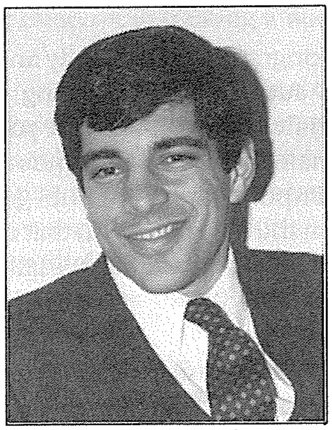
HST in perspective

A newsletter of the Harvard-MIT Division of Health Sciences and Technology

Spring/Summer 1991

Dr. Elazer Edelman Appointed Assistant Professor of HST


Elazer Edelman, M.D., Ph.D.

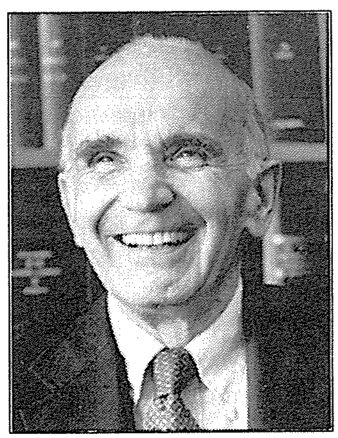
HST is pleased to welcome, Elazer Edelman, as Assistant Professor of HST. Dr. Edelman received the M.D. (HST), cum laude, in 1983, and the Ph.D. (HST/MEMP) in 1984. Dr. Edelman received three predoctoral degrees from MIT: the S.M. in 1979, in Electrical Engineering and Computer Science, and the S.B. in 1978, in Bioelectrical Engineering and in Life Sciences: Applied Biology.

Dr. Edelman is an Assistant Professor in the Department of Medicine, Brigham and Women's Hospital, Harvard Medical School. He is also an Associate Engineer in the Department of Biomedical Engineering at the Massachusetts General Hospital. Dr. Edelman has given a number of invited lectures and is a highly respected instructor, teaching courses at Harvard Medical School and in HST since 1989. This year Dr. Edelman, along with others, will be teaching the HST-090 Cardiovascular Pathophysiology course.

In addition to teaching, Dr. Edelman is very active with clinical biomedical research. He is the recipient of a number of grants, including a five-year Physician Scientist Award from the National Institutes of Health. Dr. Edelman is the author or co-author of thirty-two publications, at last count.

His research interests include:

—Image analysis of coronary atherosclerosis where experiments involve further development of the image enhancement and segmentation algorithms, image collection, data analysis and correlation with angiographic findings in living patients.
—Growth factor stabilization, examining natural storage, binding, stabilization and release of polypeptide growth factors in hopes of understanding growth factor biology, and how different diseases are affected by these growth mediators.
—Cardiac intensive care unit patient monitoring, investigating means of classifying and identifying unstable patients by correlating biochemical markers of disease with invasive and non-invasive hemodynamic and electrical measurements.
—Investigation of how polymer based controlled drug delivery can be used to obtain sustained and modulatable drug delivery; focussing on the design and development of such systems, mathematical modelling of transport from these systems and the in vivo use of these devices in understanding their impact and potential use in a variety of disease states. This research is also tied into his research in vascular response to injury by using polymer based drug delivery systems, image analysis, molecular and cell biology, and histo- and immunocytochemistry to more fully appreciate the role of locally expressed growth mediators in the pathobiology of the blood vessel wall.


Irving M. London, M.D.

Dr. London Gives Commencement Address to the HST Class of 1991

For those who missed Dr. Irving London's speech given at the HST '91 Commencement Luncheon, it is published here and we invite you to share it with us.

Thanks very much Walter [Abelmann]. Your account of our early history brings back poignant memories, on the whole, very happy ones. I am also very happy to see among you many of the faculty and staff who have been with HST from the very beginning, and who have had crucial roles in its development. I find it striking that

(Dr. London's speech continues on the following page)

I. M. London speech, continued...

there has been an impressive constancy in the HST faculty and staff. You have been loyal to HST because you believe in the rightness and values of this academic enterprise.

So, this is a happy day. It's a day of congratulations, first of all to the graduates, whose remarkable accomplishments you will learn more about shortly. To them I will say that they are now part of an HST tradition of excellence. In the twenty years since our first HST class entered, HST graduates and students have made very many important discoveries and advances in the biomedical sciences. Needless to say, these successes are deeply gratifying to HST faculty and staff who have helped in the development of these productive scholars.

This is also a day of congratulations to parents, spouses, and children. As parents you have often endured significant financial sacrifices and you have nurtured these young men and women to this moment which should be a time of great joy for you. Spouses have also often had to endure financial sacrifice, but even worse is the common problem of having so little time with the husband or wife immersed in the study of medicine. And of course the children also suffer from lack of adequate time with the mom or dad who is a medical student.

Let me tell you a "spouse story" that may be relevant. I can't vouch for its absolute truth but the story is told about a Nobel laureate, who was rather proud of his achievements. He and his wife were traveling in northern California in the back country and were running out of gas. Finally, they saw a rather dilapidated gas station and pulled in. A seedy looking man, unkempt and sloppily dressed, proceeded to pump the gas as requested. The wife of the scientist looked intently at this man and then got out of the car and went up to him. They exchanged a word or two and then clasped each other in a passionate embrace. The husband sitting in the car was quite nonplussed. His wife got back into the car and they drove off. After some moments of silence, he said, "Will you tell me what that's all about?" She answered, "Yes, he was my childhood sweetheart; we were in high school together and I was really deeply in love with him." More silence. Then he said, "Well, aren't you glad you married me?" She replied, "If I had married him he would have won the Nobel Prize."

So anytime that you find. . . .well, I think the moral is clear enough.

Realistically, with regard to the demands in this profession, this problem of time for spouse and children is just a foretaste of the future. If I have any advice at all to offer the graduates, it is to get your priorities straight and make sure that you do not neglect your wives or husbands and your children.

This is also a time to congratulate the faculty and the staff because you have succeeded in creating a climate in which learning can flourish. I think that you know that we are very fortunate in having outstanding students. What is often most important is that we not get in their way, that we give them the freedom to do that of which they are capable and sometimes to offer a little help and to be supportive.

We call it commencement because indeed it is a beginning of a life of perpetual study, of seeking to keep pace with the rapid and sometimes revolutionary changes in the biomedical sciences and their applications to medical practice. The other week Roger Mark and Walter Abelmann ran a retreat for the HST faculty and students. One student asked the reasonable question: "What is the mission of HST?" This question is a little bit like saying "tell me all about your religion while standing on one foot." The response that I offered, which I would like to offer today, is that our mission is to help to produce thinking physicians. By that we mean, people who seek to understand deeply and completely, who are curious, who are prepared to challenge conventional wisdom, who are not satisfied with dogma, who have a healthy skepticism —are skeptical but not cynical, who continue to learn and grow intellectually throughout their professional lives, and who put science to work in the practice of medicine with compassion and sensitivity.

It's a wonderful time to be in medicine. We are experiencing a revolution in biology. There are remarkable advances in human genetics and molecular biology. For example, within the past few years the basis for diseases long obscure has been discovered in terms of genetic mutations, in Duchenne's and Becker's Muscular Dystrophy, in Cystic Fibrosis, in the mental illness associated with the Fragile-X Syndrome, and in the role of tumor suppressor genes and their mutation or deficiency in human cancers. Important progress has been made in understanding the development of atherosclerosis and coronary artery disease. As for AIDS, I think it is fair to say that since its discovery a decade ago, more has been learned about this disease than about any other disease, in so short a time. New pharmacologic agents such as erythropoietin, the interferons, growth factors and monoclonal antibodies are being developed with the aid of molecular biology, genetics and immunology. And we have entered the era in which human gene therapy will be effective in treating a wide range of human diseases.

The contributions of Medical Engineering and Medical Physics are reflected in the extraordinary technologic progress that has occurred with magnetic resonance imaging, cat scanning, positron emission tomography, the development of prosthetic devices such as artificial joints, and the remarkable advances in surgery and anesthesiology.

Although the advances have been extraordinary, we, and the American people generally, are very discontented with the system of health care in the United States, a system that is seriously flawed and deficient, despite the fact that our nation in 1990 spent 650 billion dollars on health care, which is 12% of the gross national product and translates into twenty-six hundred dollars for every man, woman, and child, in the country. There are thirty-seven million people who are uninsured, and as a result have limited or no access to health care. We have an unacceptable high infant mortality rate which is characteristic of third-world countries. The threat of financial catastrophe resulting from extended illness faces the elderly. There is an increasingly intolerable burden of paper work for physicians dealing with myriad health care insurance plans, plans that often seem designed to frustrate not only the patients, but the physicians themselves. There are continually rising health care expenditures that threaten the solvency of Medicare and pose a serious financial threat to workers' benefits and pensions. These problems are our problems.

I believe that as socially responsible physicians, imbued with the idealism that attracted you to medicine, you will approach these problems with thoughtful and critical analysis. Such analysis will most likely indicate the urgent need for research of high quality on the effectiveness of medical procedures and their outcomes. And the results of such research could serve to correct, for example, the excessive performance of coronary bypass surgery, or the intemperate use of costly antibiotics, or the excessive use of expensive imaging techniques driven by financial incentives rather than medical need. Your idealism will also prompt you to be advocates of high-quality health care for all our people, for universal health insurance, for an equitable distribution of services, for emphasis on healthful lifestyles and the prevention of disease. In brief, to be leaders in fostering a national will to achieve these objectives.

So, as you go forth, you have our very best wishes for happiness, good fortune and success in your professional and personal lives. I hope you will keep in touch with us because we are eager to learn of your progress. Don't hesitate to call or write to us. Sometimes there are questions that we can answer or suggestions that we can make that will be helpful. The best of good luck to all of you. It's been a privilege to talk to you.

Parents Day, 1991

On Saturday, March 9, 1991, approximately 150 parents and siblings of first and second year students at Harvard Medical School, Harvard-MIT Division of Health Science and Technology, and Harvard School of Dental Medicine attended a day-long event sponsored by the HMS Office of Student Affairs and the Academic Societies. Several people were on hand Saturday morning to welcome the students' families and introduce them to some of the Medical School's programs. Mr. Allan Goldstein, HST '93, gave a special presentation on the HST Division.

After a buffet luncheon at Vanderbilt Hall (complete with entertainment provided by members of the HMS Second Year Show), parents et.al. returned to the individual Society office areas to meet the Masters. Drs. Abelmann and Mark briefly addressed their group, then guided the parents to the classroom/study areas, where computer tutorial demonstrations were given. Several parents expressed great appreciation and delight of the event; they enjoyed getting to know their children's professors and academic administrators.

Congratulations HST Class of 1991

The Seventeenth HST Graduating Class numbered twenty-two. Eighteen students received M.D. degrees, of whom seven also received Ph.D. degrees, one received an M.D./M.S. degree; and three Medical Engineering and Medical Physics students received Ph.D. degrees. The following pages list the graduates and the location and field of their internships and residencies.

HST MEMP Graduates

Jonathan Gardner Bliss
Ph.D. Thesis: "Rapid Determination of Antimicrobial Susceptibility Using Gel Microdroplets and Flow Cytometry"
Thesis Supervisor: Dr. James Weaver
Plans: Presently working for Ascent Technology, Cambridge, MA

Natacha DePaola-Garcia
Ph.D. Thesis: "Focal and Regional Responses of Endothelium to Disturbed Flow *In Vitro*"
Thesis Supervisor: Dr. C. Forbes Dewey, Jr.
Plans: Conducting research

Brent Douglas Foy
Ph.D. Thesis:"NMR Characterization of Interstitial Myocardial Sodium"
Thesis Supervisor: Dr. Deborah Burstein
Plans: Postdoctoral Fellow, Shriners Burns Institue

HST M.D./Ph.D. Graduates

Stephen Charles Blacklow
Ph.D., Department of Chemistry, Harvard University, 1990, Ph.D. Thesis: "The Evolution of Improvements in Catalytic Efficiency: Mutants of the Enzyme Trosiphosphate Isomerase"
Thesis Supervisor: Dr. Jeremy R. Knowles
Internship/Residency: Pathology, BWH

Chinfei Chen
Ph.D., Division of Medical Sciences, Program in Neuroscience, H.U., 1990, Ph.D. Thesis: "Voltage Dependent Calcium Channels in 3T3 Fibroblasts"
Supervisor: Dr. Peter Hess
Internship: Preliminary Medicine, MGH
Residency: Neurology, MGH

George Quentin Daley
Honors: Summa Cum Laude
Ph.D., Department of Biology, MIT, 1991
Ph.D. Thesis: "Implicating the bcr/abl Gene in the Pathogenesis of Chronic Myelogenous Leukemia"
Thesis Supervisor: Dr. David Baltimore
Internship/Residency: Internal Medicine, MGH

Thomas Mark Glaser
Honors: Magna Cum Laude
Ph.D., Department of Biology, MIT, 1991
PhD. Thesis, "The Fine Structure and Evolution of the Eleventh Human Chromosome"
Thesis Supervisor: Dr. David E. Housman
Plans: Howard Hughs Medical Institute Postdoctoral Fellowship, Department of Genetics, BWH

Albert Icksang Ko
Ph.D., Division of Medical Science, HMS, 1991
Ph.D. Thesis:"The Immunology of Schistosomiasis"
Thesis Supervisor: Dr. Donald A. Harn
Internship/Residency: Internal Medicine, BWH

Gregory David Nelson Pearson
Ph.D., Division of Medical Science, HMS, 1991
Ph.D. Thesis: "The Cholera Toxin Genetic Element: A Site-Specific Transposon"
Thesis Supervisor: Dr. John J. Mekalanos
Internship: Preliminary Medicine, Boston City Hospital
Residency: Diagnostic Radiology, BWH

Albert Cheng-Gin Shaw
Ph.D., Department of Genetics, HMS, 1990
Ph.D. Thesis: "Molecular Genetic Analysis of the Membrane Immunoglobulin Antigen Receptor"
Thesis Supervisor: Dr. Philip Leder
Internship/Residency: Internal Medicine, MGH

HST M.D. Graduates

Marvin Laurence Appel
M.D. Thesis: "Closed Loop Identification of Hemodynamic Control Systems"
Thesis Supervisor: Dr. Richard J. Cohen
Internship: Preliminary Medicine, MGH
Residency: Anesthesiology, Johns Hopkins

Hina W. Chaudhry
Honors: Cum Laude
M.D. Thesis: "Laser-Induced Relaxation of Vascular Smooth Muscle" Thesis Supervisors: Dr. Irene Kochevar, Dr. Kenton W. Gregory
Internship: Internal Medicine, Duke Medical Center
Residency: Internal Medicine, Duke Medical Center

Malvina B. Eydelman
M.D. Thesis: "Concentrated Amblyopia Therapy at Threshold Stimuli with Auditory Reinforcement"
Thesis Supervisor: Dr. Shirley H. Wray
Internship: Preliminary Medicine, Winthrop University Hospital, N.Y.
Residency: Ophthalmology, Long Island Jewish Hospital, N.Y.

Stephen Grund
M.D. Thesis: "Demonstration of Cooperation between Adipocytes and Endothelial Cells in the Synthesis of Prostacyclin by Human Adipose Tissue"
Thesis Supervisor: Dr. Lloyd Axelrod
Internship: Internal Medicine, MGH
Residency: Internal Medicine, MGH

Duncan McNicol Kuhn
M.D. Thesis: "Block of Hippocampal NMDA Receptor Responses by Tricyclic Antidepressants"
Thesis Supervisor: Dr. Mark L. Mayer
Internship: Preliminary Medicine, University of Utah Affiliated Hospital
Residency: Pending Fellowship

Edmundo Marroquin, Jr.
M.D. Thesis: "Control of Respiration Under Simulated Airway Compression"
Thesis Supervisor: Dr. Chi-Sang Poon
Internship: Preliminary Medicine, Santa Clara Valley Medical Center
Residency: Anesthesiology, MGH

Leo Seung Kon Paik
Honors: Cum Laude
M.D. Thesis: "Interleukin-lB: Analysis of Structural and Functional Relationships"
Thesis Supervisor: Dr. Lee Gehrke
Internship: Transitional, Presbyterian/St. Luke
Residency: Emergency Medicine, Denver General

Robert Lie-Yuan Sah
MEMP, Harvard/MIT, 1990, Ph.D. Thesis: "Biophysical Regulation of Matrix Synthesis, Assembly, and Degradation in Dynamically Compressed Calf Cartilage"
Thesis Supervisor: Dr. Alan J. Grodzinsky
Plans: Arthritis Foundation Fellowship, MGH and MIT

Priscilla Jennings Slanetz
Honors: Cum Laude
M.P.H., Harvard School of Public Health, 1991
M.D. Thesis: "Hemoglobin Blood Substitutes in Preoperative Autologous Blood Donation"
Thesis Supervisor: Gus J. Vlahakes
Internship: Medicine, University of Pennsylvania Medical Center
Residency: Diagnostic Radiology, MGH

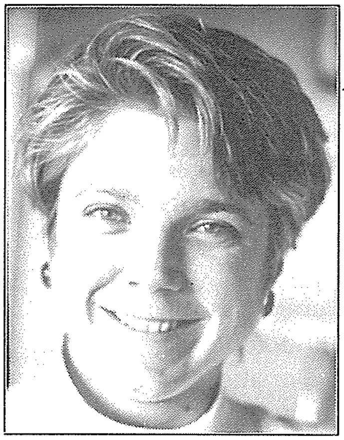
John Michael Stelling
M.D. Thesis: "Statistical Analysis of Quadratic Pressure-Flow Relationships in Intravenous Therapy"
Thesis Supervisor: Dr. James H. Philip
Plans: St. Clair Kennedy Traveling Fellowship and Echoing Green Fellowship. Will travel to Thailand and points East for work to be announced.

Ming Xu Wang
Honors: Magna Cum Laude
M.D. Thesis: "Screening Genomes to Identify and Characterize DNA Sequences Involved in Strong DNA-Protein Interactions"
Thesis Supervisor: Dr. George M. Church
Internship: Transitional, St. Barnabas Med. Ctr., N.J.
Residency: Ophthalmology, Wills Eye Hospital, Philadelphia, PA

HST M.D./M.S. Graduate

John Sun Yu
M.D., HST, 1990, M.S. Thesis: "Studies in the Molecular Pathogenesis of Multiple Sclerosis: Linkage Analysis of Candidate Susceptibility Genes and RNA Accumulation Studies in Postmortem MS Brain Tissue"
Internship: Preliminary Surgery, Beth Israel Hospital
Residency: Neurosurgery, MGH

Honors and Awards



Linda Cima, Ph.D.

Dr. Linda Cima Awarded Doherty Chair

Profs. Linda Cima of Chemical Engineering and HST, and Harri K. Kytomaa of Mechanical Engineering have been awarded the 1991 Doherty Professorships in Ocean Utilization from the MIT Sea Grant College Program.

Every year one or two new faculty members are appointed to the Chair and receive $25,000 each in annual support. Dr. Cima will use the fellowship to study the application of alginate, a product of marine algae, to the medical problem of tissue regeneration. This research has potential benefits in the controlled release of drugs and production of antibodies, as well as in organ transplantation.

The professorships, endowed by the Henry L. and Grace Doherty Charitable Foundation, open the way for promising, nontenured professors to undertake marine-related research that will further innovative uses of the ocean's resources. There are no restrictions on the area of research or on how the funds are used, and any aspect of marine use and/or management may be addressed, whether social, policical, environmental, economic or technological.

MarthaGray, Ph.D.

Profs. Cima and Gray Receive NSF PYI Awards

Linda Cima, Ph.D. and Martha Gray, Ph.D., were awarded the National Science Foundation's Presidential Young Investigator Awards (PYI). The award provides for up to five years of funding for research support. Dr. Cima has targeted the PYI Award for her research in the area of designing polymeric materials and devices for achieving tissue and organ regeneration and repair.

Dr. Gray will be using the support for her research program directed at understanding factors which mediate cartilage growth and remodeling. Over the next five years her research plans include projects which fall into two broad categories: combining molecular biology and engineering approaches to characterize the relationship between applied physical forces and tissue growth and remodeling activity and ultimately elucidate the relevant cellular transduction mechanisms; and developing methodologies which will enhance the ability to quantitatively examine cellular and physical features of connective tissues.

Lloyd B. Klickstein, M.D.,Ph.D.

Dr. Lloyd B. Klickstein Receives M.D./Ph.D. Postdoctoral Fellowship

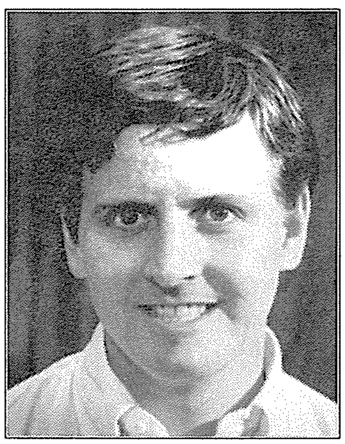
A Merck-AFCR Foundation M.D.–Ph.D. Postdoctoral Fellowship has been awarded to Lloyd B. Klickstein, M.D., Ph.D. Dr. Klickstein is a research resident in medicine at Brigham and Women's Hospital, Harvard Medical School, and postdoctoral fellow in the Center for Blood Research. His research includes structure-function correlates of cell surface receptors, receptors for inflammatory mediators, and evasion of host immunological responses by parasitic organisms.

Dr. Klickstein enrolled in the HST M.D. program in 1981 and earned a Ph.D. in Dr. Douglas T. Fearon's lab studying structure-function relationships of complement receptor type 1. Klickstein graduated in 1989 with an M.D. and Ph.D. degree and began the Research Residency in Medicine Program at the Brigham and Women's Hospital. He is currently a postdoctoral fellow in Dr. Timothy A. Springer's lab at the Center for Blood Research, where the Merck-AFCR award will support investigations of the mechanism of glycosylphosphatidylinositol membrane protein anchor biosynthesis.

This is the first year (1991) that the fellowship was awarded and 5 awards were made. The Merck-AFCR Foundation is one of the first to offer fellowships targeted specifically towards M.D.-Ph.D. degree holders. Recipients were selected on a competitive basis after submission of an 8 page research proposal. The award will support the fellow for up to 3 years. The benefactors of this award receive a $40,000 stipend and a $3,000 allowance for travel, journal subscriptions, and society memberships. In addition, their institutions receive a $7,000 grant for supplies related to the funded research.

Inquiries about this award should be directed to Merck-AFCR Foundation Postdoctoral Fellowships, Ms. Jean Haddock, Executive Director, 6900 Grove Road, Thorofare, NJ 08086

Dr. John Stelling Receives Fellowships



John Stelling, M.D.

John Stelling, a 1991 graduate of the HST MD program, has been named recipient of two fellowships with which he will study the global epidemiology of antimicrobial resistance in collaboration with the World Health Organization for a period of two years.

Resistance to antimicrobials is a severe problem throughout the world, but particularly in developing nations. Rates of infection, particularly life-threatening infection, are much higher than in the United States. As a result, the use of antibiotics is high. However, in many countries there is not a great diversity in the antibiotics from which to choose, and in addition, resources for routine susceptibility testing are limited. The result has been a high level of antibiotic resistance in most Third World nations. This high level of resistance has required the use of newer and more expensive generations of antimicrobials. The economic burden imposed by the high costs is seen in a decrease in other forms of mec services.

Bacterial susceptibility to antibiotics are de mined in major hospitals throughout the world, eve developing nations, but test results are generally analyzed in a systematic manner. With the Echc Green Public Service Fellowship and Harvard's Sin Kennedy Fellowship, Dr. Stelling will spend two y traveling to Europe, Asia, South America, Africa, Australia. A major focus of his project will be introduction of computer programs to microbiol laboratories worldwide which will permit the ongc collection of data and various levels of analysis. intent is to establish an international network for surveillance of antibiotic resistance.

There are benefits of surveillance at the lo national, and international levels. At the local le surveillance aids in the selection of appropriate antib ics for individual patients and the evaluation of l antibiotic usage and infection control practices. At national level, regional differences in resistance prof may suggest differences in antibiotic usage and hygi practices. Surveillance also allows the developmen national strategies for maximizing antibiotic effect ness while reducing cost. Globally, surveillance guide the development of new antibiotics and mean preserving the efficacy of older ones. The emergenc new resistance genes would be detected early so measures to contain the resistant strains could be in tuted and investigators may examine the circumstar preceding its emergence.

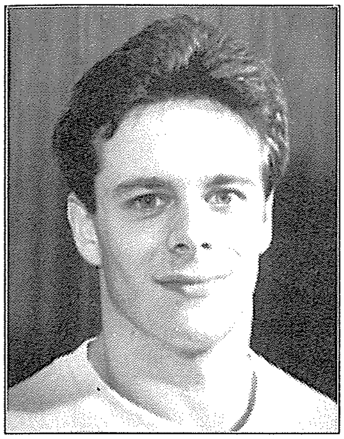
Dr. Stelling's background includes two year Mali, West Africa as a Peace Corps volunteer an Master's Degree in Public Health from John Hopk with a concentration in epidemiology and biostatist In the summer of 1990, John worked as a consultant this project for the Pan American Health Organizatio Argentina, Chile, Uruguay, and Venezuela.

1991 Johnson & Johnson Research Awards

The Faculty Advisory Committee for the Johnson & Johnson Research Fund announced in mid-May the successful applicants for funding under this innovative program. This year eleven awards were made to faculty at Harvard and MIT. All investigators are supervising HST research assistants.

PI /Institution	Title	Student/Amount
George Benedek MIT-Physics	Intermolecular Interactions in Eye Lens Protein Solutions	Bernard Fine $20,000
Richard Cohen MIT/HST	Intermediate Term Hemodynamic Regulation	Thomas Mullen $10,000
C. Forbes Dewey MIT-ME	Vascular Endothelium: Mechanism of Response to Flow	Robert Satcher $20,000
James Fujimoto MIT-EECS	Early Glaucoma Detection by Optical Coherence Domain Reflectrometry	David Huang $10,000
Laurie Glimcher HSPH	Regulation of Expression of the Class II Genes of the Major Histocompatibility Complex	Zachary Gleit $20,000
Joseph Grabowski HU-CHEM	Towards an Understanding of Vitamin B-12 Reactivity: A Novel Photoacoustic Approach	Rebecca Hung $20,000
Alan Grodzinsky MIT/HST	Physical Regulation of Repair and Degeneration of Human Osteoarthritic Cartilage	Young-Jo Kim $20,000
Seigo Izumo HMS-BIH	Mechanism of Regulation of the Endothelin Gene by Fluid Shear Stress	Adel Malek $20,000
Robert Langer MIT/HST	*In Vivo* vs. *In Vitro* Study of the Degradation of Controlled Release Polymers for Brain Tumors	Mary Wu $20,000
David Livingston HMS-DFCI	Cloning Polypeptides Associated with the Product of the Retinoblastoma Susceptibility Gene	Zoltan Arany $20,000
Kevin Struhl HMS-BCMP	Functional Analysis of the DNA-Binding Domain of the Yeast GCN4 Transcriptional Activator Protein	William Pu $20,000

Seth Karp, HST '93
Intern in the MIT Japan Program



Seth Karp, HST '93

When HST student Seth Karp saw the poster boldly exhorting him to "Go to Japan!" on the walls of the "Infinite Corridor" at MIT, his first reaction was, "That's a good idea." By the end of the same mid-November day in 1989, he had visited the MIT Japan Program Office and signed on for a one-year internship in a Japanese research laboratory.

Considerable challenge lay ahead of him. Seth had to study the Japanese language for two years. He had to take courses on Japanese culture, attend monthly breakfast meetings during the academic year, attend a three-day retreat in January and continue his studies towards a Harvard M.D. expected in 1993.

The MIT Japan Program, brainchild of Professor Richard J. Samuels, Associate Head of the Department of Political Science, was founded in 1981 to bridge the "information gap" between Japan and the United States. According to Samuels, "while the Japanese send thousands of researchers to the United States every year and while any educated Japanese can access technical information in English, a decade ago there weren't 10 Americans nationwide who could read research reports in Japanese, then walk into a Japanese laboratory, ask questions and have the same kind of access. It wasn't Japan's problem, it was ours."

Now the largest program of applied Japanese studies in the nation, and possibly in the world, Samuels' creation places its heaviest emphasis on education of MIT science, engineering and management students, both undergraduate and graduate. Central to that experience is an internship in a Japanese research or corporate environment. These internships typically last one year for graduate students, with undergrads being placed for just the summer.

Once on site, the interns are expected to perform as fully operational members of their Japanese research teams, with the same access to technological and business information as their Japanese counterparts. They live in Japanese company housing. They read research reports and memoranda in Japanese. By the end of the year, they are usually expected to deliver a speech in Japanese, and many have written their own patents in that language.

"What's unique about the Program," says Assistant Director Patricia Gercik, "is that the interns go in, with enough training not only to work in that environment, but to navigate professionally in it, to become just as successful as they would in a comparable American situation."

When Karp decided to become one of these interns, he says his main interest was the Japanese philosophical tradition. "That drove me at first." Now, he says, his goals have become broader. "I want to do some good research and learn how the lab structure in Japan works."

At the end of August, through the support of HST and the MIT Japan Program, Karp begins research at the University of Kyoto. He will postpone the beginning of his clinical rotations for one year to work in the laboratory run by Dr. Shigetada Nakanishi, one of the world's foremost molecular biologists. While many MIT Japan Program interns find their placements through their professors who have Japanese counterparts working on similar research, Karp found his through a Japanese surgeon, who was doing research in the lab of his Research Supervisor. Karp wrote Dr. Nakanishi directly, and eventually was invited to go to the Japanese doctor's laboratory. While there, Karp intends to continue his research on cell biology, "probably immunology."

Looking back over the past two years, Karp says: "I enjoyed studying Japanese, and the MIT Japan Program has been great in every way. I wouldn't say it if it weren't true."

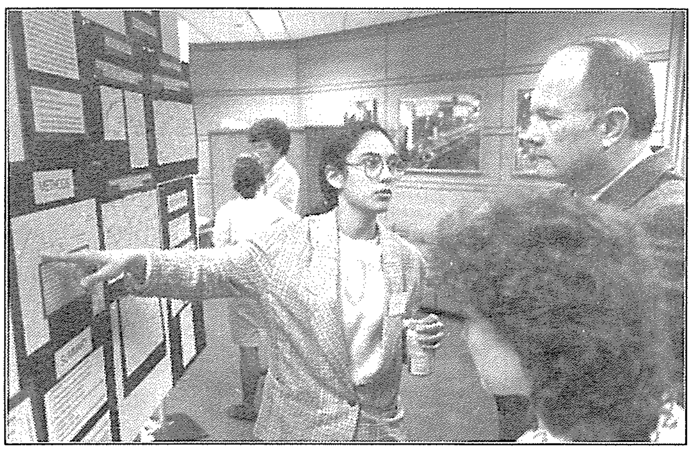
1991 HST FORUM

Continuing the tradition of emphasizing the importance of research activities in the HST Division, The 1991 HST Forum was held on April 25 at the Center for Advanced Engineering Study on the MIT Campus. Although the previous three Forums were held during the Fall term, the program was shifted to the spring semester so that more students and faculty were able to participate. A total of ten platform presentations and nearly forty posters were presented during the day, with contributions ranging from molecular biology to engineering to clinical sciences.

Following the scientific session and preceding the evening dinner-dance, a panel discussion was held on the topic "Biomedical Research and Clinical Medicine: Two Degrees? Two Careers? Too Much?" The moderator was Eugene Braunwald, M.D. and panel members included William S. Beck, M.D., Irene Kuter, M.D., D.Phil., Ernest Cravalho, Ph.D., and Bruce Rosen, M.D., Ph.D. The audience learned that although there was no clear consensus and that difficult decisions are involved, the group agreed on the great need for individuals who do both clinical and scientific work. Drs. Cravalho and Rosen added the perspective of engineers whose work on clinically relevant problems applies technology toward improving patient care.

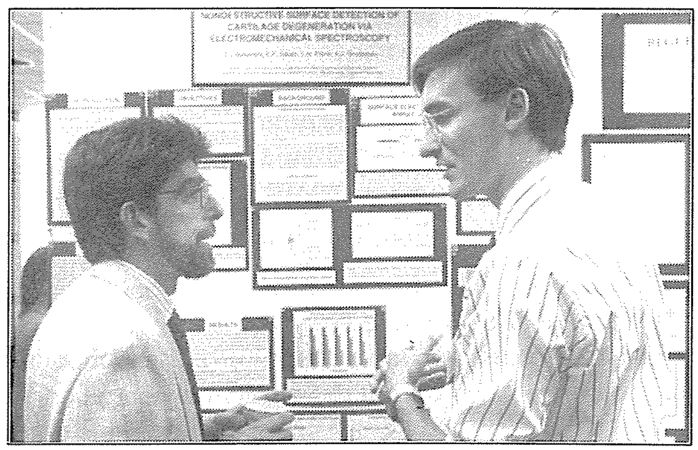
The evening celebration included a dinner at the MIT Faculty Club, followed by dancing. Mathai Mammen ('93) received a well-worn copy of Gray's Anatomy used in course HST-010 for correctly identifying the chemical structure which has been shown on the cover of all Forum program books.

The next HST Forum is tentatively scheduled for Thursday April 22, 1991.

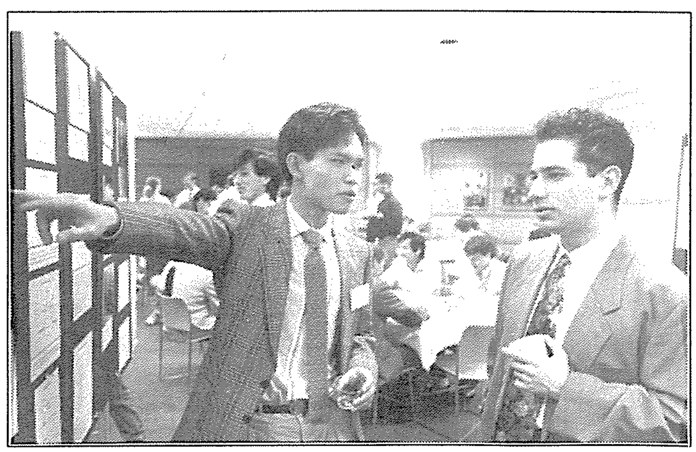


Minerva Garcia, Kathleen Donahue, and Prof. Roger Mark

Claiborne Johnston and Prof. Martha Gray



Prof. Alan Grodzinsky and Ivan Rokos



David Huang and Adel Malek

New HST Courses

HST adds four new courses to its roster this year: HST 160, Molecular Biology and Genetics in Modern Medicine; HST 240, Physician/Scientist Preceptorship; HST 510, Principles of Human Gross Anatomy; HST 550J, Fundamentals of Space Life Sciences.

During the HST Curricular Retreat held this past spring (see Retreat article on pg. 12), there was general consensus that a course should be offered in molecular biology. In partial response to that request, **HST-160; Molecular Biology and Genetics in Modern Medicine** will be offered this fall. The course is designed to bring students up to speed in areas of gene regulation, signal transduction and cell cycle control. Within this context topics in immunology, oncology and embryology will be presented. The clinical impact of molecular genetics will be considered, focusing on specific human genetic diseases. Patient presentations will be integrated with the lectures and will form the basis for discussing the genetic counseling and ethical issues raised by molecular genetic advances. The course will be taught by Drs. Cliff Tabin and David Housman.

Dr. Tabin states that he and Dr. Housman have structured the course in a way that will provide a real foundation in molecular biology and genetics; fields which they believe will be increasingly central to the practice of medicine. The concepts will be taught in a framework which will convey the ways in which molecular genetics directly impacts on medical problems. For example, lectures on gene and chromosome structure are followed by a lecture on prenatal diagnosis and then by clinical presentation of patients with chromosomal abnormalities. Similarly, lectures on the molecular control of embryogenesis will be linked to a clinic on Spina Bifida. Drs. Houseman and Tabin will give the conceptual lectures while the clinics will be presented by specialists in each field. Typically there will be three hours of lecture per week with a one-hour clinic.

Beginning with the Class of '93, a two-month course, **HST 240, Physician/Scientist Preceptorship**, will be required for all HST M.D. students. Teachers for the course will be drawn from the HST faculty at large, and will be arranged individually by each student. The goal of this preceptorial is for the student to learn both the fundamental clinical principles and practices of a medical surgical subspecialty, and also to be exposed to a related area of research in sufficient detail to understand the issues and methods of cutting edge research. One-half of this course will be devoted to clinical experiences of the Physician/Scientist, the other to independent scholarly work in basic or clinical science.

HST-510, Principles of Human Gross Anatomy, is designed as an introduction to the principles and terminology of human gross anatomy for students in the Radiological Sciences Graduate Program jointly sponsored by the Dept. of Nuclear Engineering and HST. This course will consist of a weekly meeting, with an introductory lecture followed by laboratory exercises consisting of small group demonstrations of dissected human specimens, or individual and small group self-teaching exercises. The weekly presentations will be organized to explore human anatomy on a "regional" basis as compared to the "systemic" approach and will cover all areas of the body, including an introduction to gross neuroanatomy. Correlations between anatomical structure and medical situations will be made through discussion of brief case-based presentations selected specifically to illustrate issues of modern medical imaging technology. This is your basic bread-and-butter course offering, superbly taught by Dr. Samuel Kennedy.

Next spring a new subject, **Fundamentals of Space Life Sciences, HST 550J, 16.354J**, will be offered for the first time, and should bring many of the challenges of human space flight down to earth. Space Life Sciences covers nearly all of the human physiological systems, and many relevant plant and animal systems as well. If a system is influenced by gravity, then surely it will be a factor in weightlessness. Before embarking on long duration space exploration, from extended stays on the Space Station to eventual multi-year exploration of Mars, we must understand the causes of physiological deconditioning in weightlessness and develop effective countermeasures. The challenges include cardiovascular deconditioning, loss of skeletal bone calcium and reduced muscle tone, respiratory and metabolic alterations, and neurovestibular changes. In addition, the considerable stress of long duration voyages in small groups presents interesting psycho-social problems.

The new graduate course will be led by Prof. Laurence Young of HST and the Dept. of Aeronautics and Astronautics, and by Dr. Suzanne Churchill, who is also with HMS and the Institute of Circadian Physiology. Both have current space flight experiments. The lecture course will build on material developed by Dr. Churchill for the International Space University summer program and her forthcoming book from MIT Press.

HST MD/MEMP CURRICULAR RETREAT

HST would like to thank everyone who participated in its Annual Curricular Retreat held May 9, 1991

Faculty, Administrative, and Alumni participants were: W.H. Abelmann, S.J. Adelstein, J. Bartie, W.S. Beck, A. Bernfield, J.V. Bonventre, H.F. Bowman, D. Burstein, M.C. Carey, E. Cheal, L. Cima, C.H. Coggins, R.J. Cohen, E.G. Cravalho, P.A. Cunningham, C.F. Dewey, J.T. Fallon, L.E. Freed, P.M. Gallop, R.M. Glickman, R.A. Greenes, S. Greenwald, W.C. Hayes, E.M. Hundert, H. Klapholz, I.M. London, R.G. Mark, K.F. Oh, J.A. Parrish, J.G. Perpich, P. Reich, H.G. Rennke, J.P. Saul, F.J. Schoen, D.C. Shannon, R.P. Smith, M. Toner, F.M.H. Villars, A.N. Weinberg.

Student participants included: M. Awobuyuli, B. Benda, J. Boxerman, A. Brook, A. Courtney, T. Davis, J. Dunn, B. Fine, C. Ford, B. Foy, W. Hahn, A. Hodgson, D. Huang, T.S. Lee, L. Lesperance, V. Li, M. Maggard, A. Malek, E. Murphy, T. Nagel, E. Ozawa, S. Robinovitch, F. Rybicki, D. Shaywitz, L. Shieh, D. Sodickson.

This year the Retreat was organized by Dr. Walter Abelmann, Interim Co-Director of HST, and was held at the Wellesley College Club. The proceedings of the Retreat opened with a report on the 1990 Survey of the HST M.D. Alumni, given by Dr. Abelmann, and concluded, after dinner, with a lecture entitled: "Multiple Pathways for Educating Physician-Scientists: Role of the Howard Hughes Medical Institute," given by Joseph G. Perpich, M.D., J.D., who is Vice-President, Grants and Special Programs of the Howard Hughes Medical Institute.

During the course of the Retreat the participants split into two focus groups: Task Force I and Task Force II. Later the two groups joined forces and presented their deliberations.

Participants in Task Force I, chaired by Dr. Robert Glickman, addressed the topic: "The Education of the Physician-Scientist." Dr. Glickman called the session to order with this query: in what ways could one better serve the MD/PhD students in their long track towards professionalization as physician-scientists? Task Force I tackled the problems that are faced in the protracted course of training the MD/PhD, where the final year of medical school is not well-used or planned. It looked at the some medical schools (i.e. the University of Washington), where there is no "fourth year" for MD/PhD's, and explored answers to the questions: What does the fourth year of medical school mean to the HST program? Could that be combined with house staff training? How long should that training take? Is there a way to plan for experiences after house staff training?

Dr. Glickman expressed the view that there was no need for some medical doctors, general practitioners and pediatricians for example, to have three years of graduate training. He suggested that these individuals could "short-track" the clinical experience. The group discussed the many options for shortening clinical training in many disciplines. There was a sentiment that a group should be working on changing the curriculum of the HST program with an eye to making an optional component that basically finishes the program potentially without a structured fourth year for individuals who choose that option. One of the outcomes of the Retreat was the formation of a committee that will submit an application for a condensation of various curricular requirement to the Board of Internal Medicine because they are reviewing experimental programs at this time. Dr. Glickman expressed the opinion that even though the initial program here might be limited in its numbers and scope, the impact of it will be wide because institutions all over the country will offer similar programs to compete for the best MD/PhD students.

In addition, the group focused on the training as a continuum from the MD/PhD graduate level through post-residency. It was recognized that career planning for MD/PhD students is required and future retreats will pay more attention to this topic. It was expressed that many of the residency programs are inflexible or involve long periods of clinical training that make it hard to return to research. Many of the student participants stated that the year following residency training was a mystery to them. Dr. Glickman summed up the groups discussions about career planning and careers. He noted that it is legitimate territory to be concerned with how its graduates are being treated afterwards and expressed the need for affiliated hospitals to work at making a more meaningful set of connections to recent graduates trying to find career paths as physician/ scientists. There was a consensus that it is highly appropriate for HST, with two leading institutions sponsoring it, to plan a more concerted way for the graduates of the program through the initial portions of their training into perhaps junior faculty status.

Participants of Task Force II addressed via a panel discussion, "The MEMP Program as Preparation for a Career in Medical Engineering and Medical Physics." The panel was chaired by Dr. Ernest Cravalho, co-chaired by Dr. Deborah Burstein and panel members, all HST/MEMP alumnus, included: Drs. Edward Cheal, Scott Greenwald, and Mehmet Toner. Some of the questions that were addressed follow. Does the MEMP curriculum provide the proper foundation for these careers? What is the relevance and value of the clinical experience in the MEMP curriculum? Is the MEMP Program appropriate preparation for a career in industry? Are MEMP graduates successful in competing for research funding?

Dr. Burstein summarized the group's discussion surrounding the above questions. In terms of whether the MEMP curriculum provides a proper foundation, the group was unanimous in saying, yes it does. In terms of specifics, the group felt that the engineering part of the curriculum was more important. There was general consensus that most people would like to have a course covering molecular biology, so that they, even if they are not doing that type of research, could at least converse with molecular biologists. In a quick response, HST will offer a new course this fall: HST-160, Molecular Biology and Genetics in Modern Medicine, see "New HST Courses" article on page 11 for more details.

Regarding the clinical part of the curriculum, the opinions expressed were diverse; some felt that it did not impact on their career and others regarded it as crucial. Dr. Burstein felt that the clinical experience was a valuable overview of the clinical world, which is essential for working in a hospital-based system. Specifically she mentioned the exposure to the language of the clinical environment, which can differ widely from the language that it learned in preclinical course work. She added, in some cases the clinical experience did lead some people to pursue an M.D.

The question, whether or not the M.D. was necessary for the MEMP graduates, was raised. The general consensus of the graduates present was that an M.D. certainly was not necessary or worth the endeavor for a full-time research career. In terms of grant funding, their experience found that the granting agencies don't consider the M.D. or Ph.D. as criteria, they look at experience for the most part. An opinion was expressed that the trade-off of time spent researching for the two or three years spent in M.D. training, and consequent internship can significantly harm a research career.

Yes was the answer to the question, "Are MEMP graduates successful in competing for research funding?" The broad-based training that MEMP students receive was credited for successful funding, in part because MEMPs are not limited to a small area within NIH or a small area within industry but can look for grants in a variety of places. They have the background that allows collaborations with a wide spectrum of people within both industry and academia, and these ties offer more opportunities for funding. There was a sense among the graduates that the job market was a healthy one for MEMP graduates.

In Memoriam

Maura Shannon Barrett, *the eldest daughter of Daniel and Mary Shannon, died suddenly on June 29 only thirty hours after her marriage to Edwin Chadwell Barrett IV of Burlington, Vermont. For the past four years Maura, a 1983 graduate of Barnard College, had been conducting medical research for ABT Associates in Cambridge, MA and completing her science requirements at Harvard in preparation for application to medical school. In her memory the family has established a scholarship fund at Barnard for the purpose of encouraging applications of science to medicine. An award will be made annually at graduation to the young woman who has achieved excellence in science and is pursuing a career in medicine. Those who wish to participate should send their contributions to:*
The Maura Shannon Barrett Scholarship Fund,
Barnard College, 3009 Broadway
New York, NY 10027

Calendar of Events

September	9	Monday	MIT Registration Day
	10	Tuesday	MIT Classes begin
	11	Wednesday	RA Applications DUE for Fall Term (new students)
October	11	Friday	M.I.T. ADD DATE last day to add subjects
	14	Monday	Holiday - Columbus Day - No Classes
	15	Tuesday	No Classes at MIT
November	11	Monday	Holiday - Veterans Day - No Classes
	22	Friday	MIT DROP DATE last day to drop subjects
	28	Thursday-	
	29	Friday	Thanksgiving Recess
December	2	Monday	TA Applications DUE for Spring Term
	9	Monday	RA Applications DUE for Spring Term
	12	Thursday	MIT Classes end
	13	Friday	HST Classes end
	16	Monday-	
	20	Friday	Final Exam Period - MIT and HST
	21	Saturday	Winter Recess begin
January 1992	6	Monday	MIT Independent Activities begin HST January classes begin

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HST in perspective

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