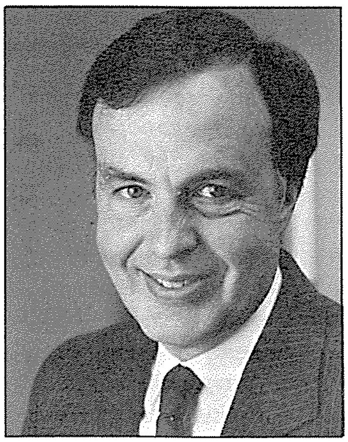
HST in perspective

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

Spring/Summer 1990

William M. Kettyle Recipient of the 1990 Irving M. London Teaching Award


Dr. William M. Kettyle

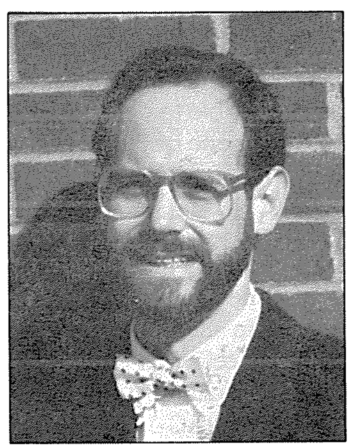
William M. Kettyle, M.D., Assistant Clinical Professor of Medicine, Harvard Medical School has been recognized by the HST student selection committee as this year's faculty member who best exemplifies the goals and philosophy of the Harvard-MIT Division of Health Sciences and Technology. He will be honored for his exceptional contributions to the training of HST students by receiving the Irving M.. London Teaching Award. Dr. Kettyle teaches HST-060, Endocrinology.

The selection committee is comprised of students who are required to have completed HST Biomedical Sciences courses through the spring of their second year. This year the committee members were Elena Taratuta ('90), Eugene Tsai ('91), Clay Johnston ('92), Adel Malek ('91), and Julie Greenberg (MEMP, entered '88). Their final selection was based on nominations from all HST students, on course reviews and on student evaluations. The faculty moderator for this year's committee was Dr. Lee Gehrke.

Nominations for Dr. Kettyle noted his "challenging style of a great instructor" coupled with the "hands-on knowledge and experience of a good clinician". Other nominations described Dr. Kettyle's "dynamic style" which "...provided a solid educational experience".

Born in Tacoma, Washington, William Kettyle received his bachelor's degree from Dartmouth College and then earned his M.D. degree from Harvard Medical School in 1971. After his internship and residency at Duke University Medical Center, Dr. Kettyle returned to Boston becoming a Research Fellow in Endocrinology at Beth Israel Hospital. Dr. Kettyle continued his association with Harvard Medical School as a Research Fellow in Medicine. In 1977 Dr. Kettyle's teaching career began as a Clinical Instructor in Medicine at HMS and as an Endocrinology Instructor at Mount Auburn Hospital. At the same time he directed training for Mt. Auburn's medical housestaff and served on the Education Committee at the hospital. In 1979 he became Mt. Auburn's Staff Physician for Physician Education and specialized in lecturing about Endocrine Pathophysiology for HMS and HST. He continued his association with Beth Israel Hospital as Attending Physician, Endocrine Service. In 1983 Dr. Kettyle became Chief of the Division of Endocrinology and Metabolism at Mount Auburn Hospital. Dr. Kettyle's dedication to education has been long recognized and he has received teaching awards at Harvard Medical School and Mount Auburn Hospital in 1983 and 1987, respectively.

J. Philip Saul Pioneers New Nonsurgical Repair of Arrythmia Disorder in a Child


Dr. J. Philip Saul

J. Philip Saul, M.D., who is part of the core faculty of HST-090, a member of the HST joint faculty and Assistant in Cardiology at Children's Hospital teamed up with Edward P. Walsh, M.D., Associate in Cardiology at Children's Hospital to successfully correct Wolff-Parkinson-White (WPW) syndrome in a 5-year-old patient using a closed chest technique in March. Assisting in the procedure was Jonathan J. Langberg, M.D., of the University of California at San Francisco, who has used the same technique to treat rhythm disorders other than WPW syndrome in adults.

According to Dr. Saul: "The patient can be considered completely cured, with no need for follow-up medication. Surgical correction of the same condition requires heart-lung bypass and a seven-to-ten-day hospital stay, and carries a greater risk of mortality than catheter ablation. The success of this procedure has significant implications for the nonsurgical repair of other pre-excitation syndromes as well," says Saul, " such as accessory AV pathways in other locations around the AV groove, nodoventricular connections, and re-entry circuits that are entirely within the AV node."

Research News

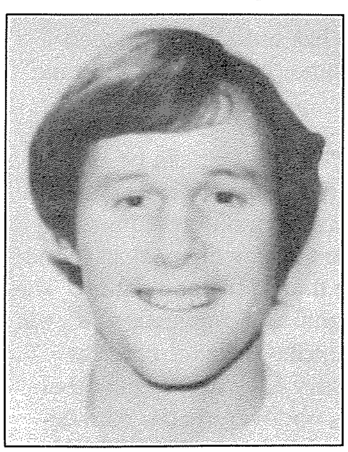
Honors and Awards

Shatz and Oettinger Find Key Immunity Gene

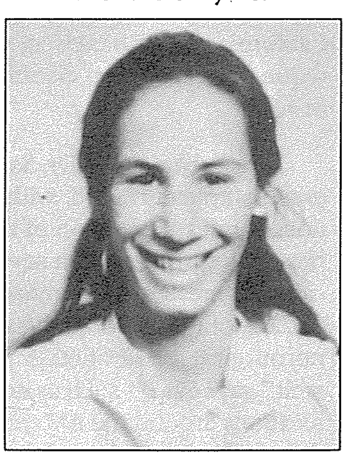
David Schatz (HST MD/PhD) and Marjorie Oettinger (HST MD/PhD), working with Professor David Baltimore at the Whitehead Institute, have been in the news since their discovery of a gene, now called RAG-1 for recombination activation gene, that could prove to control the formation of different antibody molecules. Their findings were first reported in the December issue of Cell. The discovery of RAG-1 represents a major advance in efforts to understand the way in which immune cells develop from uncommitted cells in the bone marrow. Knowledge of this process might give clues as to how immune responses are disrupted.

Mr. Schatz and Ms. Oettinger used a new technique, adapting novel cloning methods that allowed them to clone larger DNA fragments than possible with standard techniques. To identify the right gene, they transferred the DNA fragments to certain types of fibroblast cells and looked for the cells that survived the treatment with the antibiotic mycophenolic acid. In most cases the cells were killed by this antibiotic because the gene conferring resistance is "backward" in the chromosome and can't be processed. It was possible to detect which DNA fragments carried the recombinase gene because the recombinase would flip the antibiotic-resistance gene, allowing cells to survive.

RAG-1 has many features expected of the correct enzyme that allows the immature immune cells to produce the final antibody-encoding sequence. In addition RAG-1 is found to be active in primordial immune cells that are actively carrying out the antibody-specific recombination. The researchers are now investigating whether RAG-1 encodes the recombinase enzyme itself or if the molecule it encodes turns on a fibroblast gene that encodes for the enzyme.



David Schatz



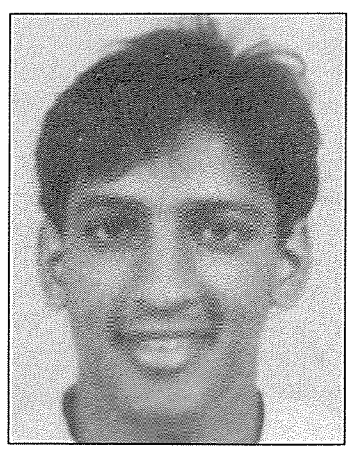
Marjorie Oettinger

Haqq and Mazzoni Present Research at Soma Weiss Assembly

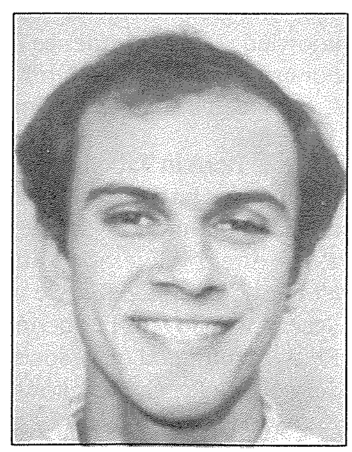
Christopher Haqq (HST MD '92) and Pietro Mazzoni (HST MD/PhD '92) presented work at the 50th Anniversary of the Soma Weiss Undergraduate Research Assembly.

Christopher Haqq and three other HMS students presented papers. Mr. Haqq presented research titled, "Analysis of Mullerian Inhibiting Substance Gene Expression". Mr. Haqq's research is supervised by Patricia Donahoe, Professor of Surgery. His research explores what controls Mullerian Inhibiting Substance (MIS). Mr. Haqq cloned and sequenced the gene for rat MIS and found it to be very similar to the human and bovine genes already cloned. Then he performed an analysis of the "on switch", or promoter DNA sequence and identified candidate regulatory regions. He reasoned proteins responsible for switching this gene on or off would likely bind to the promoter DNA sequence mediating expression of the MIS gene. This family of proteins seem to satisfy the criteria for sex-specific developmental proteins. Mr. Haqq has also demonstrated that these proteins exhibit different expression profiles in male versus female animals, which would be anticipated for sex-specific regulatory proteins. Mr. Haqq is now working to demonstrate directly that sex-specific regulatory proteins modulate MIS gene expression. His goal in these studies is to understand the genetic basis for sexual differentation

Pietro Mazzoni and 12 other students made poster presentations and explained their studies to the assembly. Mr. Mazzoni presented a poster illustrating his research titled, "A More Biologically Plausible Learning Model of Cortical Area 7a.". Richard Andersen, Ph.D. is research advisor to Mr. Mazzoni.



Christopher Haqq



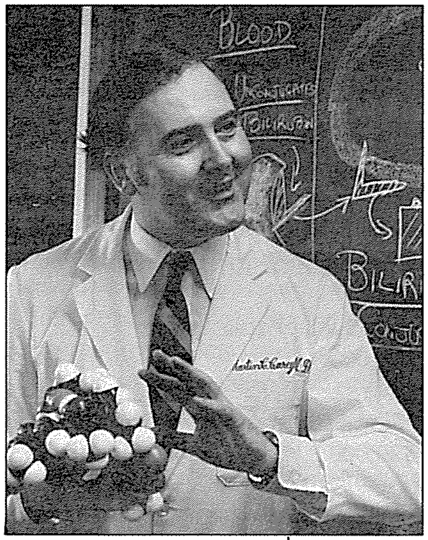
Pietro Mazzoni

1990 Johnson & Johnson Research Awards

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

PI Name/Institution	Title	Student/Amount
C.F. Dewey MIT/ M.E.	Vascular Endothelium: Response to Disturbed Flow	Natacha DePaola $20,000
William Durfee MIT/ M.E.	Failure Detection in Fes-Aided Standing Devices	Naomi Chesler $20,000
Michael Feld MIT/Physics	Early Detection of Melanoma Using Fluorescence Spectroscopy	Joseph Baraga $20,000
Judah Folkman HMS/CH	Induction of Hyperplasia and Angiogenesis in the Formation of Tumors	Vincent Li $20,000
Lorna Gibson MIT/Civil Eng.	Failure Criteria for Cancellous Bone	Robert Borchers $20,000
Walter Gilbert Harvard/Biology	Does Guanine Tetrad DNA Participate in the Homologous Pairing of DNA?	Matthew Meyerson $20,000
Martha Gray MIT/EECS/HST	Influence of Mechanical Loading on Mandibular Condyle Growth and Development *in Vitro*	Minerva Garcia $20,000
Patrick Hogan HMS/Neurobiology	Analysis of the Excitatory Action of Bradykinin on Rat Sensory Neurons	Lucy Song $10,000
Donald Ingber HMS/CH	Control of Cytoskeletal Polymerization by Fibronectin	Seth Karp $20,000
Joanne Ingwall HMS/BWH	Mechanisms for Decreased Myocardial Systolic Function Following Ischemic Injury	Jack Tsao $20,000
David Livingston HMS/DFCI	Test of the Role of DNA Binding in the Expression of the Growth Suppression Function of the Retinoblastoma...	Zoltan Arany $20,000
Stuart Orkin HMS/CH	Control of Gene Expression in the Myelomonocytic Lineage of Hematopoietic Cells	Erich Strauss $10,000

Honors and Awards



Martin C. Carey M.D., D.Sc.
Course Director,
HST-120, Gastroenterology

Martin Carey Receives AGA's Distinguished Achievement Award

Martin C. Carey M.D., D.Sc., who has been a member of the HST faculty since 1975 and course director of HST-120 (Gastroenterology) since 1978, received the American Gastroenterological Association's Distinguished Achievement Award at the plenary session of the AGA's annual meeting on Monday, May 14, 1990 in San Antonio, Texas.

The AGA's Distinguished Achievement Award is given each year as recognition for a major scientific accomplishment in gastroenterology or a related field. This year the selection committee chose Dr. Carey for making significant advances in the field of gastroenterology through fundamental research on biliary and alimentary tract lipids. He was awarded a cash prize and delivered a lecture entitled "Reflections from Moving Objects: Micelles in Bile and Gut Revisited".

Dr. Carey is on the staff of Brigham and Women's Hospital and is both a Professor of Medicine at Harvard Medical School and Lawrence J. Henderson Professor of Health Sciences and Technology in the HST Division. Over the course of his career, he has divided his responsibilities between basic research, teaching, and patient care. His research has focused primarily on such topics as the physical chemistry and pathophysiology of bile; the biochemistry and biophysics of gallstone formation and dissolution; fat and digestion and absorption and bile secretory failure; and the chemistry and physics of micelles, liquid crystals, ordered fluids, emulsions and microemulsions. He has also conducted research on phase transitions and equilibria in biologically relevant and classical lipid systems; lipid-protein interactions in lipid transport and lipolysis; and drug delivery systems.

Born in Clonmel, County Tipperary, Ireland, Dr. Carey has been on the staff of hospitals and institutions in both the U.S. and Great Britain. He has held visiting professorships and has lectured world-wide at numerous societies and institutions that have included the Lund Institute of Technology in Lund, Sweden; the All-India Institute of Medical Sciences in New Delhi, India; and the Ludwig Maximillian University in Munich, West Germany. He has written over 150 articles and currently holds three U.S. patents.

For his lecture at the AGA's annual meeting, Dr. Carey discussed how quasi-elastic light scattering has provided valuable information on the mixed bile salt micelles of bile and gut-luminal contents. He demonstrated how systematic application of this technique led to the discovery of unilameller vesicles in bile. These particles carry excess cholesterol in supersaturated bile and , in gallstone-prone individuals, they may fuse, which can then lead to the nucleation of cholesterol monohydrate crystals in the gallbladder. Dr. Carey and his colleagues discovered that analogous vesicle particles in the gut lumen are crucial for health in that they maintain the bile salt micelles supersaturated with lipolysis products for efficient dietary fat absorption.

Over the years Dr. Carey's teachers and collaborators have included the late Professor O. Fitzgerald (University College, Dublin), and Professors D.M. Small (Boston University Medical Center) and B.G. Benedek (MIT and HST). Since 1975, nearly 30 graduate students, post-doctoral Fellows and Visiting Scientists have worked in his laboratory now located in the George W. Thorn Building for Medical Research at Brigham and Women's Hospital. Many of these have gone on to achieve distinguished careers in academic medicine, science and technology, or the pharmaceutical industry in both the United States and abroad. But "the cementing force that held my laboratory together over the years has been my wonderful research technicians, Grace Ko, Heidi Ahari, and Natasha Timofeyeva, and my former Administrative Secretary, Ms. Rebecca Ankener", Dr. Carey said.

Honors and Awards

Scott Greenwald Recipient of AAMI Award

Mr.Scott Greenwald (MEMP) recently won the 25th AAMI Annual Meeting Student Manuscript Award for the most outstanding paper presented at the Annual Meeting of the Association for the Advancement of Medical Instrumentation (AAMI). Scott was awarded a commemorative plaque and a $500 cash prize.

Scott's paper, "Improved detection and classification of arrhythmias in noise-corrupted electrocardiograms using contextual information within an expert system", describes the operation and evaluation of an arrhythmia detector designed to enhance detection and classification of beats and rejection of artifact in noisy ECGs.

Scott defended his doctoral research at the end of May. After a brief sabbatical ending in July, he plans to continue his career developing medical instrumentation with Hewlett-Packard's R&D group in Waltham, Massachusetts.

Frederick Schoen Elected President of The Society for Biomaterials

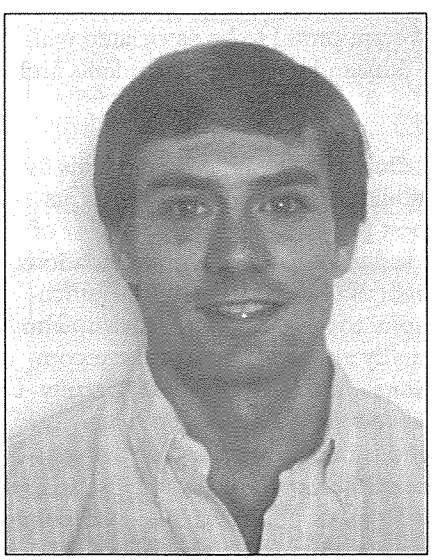
Dr. Frederick Schoen, Associate Professor of Pathology at Harvard Medical School and Head of the Cardiac Pathology Division at BWH, has been elected President of the Society for Biomaterials, an organization interested in the development of materials used in implanted medical devices and artificial organs, and in the biology of fundamental biomaterial-tissue pathological interactions.

Dr. Schoen's primary interest is in the pathology of cardiac surgery and interventional cardiology, particulary the complications of prosthetic heart valves and other implanted cardiovascular devices. He has also conducted laboratory research related to the mechanics of the clarifications of bioprosthetic heart valves. Dr. Schoen is course head of HST-030, Human Pathology.

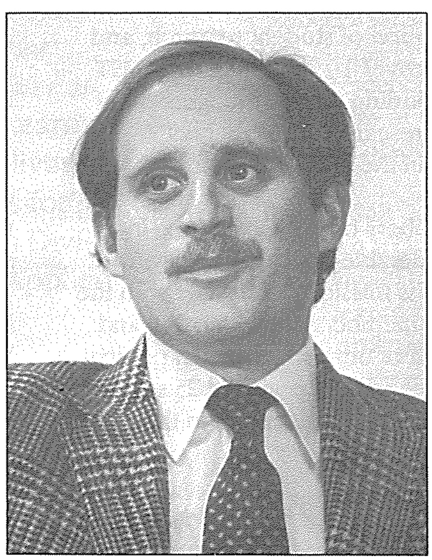
John Frangioni Recipient of Proctor and Gamble Award

Mr. John V. Frangioni, a third-year medical student and the 1990 Rowland Fellow in the Harvard-MIT Division of Health Sciences and Technology who is simultaneously enrolled in a Ph.D. program in the Department of Cellular and Molecular Physiology at the Harvard Graduate School of Arts and Sciences, was recently awarded a Proctor and Gamble Professional Opportunity Award. He was elected to this award by the Council of the American Physiological Society.

John is currently researching pH regulation in normal and transformed cells under the supervision of Dr. Claude Lechene in the Laboratory of Cellular Physiology at the Brigham and Women's Hospital. Mr. Frangioni presented his research at the 1990 Federation of American Societies for Experimental Biology (FASEB) Meeting on April 5th in Washington D.C. at a mini-symposium entitled "Molecular Biology and Biochemistry of Cancer".



Scott Greenwald

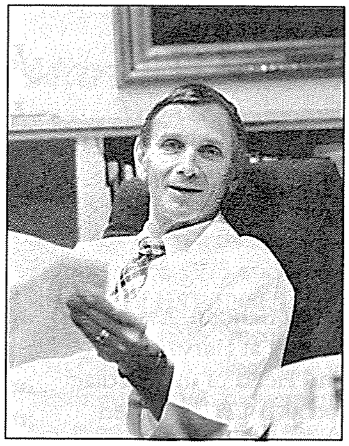


Dr. Frederick Schoen

John Frangioni

A Message from the Co-Directors

Dr. Roger Mark



Dr. Richard Kitz

Advisory Committee Reviews Student Research

Although not every project rated a "straight A," it is clear that the average was of outstanding quality, and that some projects stood out as "brilliant."

The Division was visited by our Advisory Committee March 28-30, 1990. The Advisory Committee, comprised of 12 outside experts in medicine, biomedical science, and biomedical engineering, visits HST every two years in order to assess our educational and research programs and to provide reports to the Dean of Harvard Medical School and the Provost at MIT. This year, the charge to the Committee was to assess the quality of research conducted by the students within the Division. In particular: a) Is student research at the cutting edge, and is it so in both the M.D. and Ph.D. programs? Are the students, research preceptors, facilities, and access adequate to the task? What are the methods of evaluation of student research, and are they effective? b) Assess current HST policies, including the encouragement of longitudinal research in parallel with coursework in the M.D. program.

Members of the Committee invested considerable time and energy in carrying out its mission. They met with the co-directors, members of our faculty, and students in all of our programs. In particular, Committee members visited 25 students and their faculty mentors in their research laboratories.

The Committee concluded that the research conducted by students in HST is of excellent quality. They stated, "Although we made no formal comparison, much of it must be among the very best of the graduate research at Harvard or MIT." Although not every project rated a "straight A," it is clear that the average was of outstanding quality, and that some projects stood out as "brilliant."

We are most grateful to the many students and faculty members who contributed so effectively to this visit. The identification of the final set of research projects to be examined by the Committee, the preparation of formal abstracts and papers, and the dress rehearsals were certainly demanding, but clearly were beneficial for all of us. We are proud to be associated with such an outstanding group of students and faculty!

Our Advisory Committee takes its responsibilities quite seriously, and in its final report provided us with a number of specific suggestions and recommendations. The insight of the Committee was particularly helpful to the Dean and Provost, who have already acted on some of the recommendations. In addition, the HST faculty has reviewed the Advisory Committee report and is in the process of implementing some of the Committee's suggestions which will, we hope, move the Division in a positive direction for the benefit of all.

Congratulations to the HST Graduating Class of 1990

The Sixteenth HST Graduating Class numbered thirty-seven. Twenty-four students received M.D. degrees, seven received M.D./Ph.D. degrees and six 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. Also listed are the graduates theses titles and theses supervisors.

The MEMP graduates, while not headed directly to internships, are also going in diverse directions. Martitia Barsotti, Greg Brown and Robert Sah are continuing on at HST to obtain the M.D. degree. Scott Greenwald plans to continue his career developing medical instrumentation with Hewlett-Packard's R&D group in Waltham, Massachusetts. Rebecca Richards-Kortum recently moved to Austin, Texas to accept the position of Assistant Professor in the Biomedical Engineering Department at the University of Texas. Chuck Stearns, having graduated in February, is living in Milwaukee, Wisconsin and works for General Electric, Medical Systems Division, as a Senior Physicist in the Applied Science Laboratory.

1990 Ph.D. Graduates

Medical Engineering and Medical Physics

June 6, 1990, (*February 21, 1990)

Martitia F. Barsotti
Gregory A. Brown
Scott D. Greenwald
Rebecca R. Richards-Kortum
Robert Lie-Yaun Sah
Charles W. Stearns *

1990 MEMP Ph.D./Sc.D. Theses

Student /Supervisor /Topic

Martitia Barsotti
Dr. Roger D. Kamm
"The Source of Proteins in the Aqueous Humor of the Eye"

Gregory Brown
Dr. Derek Rowell
"Load-Bearing Role of the Human Knee Meniscus"

Scott Greenwald
Dr. Roger G. Mark
"Improved Detection and Classification of Arrhythmias in Noise-Corrupted Electrocardiograms Using Contextual Information"

Rebecca Richards-Kortum
Dr. Michael Feld
"Fluorescence Spectroscopy as a Technique for Diagnosis of Pathological Conditions in Human Arterial, Urinary Bladder, and Gastro-Intestinal Tissues"

Robert Sah
Dr. Alan J. Grodzinsky
"Biophysical Regulation of Matrix Synthesis, Assembly, and Degradation in Dynamically Compressed Calf Cartilage"

Charles W. Stearns
Dr. Gordon Brownell
"Accelerated Image Reconstruction for a Cylindrical Positron Tomograph Using Fourier Domain Methods"

1990 M.D. Graduates

Doctoral Degree in Medicine

June 6, 1990, (*November 21, 1989)

Faith H. Barnett
Michael P. Bogenschutz
Loren J. Borud
Susan Canning
Catherine Chen
Diane L. Chen
Daniel M. Chernoff
Merit E. Cudkowicz
Benjamin T. Davis
Peter H. Diamandis *
Elana B. Doering
Howard W. Francis
Andrew Freese
Mark W. Frohlich
Jennifer S. Green-Nastelin
Roger J. Hajjar
Anya C. Hurlbert
Howard H. Lebowitz
Kathleen S. Lee-Faust
John M. Lewin
Adam F. Lowy
Eric R. Mortensen
Eric A. Pierce
David E. Powell
Bror V.H. Saxberg
Barry P. Sleckman *
Elena G. Taratuta
Byron E. Wilson
Nancy G. Wolf
Benson M. Yu
John S. Yu

1990 M.D. Theses

Student /Supervisor /Topic

Michael Bogenschutz
Dr. Dyann Wirth
"Molecular Analysis of MDR-Like Genes and RNA Transcripts in Drug-Resistant and Drug-Sensitive Strains of Plasmodium Falciparum"

1990 M.D. Theses

Student /Supervisor /Topic

Loren Borud
Dr. Malcom L. Gefter
"A Novel Strategy for Mapping Cytotoxic T Cell Epitopes of the gp160 Glycoprotein of the Human Immunodeficiency Virus"

Susan Canning
Dr. Thaddeus Dryja
"Fine Mapping and Sequence Analysis of Deletions of the Retinoblastoma Gene"

Catherine Chen
Dr. Richard Klausner
"Selective Degradation of T Cell Antigen Receptor Chains Retained in a Pre-Golgi Compartment"

Diane Chen
Dr. Guy Rouleau
"Genetic Linkage Study of Two Neurodegenerative Motor-Sensory Diseases"

Merit Cudkowicz
Dr. Neil Rowall
"Neuropathological and Neurochemical Changes in the Cerebral Cortex in Huntington Disease Patients"

Benjamin Davis
Dr. William Haseltine
"Construction of a CD4+ T Cell Line That Inducibly Expresses the HIV Transactivator Protein, TAT"

Elana Doering
Dr. Thomas F. Weiss
"Osmosis: Theories of Neutral Solvent Flow"

Howard Francis
Dr. Nelson Kiang
"Patterns of Innervation of Outer Hair Cells in the Chimpanzee"

Mark Frohlich
Dr. Jack Wands
"Enhanced Expression of the Protein-Kinase Substrate p36 in Human Hepatocellular Carcinoma"

Roger Hajjar
Dr. Judith K. Gwathmey
"Calcium Responsiveness of Myofilaments in Cardiac Muscle: A Novel Approach of Characterizing Calcium Activation in Human Myocardium"

1990 M.D. Theses

Student /Supervisor /Topic

Howard Lebowitz
Dr. Chi-Sang Poon
"A Comparison of Negative Impedance Ventilation with Conventional Mechanical Ventilation in a Rabbit Model"

Katherine Lee
Dr. Robert Novelline
"Accuracy of Computed Tomography in the Diagnosis of Abdominal Trauma: A Retrospective Evaluation"

John Lewin
Dr. Eric T. Fossel
"The Effect of Dietary Fatty Acid Composition on the Methyl and Methylene Proton NMR Line-widths in Rats"

Adam Lowy
Dr. Man-Sun Sy
"The Generation of Cytotoxic T Lymphocytes to the HIV-1 tat Protein"

Jennifer Green-Nastelin
Dr. Joseph P. Vacanti
"Pancreatic Islet Cell Transplantation: Optimization of Islet Cell Adhesion by Altering Polymer Surface Characteristics"

Eric Pierce
Dr. Stuart Orkin
"Antibodies to and Studies of the X-Linked Chronic Granulomatous Disease Protein"

David Powell
Dr. Eric T. Fossel
"NMR Studies of Sodium Calcium Exchange in Perfused Beating Frog Hearts"

Elena Taratuta
Dr. Richard J. Cohen
"Statistical Properties of the Long-term Heart Rate Time Series"

Byron Wilson
Dr. Jack Wands
"Antigenic Changes of Neoplastic Transformation"

Nancy Wolf
Dr. Julie Glowacki
"Hyperostosis and Bone Metabolism in Fishes"

1990 M.D. Theses

Student /Supervisor /Topic

Benson Wu
Dr. Robert Langer, Jr.
"Oral Enzyme Treament for Hyperbilirubinemia"

John Yu
Dr. Stephen Hauser
"Studies in the Molecular Pathogenesis of Multiple Sclerosis: Linkage Analysis of Candidate Susceptibility Genes and RNA Accumulation Studies in Postmortem Brain Tissue"

1990 M.D./Ph.D. Theses

Student /Supervisor /Topic

Faith Barnett
Dr. Lydia Villa-Komaroff
"Molecular Aspects of the Development and Regulation of Schwann Cells"

Daniel Chernoff
Dr. Gary Strichartz
"Kenetic Anaylsis of Local Anesthetic Binding to Sodium Channels"

Andrew Freese
Dr. Joseph B. Martin
"Excitoxic Mechanisms in Huntington's Disease"

Anya Hurlbert
Dr. Tomaso Poggio
"The Computation of Color"

Eric Mortensen
Dr. Guido Guidotti
"Evaluation of Factors Affecting Hormone Binding (Insulin) and the Intrinsic Hormone Stimulated Tyrosine Kinase Activity Asociated with the B Subunit of the Receptor"

Bror Saxberg
Dr. Tomaso Poggio
"A Modern Differential Geometric Approach to Shape from Shading"

Barry Sleckman
Dr. Steven Burakoff
"Role of the CD4 Molecule in T Cell Activation"

Internships — HST M.D. Class of 1990

STUDENT	HOSPITAL	INTERNSHIP/RESIDENCY
Barnett, Faith	Brigham and Women's Hospital Boston, MA 02115	Preliminary Surgery Neurosurgery
Bogenschutz, Michael	Cambridge, Hospital Cambridge, MA 02238	Transitional Psychiatry
Borud, Loren	University of California Los Angeles, CA 90024	Otolaryngology
Canning, Susan	Faulkner Hospital Boston, MA 02130	Preliminary Medicine Dermatology
Chen, Catherine	New England Deaconess Boston, MA 02115	Surgery
Chen, Diane	Beth Israel Hospital Boston, MA 02215 Mass. General Hospital Boston, MA 02114	Preliminary Medicine Anesthesia
Chernoff, Daniel	Brigham and Women's Hospital Boston, MA 02115	Radiology
Cudkowicz, Merit	Beth Israel Hospital Boston, MA 02215 Mass. General Hospital Boston, MA 02114	Preliminary Medicine Neurology
Davis, Benjamin	Mass. General Hospital Boston, MA 02114	Internal Medicine
Doering, Elana	University of Pennsylvania Philadelphia, PA 19104	Preliminary Surgery Anesthesia
Francis, Howard	Johns Hopkins Hospital Baltimore, MD 21205	Preliminary Surgery Otolaryngology
Freese, Andrew	University of Pennsylvania Philadelphia, PA 19104	Neurosurgery
Frohlich, Mark	University of California San Francisco, CA 94143	Internal Medicine
Green-Nastelin, Jennifer	University of Michigan Ann Arbor, MI 48109	Internal Medicine

Internships — HST M.D. Class of 1990

STUDENT	HOSPITAL	INTERNSHIP/RESIDENCY
Hajjar, Roger	Mass. General Hospital Boston, MA 02114	Internal Medicine
Lebowitz, Howard	Brigham and Women's Hospital Boston, MA 02115	Internal Medicine
Lee, Kathleen	Mount Auburn, Hospital Cambridge, MA 02238	Preliminary Medicine
	Brigham and Women's Hospital Boston, MA 02115	Radiology
Lewin, John	St. Luke's Hospital Denver, CO 80203	Transitional
	University of Colorado Denver, CO 80262	Radiology
Mortensen, Eric	Mass. General Hospital Boston, MA 02114	Internal Medicine
Pierce, Eric	Mass. General Hospital Boston, MA 02114	Preliminary Medicine
	Mass. Eye and Ear Infirmary Boston, MA 02114	Ophthalmology
Powell, David	NYU Medical Center New York, NY 10011	Internal Medicine
Sleckman, Barry	Brigham and Women's Hospital Boston, MA 02115	Medicine
Taratuta, Elena	Faulkner Hospital Boston, MA 02130	Preliminary Medicine
	NYU Medical Center New York, NY 10011	Radiology
Wilson, Byron	Stanford Affiliated Hospitals Stanford, CA 94305	Internal Medicine
Wolf, Nancy	Brigham and Women's Hospital Boston, MA 02115	Pathology
Wu, Benson	Rhode Island Hospital Providence, RI 02902	Preliminary Medicine
Yu, John	Beth Israel Hospital Boston, MA 02215	Preliminary Surgery
	Mass. General Hospital Boston, MA 02114	Neurosurgery

Calendar of Events

August	24, 1990	RA Application Due for Fall Term - continuing students
September	4, 1990	HST Classes Begin HST/MD-Registration —2nd yr Class at HMS HST/MD-Orientation —1st yr Class at HMS HST/MD 1st yr Orientation Luncheon HMS
September	5, 1990	MEMP Orientation Luncheon at MIT
September	12, 1990	RA Applications Due for Fall Term - new students
December	1, 1990	TA Applications Due for Spring Term
December	10, 1990	RA Applications Due for Spring Term
December	14, 1990	HST Classes end
December	17-21, 1990	HST Final Exam Period

HST in Perspective is published twice a year by the Harvard-MIT Division of Health Sciences and Technology.
News items and editorial comments are welcome.

HST in perspective

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