce fabrication time and costs, while making individual layers thinner, facilitating implantation.

MORE CLUES ON HUNTINGTON'S DISEASE PATHOPHYSIOLOGY

Luise L. M. Pearn (MD '07), working with Professor Anne B. Young in the Department of Neurology at HMS and MGH, reported on "Huntingtin Associates with Glutamate Receptors at the Post-Synaptic Membrane." They used a knock-in mouse model of Huntington's disease to investigate the possible role of a polyglutamine (CAG) expansion in exon 1 of the huntingtin gene in altering the molecular interaction between huntingtin and post-synaptic density proteins (PSD).

The results suggest that huntingtin interacts with glutamate receptor proteins in the post-synaptic density, and also that an expanded polyglutamine repeat in huntingtin alters the association of these receptors with each other and their signal-transduction pathways. It was concluded that these glutamatergic-signaling complexes might be viable targets of therapeutic intervention.

ELECTRICAL STIMULATION MAY BE VITAL FOR NEURAL RESTORATION

MEMP student **Rajiv Saigal**, working with HST Professor Robert Langer, presented "Electrical Stimulation Via a Biocompatible Polymer Augments Production of Neurotrophic Factors by Neural Stem Cells *in vitro*."

Electrical stimulation has been shown to have positive effects on neurite outgrowth of PC12 cells *in vitro* and functional recovery of PNS injury *in vivo*. They tested the effects of surface electric fields on C17.2 neural stem cells at various stages of differentiation, including undifferentiated and 6 days post-mitotic inhibition with mitomycin C. The cells were seeded on thin films of polypyrrole (a synthetic biomaterial developed in the Langer lab), then electroplated onto indium tin oxide covered

glass slides. Multiple stimulation paradigms increased production of several neurotrophic factors relative to controls. In many groups, a low DC current stimulus and a 20Hz pulse stimulus led to the highest neurotrophic factor production of the various stimulation paradigms. The highest improvements were an approximate fourfold increase of neurotrophic factors over controls with the low DC stimulus in undifferentiated and 2 day post-mitotic groups. The results imply that electrical stimulation should be considered as part of future therapeutic interventions with neural stem cells.

FOCUSED ULTRASOUND OPENS BLOOD-BRAIN BARRIER

MEMP student **Lisa Hsu Treat** and Kullervo Hynynen, Professor of Radiology at HMS and BWH, reported on "MRI-Guided Therapeutic Focused Ultrasound (FUS) to Enhance Drug Delivery to the Rat Brain."

The difficulty antitumor agents have to cross the blood-brain barrier (BBB) has limited chemotherapy of brain tumors. Previous studies had shown that FUS applied directly to rabbit brain can open the BBB. Here, in 50 male rats, it was shown that FUS, guided by magnetic resonance imaging, could penetrate the rat skull and open the BBB. In six rats the uptake of doxorubicin increased by an average of 53 percent. These initial results are a promising indicator of the clinical potential for FUS-enhanced drug delivery.

PLANNING SEQUENCE OF ARM MOVEMENTS

SHBT student **Joseph Feingold**, working with Professor Ann M. Graybiel in the Department of Brain and Cognitive Sciences and the McGovern Institute for Brain Research at MIT, trained a macaque monkey to perform sequences of three center-out-center joy stick movements in response to static visual cues. Eye position was recorded. The monkey fixated its eyes on the cues instructing arm movement, tending to anticipate trial-start by fixating the center cue. In addition to fixating on the cue instructing the first movement, it often fixated on the cues instructing the second and third arm movements. This indicates that monkeys may be using their eyes to plan an upcoming arm movement sequence prior to initiating it.

Research News

PATHOPHYSIOLOGY OF APNEA

David W. Carley, PhD '85 is senior author of an overview of his laboratory's work to elucidate the mechanism(s) of sleep apnea. Carley and associates documented in anesthetized and in freely moving rats that the pedunculopontine tegmental nucleus (PPT) and the intertrigeminal region (ITR) play a role in respiration. Neurochemical manipulations of each area affected the brainstem respiratory pattern generator and variability, observed as spontaneous disturbances during sleep or as induced reflex apnea. (M Radulovacki et al., *Respir Physiol Neurobiol* 2004; 143: 293-306.) Carley is Research Associate Professor of Medicine and Bioengineering at the University of Illinois-Chicago.

SIMULATION IN MEDICAL EDUCATION A SUCCESS

Jeffrey B. Cooper, PhD, Associate Professor of Anesthesiology at HMS and MGH and member of the HST affiliated faculty, is senior author of a report of the success of the integrating simulator programs to medical education. These programs are well accepted and in demand at HMS. (JA Gordon et al., *Acad Med* 2004; 79: 23-7.) Another article reviews the history of developing simulators for clinical education and training, co-authored by **Viviany R. Taqueti (MD '07)**. (JB Cooper and VR Taqueti, *Qual Saf Health Care* 2004; 13 Suppl 1: I 11-18.)

SCREENING NEWBORNS FOR SCID

Jennifer M. Puck, MD '75 is senior author of a report of a new population-based screening test for newborns with severe, combined immunodeficiency (SCID). A fatal but treatable genetic disease, SCID infants lack cellular and humoral immunity. This work addressed the lack of a test suitable for population screening. Inasmuch as patients with SCID make few or no T-cells, the authors asked "whether the absence of T-cell receptor excision circles (TRECs), DNA episomes in newly formed T cells, could identify SCID, regardless of gene type." Blood from SCID patients was spotted onto filters and assayed by real-time PCR to quantitate TRECs. Blood from 23 SCID patients had less than 30 TRECs. It was concluded that "TRECs are a stable analyte that can identify T-cell lymphopenia in newborn dried blood spots so that infants with SCID can receive early, life saving treatment." (K Chan and JM Puck, *J Allergy Clin Immunol* 2005; 115: 391-8.)

Puck is Senior Investigator and Chief,

Genetics and Molecular Biology Branch, as well as Head of the Immunologic Genetics Section of the National Human Genome Research Institute, NIH.

IMAGING SENTINEL LYMPH NODES IN CANCER PATIENTS

Metastases to lymph nodes are important prognostic markers. **John V. Frangioni, MD, PhD '94** is co-author of a report of a new technique that permits rapid, noninvasive and accurate mapping of lymph nodes in the lung, applicable to an intra-operative setting. The approach uses an invisible near-infrared (NIR) fluorescence imaging system that displays simultaneously color video and NIR images of the surgical field. It involves the use of 15nm non-radioactive NIR fluorescent quantum dots as optimal lymphotropic probes. This technique permits real-time visualization of draining lymphatic channels and nodes. It was validated in Yorkshire pigs. (EC Soltesz et al., *Ann Thorac Surg* 2005; 79: 269-77.) Frangioni is Assistant Professor of Medicine at HMS and BIDMC.

NEW APPROACH TO DISCOVERY OF ANTICANCER DRUGS

Ilan R. Kirsch, MD '77 is senior author of a report in support of the thesis that it is possible to discover potential anticancer agents based on the association of their activity with a determinant of genomic state rather than with an already identified gene product. Using a panel of well-characterized cancer cell lines, the authors were able to identify specific groups of chemical compounds that are more cytotoxic toward the relatively more karyotypically complex and unstable panel members. (AV Roschke et al., *Proc Natl Acad Sci USA* 2005; 102: 2964-9.)

Kirsch is Chief of the Genetics Branch of the Center for Cancer Research at the National Cancer Institute.

CARE OF MYOCARDIAL INFARCT PATIENTS IN VHA HOSPITALS

HST affiliated professor **Barbara J. McNeil, MD, PhD**, the Ridley Watts Professor and Head of the Department of Health Care Policy at HMS and BWH, is senior author of a study comparing the care of Medicare patients and veterans in the Veterans Health Administration (VHA) Medical Centers following acute myocardial infarction (AMI). The database comprised 13,129 elderly male veterans hospitalized between 1996 and 1999,

and a matched set of Medicare beneficiaries treated in a non-VHA facility. VHA patients were less likely to undergo coronary angiography or revascularization in the 30 days following their AMI and had significantly higher mortality at one year. Between 1997 and 1999, the proportion of patients admitted to high-volume facilities increased and mortality decreased. Further investigations of those differences and strategies to eliminate them are in order. (MB Landrum et al., *Health Serv Res* 2004; 39: 1773-92.)

NASAL CARTILAGE REPLACEMENT

Robert L. Sah, PhD '90, MD '91 is co-author of the first report of tissue-engineered human nasal septal cartilage without the use of biodegradable scaffolds. Using the alginate-recovered-chondrocyte (ARC) culture method, nasal septal chondrocytes from five patients were isolated by enzymatic digestion and then expanded in monolayer culture. The ARC constructs had substantial structural stability and the gross and histological appearance of cartilaginous tissue. The composition of the matrix was similar to that of native human cartilage. (SH Chia et al., *Laryngoscope* 2004; 114: 38-45.)

Sah is the Charles Lee Powell Associate Professor of Bioengineering at University of California-San Diego.

THE INTESTINE AND ENERGY BALANCE

Jeffrey S. Flier, MD, HST affiliated faculty and the George C. Reisman Professor of Medicine at HMS and BIDMC, co-authored a comprehensive and well-illustrated review of the role of the intestine and associated visceral organs in the physiology of energy, and homeostasis, including both neural and endocrine pathways. Recent discoveries as well as novel routes for control of obesity are discussed. (MK Badman and JS Flier, *Science* 2005; 307: 1909-1914.)

AMINO ACID GAIN AND LOSS IN EVOLUTION OF PROTEINS

Shamil R. Sunyaev, PhD, Assistant Professor of Health Sciences and Technology, and Assistant Professor of Medicine at HMS and BWH, is senior author of a major contribution on the evolution of proteins (IK Jordan et al., *Nature* 2005; 433: 633-8).

The authors write, "We compared sets of orthologous proteins encoded by triplets of closely related genomes from 15 taxa rep-

representing all three domains of life (Bacteria, Archaea and Eukaryota), and used phylogenies to polarize amino acid substitutions. Cys, Met, His, Ser and Phe accrue in at least 14 taxa, whereas Pro, Ala, Glu are consistently lost. The same nine amino acids are currently accrued or lost in human proteins as shown by analysis of non-synonymous single-nucleotide polymorphisms. All amino acids with declining frequencies are thought to be among the first incorporated into the genetic code; conversely, all amino acids with increasing frequencies, except Ser, were probably recruited late. Thus, expansion of initially under-represented amino acids, which began over 3,400 million years ago, apparently continues to this day.”

MALARIA INFECTED RED BLOOD CELLS CHANGE THEIR SHAPE

HST affiliated faculty **Subra Suresh, PhD**, the Ford Professor of Engineering and Head of the Department of Materials Science and Engineering at MIT, is co-author of a study of the deformability of red blood cells infected with *Plasmodium falciparum*, by means of optical tweezers. The deformability of these cells was found to be reduced progressively in response to the development of the parasite inside the cell. (J Li et al., *Biophys J* 2005; 88:3707-19.)

MYOCARDIUM ENGINEERED

Gordana Vunjak-Novakovic, PhD, Principal Research Scientist in Health Sciences and Technology at MIT, is senior author of “Functional assembly of engineered myocardium by electrical stimulation of cardiac myocytes cultured on scaffold.”

The authors hypothesized that excitation-contraction coupling, which is critical for the development and function of a normal heart, determines the development and function of engineered myocardium. Electrical signals were applied to constructs of precultured neonatal rat ventricular myocytes to induce synchronous contractions. Over eight days, this electrical stimulation induced alignment and coupling of cells, and increased the amplitude of synchronous contractions of constructs seven-fold, as well as induced a remarkable level of ultrastructural organization. These studies justify the expectation that eventually cell-based cardiac grafts may be surgically attached to malfunctioning myocardium. (M Radisic et al., *Proc. Natl Acad Sci USA* 2004; 101:18129-134.)

Frederick J. Schoen, MD, PhD, Profes-

sor of Health Sciences and Technology; **Robert S. Langer, Jr., ScD**, Professor of Health Sciences and Technology; and **Lisa E. Freed, MD '88, PhD '88**, Principal Research Scientist at HST, are co-authors.

EFALIZUMAB THERAPY OF CHRONIC PSORIASIS

Patricia A. Walicke, MD '80 is co-author of a randomized phase III, double-blind trial of efalizumab therapy of chronic plaque psoriasis. Four hundred and ninety-eight patients received 1 or 2 mg/kg/week subcutaneously or placebo for 12 weeks. Patients who achieved less than 75 percent improvement (PASI-75) were re-randomized to a second 12-week course. At the 12th week, 39 percent and 27 percent of efalizumab-treated patients (1 and 2 mg/kg, respectively) achieved PASI-75, versus 2 percent placebo ($p < .001$ both dose groups). At week 24, an additional 20 percent of efalizumab-treated patients achieved PASI-75, versus seven percent placebo ($P = .018$). Efalizumab was well tolerated. (CL Leonardi et al., *J Am Dermatol* 2005; 52: 425-33.) Walicke is Vice President of Clinical Development at Rinat Neuroscience.

NEW METHOD OF MONITORING RESPIRATION

George R. Wodicka, PhD '89 is senior author of “Detection of respiratory sounds at the external ear.” He and his colleagues first showed that sound could be transmitted faithfully from the oropharynx into an earplug inserted into the external ear in 19 subjects. A second study in 20 subjects demonstrated that respirations over a range of flow rates could be recorded at the external ear. The method is proposed as a way to “monitor breathing in a relatively non-invasive and unobtrusive manner.” (GA Pressler et al., *IEEE Trans Biomed Eng* 2004; 51: 2089-96.)

Wodicka is Professor of Biomedical Engineering and Head of the Department of Biomedical Engineering at Purdue University in West Lafayette, IN.

INFLUENCE OF TENSION ON LUNG DEVELOPMENT

Donald E. Ingber, MD, PhD, HST affiliated faculty and the Judah Folkman Professor of Vascular Biology at HMS and Children's Hospital Boston, is senior author of a study of the effects of altering tension upon the pulmonary cytoskeleton. The tension in developing mouse lungs was altered by means

of inhibiting the action of Rho-associated kinase (ROCK), myosin light chain kinase, myosin ATPase and microfilament integrity, or by stimulating Rho by means of cytotoxic necrotizing factor -1. Increasing cell tension by means of activation of Rho accelerated lung branching and increased the elongation of capillaries. The authors write, “These data suggest that change in cytoskeletal tension mediated by Rho signaling through ROCK may play an important role in the establishment of the spatial differential in cell growth and extracellular matrix remodeling that drive embryonic lung development.” This work has the potential to lead to therapy of impaired development of the lungs seen in many premature infants. (KA Moore et al., *Dev Dyn* 2005; 232: 268-81.)

SPECT IN SCREENING OF DIABETICS FOR CAD

Under the title “Identifying high risk asymptomatic diabetic patients who are candidates for screening, stress single-photon emission computed tomography imaging (SPECT)”, **Raymond J. Gibbons, MD '76**, as senior author, reports that high-risk findings on stress SPECT imaging were present in 18 percent of asymptomatic diabetic patients without known coronary artery disease (CAD). High-risk scans were associated with more severe CAD. (N Rajagopalan et al., *J Am Coll Cardiol* 2005; 45: 43-9.) Gibbons is the Arthur M. and Gladys D. Gary Professor of Medicine at the Mayo Clinic.

ROLE OF PATCHY VENTILATION IN ASTHMA

Jose G. Venegas PhD '83 and associates used positron emission tomography to analyze the nature of functional changes during acute asthma attacks provoked in mild- and moderate-asthmatic patients by inhalation of methacholine aerosol. They demonstrated that bronchoconstriction leads to patchiness in lung ventilation comprising units of poorly ventilated lung. Modeling of an asthmatic lung also demonstrated heterogeneity in bronchoconstriction. They proposed that such clustered bronchoconstriction could explain cases of ineffectiveness of inhaled bronchodilator drugs for asthma, which tend to be delivered to the healthier parts of the lungs, while systemically administered drugs may be effective. (JG Venegas et al., *Nature* 2005; 434: 777-782.) Venegas is Associate Professor of Anesthesia at MGH and HMS.

Alumnus Profile

THE Translator-Tugboat Pediatrician

Kevin Powell, PhD, '89, MD (Tufts) has been juggling ethics, economics, religion, engineering, and medicine throughout his training and 15-year career.

Apt is Powell's own description of himself as a "translator": translating among the languages, as namely the "styles of thought" of these diverse fields. Not surprising, among his publications is even a co-authored book on language (*Excellent Words: Inclusive Language in Liturgy and Scripture*) written while part of the Lutheran Episcopal Ministry at MIT. Powell thinks back to his HST days as the start of his career in translation in which he learned to bridge engineering and medicine.

Recalling his HST days, Powell took metaphorical note that the MIT chapel is surrounded by a moat. Throughout his college and graduate careers, he crossed this and many other disciplinary channels. In college, Powell majored in systems engineering, took many courses on religion, and joined the Lutheran church; he also recalls an influential course on the law and legal briefs. During his HST years, he was a regular at noon seminars at the Sloan School of Management, audited courses on health economics and comparative health systems, and participated in the vital intellectual Christian life through University Lutheran in Harvard Square.

If Powell began his translation work between engineering and medicine, it is the mediation between ethics and medicine that has driven his career. Medical ethics for Powell far exceeds the clinical ethics that first come to mind. While not uninterested in classical debates on abortion or the termination of life, Powell's reach is much larger: the ethics of the

prevailing culture and economy of American medicine, namely high-tech individualized medicine. He charges engineers and medical professionals like himself with the responsibility for *constantly* thinking about the costs and implications of this sort of medicine and technology. At a recent conference on brain science at MIT, one of the speakers noted that science is obsessed with finding knowledge. Powell agreed, but responded that religion is obsessed with finding wisdom and that both are important. He reminded, "I'm an engineer," and notes that while scientists can seek any possible solution, engineers must seek cost-effective solutions. He described a "systems engineering approach" to problems: one at home in the "analytic process" and able to make sense of things with many variables, such as high-tech medicine.

Powell has committed his career to fostering a living conversation among medical and technological practitioners about the ethics of this status quo, a commitment he took on at Carle Hospital in Urbana, Ill., as the chair of the hospital ethics committee where he worked hard to ensure that the voices of the diverse professionals at the table were all valued, including nurses, philosophers, social workers, and home care workers. Powell also served as a Clinical Assistant Professor of Pediatrics at the University of Illinois College of Medicine, where he was twice garnered by the Family Practice residents with the Outstanding Teacher Award.

Ethics is not a side-bar for Powell, but the core of his career as a practicing pediatrician. He recently resigned his position at Carle Hospital and the University of Illinois College



courtesy of Kevin Powell

of Medicine in order to take what he thinks of as a "sabbatical" as he tries to configure a future in which he can serve more fully as an educator of ethics-in-practice. Ethics for Powell is not a theoretical venture, and it is never about drawing clear ethical lines; he stresses that "normative ethics" is not his purview. His passion: the day to day, the multitude of decisions, the murky waters in which professionals must necessarily practice ethics.

Powell puts his finger on business as usual in American medicine and technology this way: the moon-shoot—the most expensive, highest-tech solution to any single problem. How to fight this? Powell describes himself as the tugboat that pulls alongside

Alumnus Profile

the technology steamliner, pushing for “small changes in direction that compound over time.” Powell is a wonderful story teller with a store of images—like the tugboat and the steamliner—that have helped him to bridge worlds, and to make his points simply to the likes of the uninitiated (like this interviewer). The challenge that Powell poses to all medical professionals is: “Who benefits? Who pays?” and “What kind of medicine do *you* want to practice?”. And he reminds that one-half of personal bankruptcies in the US are the result of medical costs. Powell envisions a career in which he is an instigator: being on-site and able in his own work to teach and encourage professionals to ask these big questions; again, he is that systems engineer who goes for the “big picture.” While he asks high-tech folks to think about when and where to put the brakes on, when he “translates” for religious communities he guides them to trust scientific advances, to slay their myths of Frankenstein. Scientists, Powell charges, need to “bring their education to the pews,” but instead most church-going scientists keep these realms of their lives separate.

The big picture and justice politics aside, Powell appreciates that it is no easy matter to retreat from the high tech. He recalls a single day at HST that brought this home: in the morning he went to his respiratory pathophysiology class, at noon to a lecture on health economics, to the lab for his research in the afternoon, and to the hospital in the evening. On that particular evening a little boy on a tricycle ran into him—the same little boy he had heard about in the pathophysiology class in the morning, a boy who stopped breathing during sleep, a boy who was kept alive at great cost (and who died at age 3 never having left the hospital). I was baffled by the story—not

quite sure what Powell wanted me to do with this information. He explained that he wanted to show me that “humanizing makes it harder,” and to remind that ethics can only be engaged in the field.

Every aspect of Powell’s medical career to date reflects these larger commitments. Why general pediatrics? Why *not* internal medicine? Why employment in a regional city (circa 100,000)? Carle Clinic offered Powell a hospital small enough that he could deliver a broad range of care but large enough that the hospital could handle the “interesting cases” in-house. At Carle Hospital, Powell opted for a 40 percent hospitalist position in which he could serve the sicker children he has been well-trained to handle. As he looks to the future, he imagines a profile with more or exclusively hospitalist work. Finally, the practice of pediatrics offers Powell the short-term rewards that sustain him as he fights the much larger ethics battle in the local and national arena.

In talking with Powell, it was clear that his “community” is a national one: a network of people committed to pondering the interface of ethics, technology, and medicine. He is very active in the Law and Bioethics Affinity Group of the American Society for Bioethics and Humanities, and is a member of the national steering committee of the Evangelical Lutheran Church in America Alliance for Faith, Science, and Technology (he chaired that committee from 2000-2003). Powell described an active life in on-line discussion formats, as well as attendance at many national gatherings.

Powell’s memories of HST—well, not without criticism. MIT had loomed large as a destination from Powell; he had been accepted there as an undergrad but couldn’t afford to

attend. (He received his undergraduate training at Michigan State University.) Although Powell asserts that HST certainly helped to make him the translator he has become, he wishes that HST could have more fully supported those with interests that span health and technology, as well as justice and ethics. He took note of the irony; it is often at the “cutting edge” of the likes of Harvard and MIT that interdisciplinarity is harder to achieve.

As for his free time, Powell is an avid fan of small theatre, but of a serious variety. “No farces, no musicals,” he stressed. His favorite playwright is George Bernard Shaw. As for films, only independent ones!

As for his self-designated “sabbatical,” Powell mused about how little vacation he has taken, about the enormous value of time for reflection. Certainly, wherever he lands, we can be sure that Powell will hold fast to his commitments, rev up the tugboat, and that he will keep translating. Powell’s guiding principle is clear: a future in which he can effectively mentor on ethics and technology in the field. He left his job not because of anything monumental, but simply because the configuration had not allowed this conversation to come fully enough to the center of his work. He envisions himself in one of America’s smaller cities and closer to his aging parents in Nebraska. “Home” brings Powell to issues at the heart of American medicine, where his aging mother cares for his ailing father at home.

To meet him, Powell is mild mannered and self-effacing. His career and mission? Nothing short of monumental.

*Nancy Abelman
Department of Anthropology
University of Illinois–Urbana*

Like a tugboat alongside the steamliner of technology, Powell pushes for small changes in direction that compound over time.

Alumni News

1970s

HST director **Joseph V. Bonventre, MD '76, PhD** and his postdoctoral research fellow, Vishal S. Vaidya, PhD, received the Outstanding Presentation in Risk Assessment Award at the 44th annual meeting of the Society of Toxicology held in New Orleans in March.

Brian Jaski, MD '79 writes, "It was a pleasure to return to Boston over 25 years after graduating from HST. My official reason was to compete in the 109th running of the Boston Marathon, an event I watched from Beacon Street on several occasions during medical school. Since then, after completing my fellowship at the Brigham and Women's Hospital in 1985, I have been medical director of the Advanced Heart Failure and Cardiac Transplant Program at the San Diego Cardiac Center, Sharp Memorial Hospital. My wife, Cindy, an endocrinologist at UC-San Diego,

courtesy of Brian Jaski



Brian Jaski met his daughter, Katherine, and wife (not pictured) for a walk break at Mile 17 of the Boston Marathon.

and our 14-year-old daughter, KC, cheered me on. Having started marathon running last year to coincide with my 50th birthday, I was satisfied with my finishing time of 4:35.

"Before and after the race, I also participated as a research subject in a study organized by MGH cardiologist Dr. Melissa Wood, looking at tissue Doppler strain and strain rate in the right and left ventricles and comparing changes previously observed with the newer cardiac markers BMP and troponin. I felt a bit wobbly after standing following the immediate post-race echo.

"Before returning to San Diego the following day, I was fortunate to be able to visit with both Dr. Abelmann and Dr. London at E25 on the MIT campus. The HST program has come a long way since 1979! With sore muscles, but warm memories, I reflected on a special weekend in Boston."

1980s

David C. Page, MD '84 was elected to membership in the National Academy of Sciences. He is Professor of Biology at MIT and Interim Director of the Whitehead Institute for Biomedical Research.

Martha L. Gray, PhD '86, HST Director and the Edward Hood Taplin Professor of Medical and Electrical Engineering at MIT, has been appointed Chair of the College of Fellows, the American Institute for Medical and Biological Engineering.

Barry Sleckman, MD '89 was elected to membership last year in the prestigious American Society for Clinical Investigation. He is Associate Professor of Pathology and Immunology at Washington University in St. Louis. His laboratory is primarily interested in elucidating the molecular basis of T lymphocyte development and lineage commitment.

1990s

Tufts New England Medical Center announced the development of a neuroscience institute and the recruitment of three neurosurgeons now at BIDMC. These include **Adel M. Malek, MD, PhD '94**, now Assistant Professor of Surgery at HMS and BIDMC. Malek's clinical interests include endovascular

and cerebrovascular neurosurgery, and carotid and vertebral stent angioplasty. The move is planned for July 1.

2000s

Ruilin Zhao, PhD '02 writes, "After graduating from the MEMP program, I started working for Johnson & Johnson's drug delivery franchise. After a year I felt the need to pursue yet another graduate degree in the business world, so I entered the MBA program of the Wharton Business School at the University of Pennsylvania in 2003. This past January, along with a group of 17 other Wharton MBA students, I completed a week-long leadership venture to Antarctica. Organized by Wharton administrators, the trip focused on building leadership skills outside of the "boardroom."

"Our long journey started in the small town of Punta Arenas, Chile, with giant backpacks filled with sleeping bags, mattresses, trekking tools, an abundance of candy bars and ramen noodles. After a two-day weather delay, we boarded a small plane headed for the southern-most tip of the globe. The cloudy weather made for a very difficult landing, and when we finally did touch ground on the Chilean base, we all breathed a sigh of relief.

"Excited to finally arrive in Antarctica, the team started the hiking venture. The student group was divided into groups of three, with each group leading at least one day's activities. Our five days were filled with camping, hiking, climbing and taking pictures with seals and penguins. For me the most exciting activity was climbing several snow mountains. Not only did I overcome my fear of heights, but also I learned that the leadership skills I've developed inside the classroom could extend outside as well, even to one of the most remote locations in the world!

{ REMINDER }

It has been gratifying to our admissions committees that HST is drawing applicants from a wide geographic range. Yet, we still find many generally well-informed colleagues who have never heard of HST.

There are still many HST alumni/ae—and even members of the HST faculty—who fail to refer to HST in their publications, websites and CVs. Therefore, we strongly encourage you to remember to mention HST in print and online. With this small step, you can help make HST even better. Many thanks!

Martha and Joe

"Prior to the trip, I still had not made my decision about the next steps after graduation in May. The choice of working for a large company versus a startup company weighed heavily on my mind. Although I had overcome significant obstacles in the past, from growing up on a remote farm in China to working in a coal mine, I learned that hard work is the only way to possibly achieve my goals.

"My trip to Antarctica further cemented my resolve to build a successful business career. Whether scaling ice walls or taking on a startup business venture, I realized that I thrive on taking risks. Perhaps I needed this journey to test my own resolve to follow through with my goals. At the end of the trip, I finally felt confident enough to seize the opportunity to join a medical device startup company based in Shanghai. Although I won't be scaling any ice walls, I will be based in San Francisco for business development and strategic planning!"



courtesy of Ruilin Zhao

Ruilin Zhao takes a break from hiking and climbing to pose in front of a lone male elephant seal, which is napping in the Antarctic summer sun.

Where are they?

We don't have contact information for the following alumni/ae. If you know their whereabouts, email the HST Alumni Office at hst@mit.edu.

Jeffrey S. Dunham, MD, PhD	1983
Peter M. Li, MD	1993
Xin Yu, ScD	1996
Erin B. Hutchinson, PhD	1997
Dimitros P. Kontoyiannis, MD, DSc	1997
Li Zhang, PhD	1998
Anh Tuan Nguyen-Huynh, MD	1999
Paul Steven Dimitri, PhD	2001
Stephanie Anne Nonas, MD	2000
Maria Judith Peterschmitt, MD	2000
S. Aubrey Stoch, MBChB	2000
Sotirios Tsiodras, MD	2001
Christopher R. Wright, MD	2001
Qinwei James Yin, MD, PhD	2001
Xun Clare Zhou, MD	2001

Anniversary

(continued from p. 1)

invited to participate in a Saturday night gala celebration at the Sheraton Hotel, complete with dinner and dancing. For more information or to register for this very special weekend, go to the 35th anniversary website at hst.mit.edu/35/. 6.5 CME credits will be available.

\$50K Competition

(continued from p. 1)

uses micro-electro-mechanical-systems (MEMS) accelerometers and gyroscopes in combination with mathematical algorithms to accurately estimate a person's body tilt. This tilt information is then presented to the person by small vibrating elements strategically placed around the waist.

The other two members of the Balico team are Harry Lee, a PhD student in the Department of Electrical Engineering and Computer Science at MIT, and Jimmy Robertsson, a research engineer at Massachusetts Eye and Ear Infirmary who holds an MS in Mechatronics Engineering from the Royal Institute of Technology.

Gilchrest

(continued from p. 1)

pleted two years of clinical training in internal medicine and three years of dermatology residency in the Harvard-affiliated hospitals, followed by a laboratory-based research fellowship at MIT.

In 1977 Gilchrest joined the Department of Dermatology and Division on Aging at HMS, where she established a tissue culture laboratory to study aging and photoaging in human skin. In 1983 she joined the USDA Human Nutrition Research Center on Aging at Tufts University to continue and expand her work. Two years later Gilchrest was appointed Professor and Chairman of Dermatology at the Boston University School of Medicine and Dermatologist-in-Chief at the Boston Medical Center, where her clinical practice focuses on laser therapy and prevention of skin cancers. Her laboratory-based research currently involves telomere-initiated DNA damage responses, implicated in cancer prevention and treatment, and she has founded a company to commercialize the resulting intellectual property.

Gilchrest is the author of over 400 publications. She is past president of three national dermatologic organizations and in 1998 was elected to the Institute of Medicine of the National Academy of Sciences.



The Harvard-MIT Division of
Health Sciences and Technology
77 Massachusetts Ave., E25-519
Cambridge, MA 02139 USA

Non-Profit
Organization
US Postage
PAID
Cambridge, MA
Permit No. 54016

Neither sleet nor spring rain can dampen HST community spirit

In spite of inclement weather, about 30 hardy souls participated in the annual HST Community Service Day events on Saturday, April 23. This year students, faculty and staff could choose to serve among three different sites in the medical school area: Jim Rice Field in Roxbury (clean-up), the Greater Boston Food Bank (food sorting for shelters), and Rosie's Place (luncheon service for homeless women). In advance of the event, attractive t-shirts emblazoned with the HST logo were sold to raise money for charity, generating \$400.

The day began with a yummy breakfast together, then the group split up and went to their respective assignments. When work ended, the group reconvened in the Cooper Community Center to enjoy lunch. As in the past, the park and shelter managers were impressed with the dedication and speed of the HST volunteers!

For more photos of this year's Community Service Day, go to web.mit.edu/lkbarr/public/hst%20service%20day/. Many thanks to all who participated, especially HST Service Representatives Lucia Madariaga and Rajiv Saiga.

— *Patricia A. Cunningham*



photo by Lauren Barr

Representatives of the HST MD, PhD and MS student communities—as well as faculty—participated in the HST Community Service Day.

Symposium on Therapeutic Ultrasound

October 27~29, 2005

HMS Conference Center

The Fifth International Symposium on Therapeutic Ultrasound is chaired by HST affiliated faculty Kullervo Hynynen, PhD, Professor of Radiology at HMS and Director of the Focused Ultrasound Laboratory at BWH. The organizing committee includes HST Senior Administrator H. Frederick Bowman, PhD and Shunmugavelu Sokka, PhD '04 of the Focused Ultrasound Laboratory at BWH.

The symposium is co-sponsored by Harvard, MIT, HST and Boston University. For more information, visit www.ist2005.org or e-mail info@ist2005.org.