Ph.D. Tracks in Clinical and Translational Science  
2013  
PhD in Clinical Investigation (PCI)  
Education Connecting Laboratory Investigation and Population Science (eCLIPSE)  

Under the Auspices of the  
Institute for Clinical and Translational Research  
(ICTR)  
-and-  
Graduate Programs in the Biomedical Sciences  
of the Albert Einstein College of Medicine
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Kathryn Anastos, M.D.

**Professor**, Departments of Medicine/General Internal Medicine; Epidemiology and Population Health; OB/GYN;
**Co-director**, Einstein Global Health Center
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**Professional Interests**

Kathryn Anastos, MD is a physician executive, clinician and medical researcher who for more than 20 years who has provided both clinical care and operational and clinical leadership in the South Bronx. She has extensive experience in innovative development of large programs designed to increase access to high quality, culturally sensitive care by poor communities of color, while meeting both a clinical and financial bottom line. She has served as executive director of several large systems of ambulatory care in the Bronx, and has provided leadership during design, construction and opening of new primary care clinics. Clinically Dr. Anastos trained and actively practices as a primary care internist with expertise in the comprehensive care of HIV infected individuals and HIV infection in women.

Since September 2002 Dr. Anastos has devoted her time to patient care and research in HIV infection in women in the United States and Rwanda. A founder of WE-ACTx (Women's Equity in Access to Care and Treatment), a community-based organization devoted to developing high quality ambulatory medical services for HIV infected women in Rwanda, she now serves as its Director of Clinical Systems and Scientific Programs. WE-ACTx collaborates with the Rwandan government and twenty-four non-governmental organizations to provide comprehensive HIV primary care, including antiretroviral therapy as indicated, to women survivors of genocidal rape. She has also developed and serves as Principal Investigator of the Rwandan Women's Cohort Study (RWISA, which in Kinyarwanda means beautiful), funded by the National Institutes of Health (NIH). She is a Professor of Medicine, Epidemiology and Population Health at the Albert Einstein College of Medicine.

Dr. Anastos has served since 1993 as the principal investigator of the New York City/Bronx Consortium of the Women's Interagency HIV Study (WIHS), the largest of the WIHS sites nationally, funded by the National Institute of Allergy and Infectious Diseases, National Cancer Institute and National Institute for Drug Abuse. Dr. Anastos’ specific areas of research focus include survival and disease progression in women with HIV infection, the role of sex and race in biologically determined responses to infection and treatment, and the contribution of HIV related immune dysfunction or treatment on other medical conditions (e.g.-diabetes, cardiovascular disease, etc) already highly prevalent in United States urban communities of color. Dr. Anastos has lectured extensively nationally and internationally to both professional and lay audiences about HIV infection in women and communities of color. She has received multiple awards from the community for her contributions to the health of HIV-infected people in the Bronx, and was cited in 1996 by POZ Magazine as one of the nation's top AIDS researchers.

Dr. Anastos received her undergraduate degree at Oberlin College, Oberlin Ohio, which cemented her commitment to entering Medicine as a vehicle for social change. She earned her medical degree at the University of California at San Diego School of Medicine, La Jolla, California in 1980. She did her internship and residency in internal and social medicine at the Montefiore Medical Center, in the Bronx, and finished her post-graduate training as the Chief Medical Resident at Montefiore Medical Center.

**Key Words:** epidemiology, global health, HIV/AIDS
Julia H. Arnsten, M.D., M.P.H.

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Director, Center for Comparative Effectiveness Research
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Professional Interests

Dr. Julia Arnsten is Chief of the Division of General Internal Medicine and a Professor of Medicine, Psychiatry & Behavioral Sciences, and Epidemiology & Population Health. Dr. Arnsten is a general internist with a long-standing interest in behavioral medicine, including adherence with medication-taking, nicotine dependence, and substance abuse. She currently leads an NIH-funded research program focused on addiction and chronic medical illness.

Dr. Arnsten graduated from the New York University School of Medicine in 1990 and completed residency training in Primary Care Internal Medicine at Bellevue Hospital and New York University Medical Center in 1993. She then completed a research fellowship in General Internal Medicine at Harvard Medical School and Massachusetts General Hospital. From 1998-2002, Dr. Arnsten was a Robert Wood Johnson Generalist Physician Faculty Scholar. In 2002, she was awarded an R25 grant from NIDA to start a clinical addiction research and education fellowship for physicians; this program has now been funded for over a decade. Dr. Arnsten has been recognized for outstanding teaching and mentoring with several local and national awards.

Key Words: drug abuse, HIV, medication adherence, smoking cessation
Professional Interests

Dr. Nir Barzilai is the director of the Institute for Aging Research at the Albert Einstein College of Medicine and the Director of the Paul F. Glenn Center for the Biology of Human Aging Research and of the National Institutes of Health’s (NIH) Nathan Shock Centers of Excellence in the Basic Biology of Aging. He is the Ingeborg and Ira Leon Rennert Chair of Aging Research, professor in the Departments of Medicine and Genetics, and member of the Diabetes Research Center and of the Divisions of Endocrinology & Diabetes and Geriatrics.

Dr. Barzilai’s research interests focus on several key mechanisms involved in the biology of aging, including the effects of the environment (mainly nutrients) on extending life and the genetic determinants of lifespan. He discovered the first “longevity gene” in humans and is further characterizing the phenotype and genotype of humans with exceptional longevity through a NIH-supported Program Project. He has received numerous grants, among them ones from the National Institute on Aging (NIA), American Federation for Aging Research, and the Ellison Medical Foundation. He has published over 200 peer-reviewed papers, reviews, and textbook chapters. He is an advisor to the NIH on several projects, initiatives, and study sections. He serves on several editorial boards and is a reviewer for numerous other journals. Dr. Barzilai has been the recipient of numerous prestigious awards, including the Beeson Fellow for Aging Research, the Ellison Medical Foundation Senior Scholar in Aging Award, the Paul F. Glenn Foundation Award, the NIA Nathan Shock Award, and the 2010 Irving S. Wright Award of Distinction in Aging Research.

Born in Israel, Dr. Barzilai served as chief medic and physician in the Israel Defense Forces. He graduated from The Ruth and Bruce Rappaport Faculty of Medicine at the Technion-Israel Institute of Technology in Haifa and completed his residency in internal medicine at Hadassah Medical Center in Jerusalem. He served in a refugee camp during the war in Cambodia (1979-1980) and built a nutritional village in the homeland of the Zulu (1983 – Kwazulu). He was an invited speaker at the Fourth Israeli Presidential Conference on the Future in 2012.

Key Words: Aging, genetics, longevity genes, exceptional longevity, metabolism
Laurie J. Bauman, Ph.D.
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Professional Interests

Laurie J. Bauman, Ph.D., a sociologist, is a tenured Professor of Pediatrics and the Director of the Preventive Intervention Research Center (PIRC). She has been Principal Investigator of multiple NIH-funded studies that apply social science theory to the prevention of mental and physical health conditions in children, adolescents and their parents. For the past 10 years Dr. Bauman has been studying health disparities in children and youth, with special attention on adolescent sexual risk behavior and child/adolescent mental health. With her colleagues at the PIRC, she has developed and tested 6 interventions using randomized controlled trial (RCT) designs to identify strategies that are successful in reducing HIV/STI transmission. Dr. Bauman has examined service learning (that gives teens the opportunity to teach other teens what they learned about safer sex); gender norms (to help teens understand how gender norms influence risk); and relationship characteristics (so teens recognize that being in love and trusting one’s partner are associated with stopping condom use).

Dr. Bauman is currently Principal Investigator on an NICHD-funded 2-group randomized trial to assess the effectiveness of Project Prepared, an HIV/STI prevention program for young people aged 12-14. She is also PI of an NIMHD-funded project “Bronx Youth as Partners in Community Based Participatory Research” which is a teen-led partnership of adults and teens from the Bronx community. The community partners, Bronx teens aged 13-17 years, evaluated 6 health disparities and selected mental health to focus on. Together with adult partners, they developed a preventive mental health intervention called “BxThunder” which is currently being tested in an RCT with 720 youth in 5 community settings. Seventeen Bronx agencies were involved in BxThunder; they were drawn from the membership of the Bronx Youth as Partners community coalition, which includes over 50 organizational partners.

In addition, Dr. Bauman is also the PI (New York site) of a 9-city initiative that is funding CFARS to assist local Departments of Health to implement the President’s National AIDS Prevention Plan. The New York site of ECHPP (The Enhanced Comprehensive HIV Prevention Planning and Implementation for Metropolitan Statistical Areas Most Affected by HIV/AIDS) is focusing on improving linkage and engagement in care of newly diagnosed HIV positive individuals.

Dr. Bauman has been elected to the American Pediatrics Society and the New York Academy of Medicine; was the recipient of the Lela Rowland award from the National Mental Health Association and the 2008 Public Health Community Award from the Public Health Association of New York City; was Associate Editor of The Journal of Developmental and Behavioral Pediatrics; and currently serves on the Joint Executive Committee of the Einstein-Montefiore Institutional Review Board.

Key Words: adolescent, behavior, health disparities, HIV, mental health
Dr. Burk is an authority on the genomics and evolution of human papilloma viruses (HPV), which cause nearly all cases of cervical cancer. His team was the first to report, in the *New England Journal of Medicine*, that the vast majority of HPV infections in young women are short-lived and don’t require treatment.

Dr. Burk is one of five scientists, including Nobel Laureate Harold zur Hausen, appointed to the International Committee on Taxonomy of Viruses Papillomavirus Working Group, which is responsible for developing a classification system for these cancer-causing viruses.

In other research, Dr. Burk is conducting genetic studies of prostate cancer in men of Ashkenazi Jewish descent and was the first to connect aggressive forms of the disease with *BRCA1* and *BRCA2* genes, which were originally linked with breast cancer in women. In addition, Dr. Burk in collaboration with Dr. Steven Keller is working on a project to identify the genes involved in excessive sweating conditions known as hyperhidrosis.

*Key Words: human papilloma virus, prostate cancer*
Professional Interests

John Condeelis' research interests are in optical physics, cell biology and biophysics, cancer biology and mouse models of cancer. He and his collaborators developed the multiphoton imaging technology and animal models used to identify invasion and intravasation microenvironments in mammary tumors. This led to the discovery of the paracrine interaction between tumor cells and macrophages in vivo, and the role of macrophages in the migration of tumor cells and their dissemination from primary tumors via blood vessels to distant metastatic sites. Based on these results, cell collection techniques, including the in vivo invasion assay, and markers for FACS, were developed for the collection of migrating and disseminating macrophages and tumor cells. This led to the discovery of the mouse and human invasion signatures.

John Condeelis has devised optical microscopes for uncaging, biosensor detection and multiphoton imaging for these studies and has used novel caged-enzymes and biosensors to test, in vivo, the predictions of the invasion signatures regarding the mechanisms of tumor cell dissemination and metastasis. This work has supplied markers for the prediction of breast tumor metastasis in humans. Three of these markers, TMEM, MenaCalc and cofilin x p-cofilin, have been used in retrospective studies of cohorts of breast cancer patients to predict metastatic risk and are now in clinical validation trials. He has authored more than 250 scientific papers on various aspects of cell and cancer biology, biophysics and optical imaging.

Key Words: biomedical technologies, breast cancer, intravital imaging, metastasis, tumor microenvironment
Professional Interests

Dr. Crandall is Director of the Diabetes Clinical Trials Unit and co-director of the DRTC Clinical Research Facilitation Core. She is an experienced clinical investigator with joint appointments in the Divisions of Endocrinology and Geriatrics. Dr. Crandall is principal investigator for the Einstein sites of the Diabetes Prevention Program Outcomes Study (DPPOS) and the Epidemiology of Diabetes Interventions and Complications (EDIC) study. She is project leader for Heart Risk in Older Adults with Diabetes (HeartROADS), a component of the Program Project, the Metabolic Syndrome of Aging (N. Barzilai, PI). This study is evaluating the relationship between typical age-related changes in glucose metabolism (post-challenge hyperglycemia) and changes in cardiovascular risk markers, including endothelial function. As director of the Clinical Core for the Program Project, The Role of Genes in Exceptional Longevity (N. Barzilai, PI), she is responsible for recruitment, phenotyping and follow-up of a large cohort of elderly subjects with parental longevity. Dr. Crandall is also active in teaching and is the Course Director for the Endocrine Systems course for 2nd year medical students.

Key Words: clinical trials, diabetes, prediabetes, diabetes prevention, reservatol, type 2 diabetes
Professional Interests

Our primary research interest is in pathogenesis and drug resistance in the malaria parasite *Plasmodium falciparum*. Patients infected with this parasite can be completely asymptomatic or develop severe disease resulting in death. The goal of our research has been to define the molecular mechanisms that underlie this variation in disease outcomes in *P. falciparum*. Toward this goal, we have developed a new pathogenesis model through the analysis of *in vivo* parasite biology and associated host factors using a whole genome approach. We have identified novel parasite biology when it resides in the human host; this biology has not been reported under *in vitro* cultivation and may play a role in enhanced virulence and/or transmission capacity. To further understand the implications of these novel *in vivo* states we will study the parasite under *in vitro* conditions that mimic host blood stream conditions. We are also studying host response to infection using whole genome approaches to identify host factors that associate with severe disease outcomes. The long term goal is to identify parasite and host processes involved in disease to serve as targets for vaccine or chemotherapeutic development. In addition we have begun to identify parasite specific small molecules to study its biology using a complementary approach and potentially these molecules could serve as biomarkers of infection. We carry out field based translational studies in cohorts infected with malaria in Africa and these inform our experimental work using basic molecular biology approaches in the laboratory.

*Key Words: drug resistance, global health, malaria, metabolomics, parasite and host transcriptional profiling, research ethics, stress response, virulence mechanisms*
Richard G. Gorlick, M.D.

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Professional Interests
My clinical interests are focused upon the care of children, adolescents and young adults afflicted with sarcomas. Our laboratory is focused upon osteosarcoma. In the context of this malignancy we study drug resistance, potential therapeutic targets and mechanisms of pathogenesis with the aim being the improved treatment of this disease. The longstanding focus of the laboratory has been the mechanisms of antifolate resistance that are observed in osteosarcoma. We seek to understand how alterations in membrane transport influence sensitivity versus resistance to antifolates and how normal folate requirements are met in the context of these alterations. We are interested in defining the signal transduction pathways that are relevant to osteosarcoma in part to identify key genes involved in osteosarcoma pathogenesis. It is felt that these signal transduction pathways may be amenable to inhibition by targeted therapies enhancing the standard treatment with cytotoxic chemotherapy. Much of our current efforts are directed towards the IGF signaling pathway. We are interested in understanding the cell of origin of osteosarcoma, which may be a mesenchymal stem cell or a more differentiated osteoblast. We are exploring further, the genetic pathways that drive these cells towards an osteosarcoma phenotype. The laboratory performs preclinical drug studies utilizing osteosarcoma xenografts as a site for the National Cancer Institute funded Pediatric Preclinical Testing Program. A wide variety of functional and molecular approaches are used to study the various candidate genes as well as to address the drug resistance questions.

Key Words: antifolate resistance, cancer, insulin like growth factor, mesenchymal stem cells, osteosarcoma, pediatric oncology, preclinical and clinical trials cancer
Professional Interests

**Cell Transplantation to repair radiation injury:** The radiation biology laboratory is investigating the molecular pathways of radiation-induced normal tissue injury. In a rodent model of radiation-induced liver damage, our group has demonstrated that intrasplenic or intraportal transplantation of hepatocytes can ameliorate the histopathological manifestations of hepatic radiation injury and significantly improve survival in rodents. We have extended this strategy and are examining whether intestinal stem cell growth factors, such as, R-spondin 1 and endothelial cell transplantation would ameliorate radiation-induced gastrointestinal tract injury.

**Preparative Irradiation to facilitate liver cell repopulation and stem cell engraftment in vivo:** We were the first to use liver irradiation as a preparative regimen for liver cell transplantation. The long-term goal of this project is to develop liver cell transplantation as an alternative to orthotopic liver transplantation for patients with terminal liver diseases. We are examining whether a preparative regimen of focal irradiation, delivered by stereotactic radiosurgery (SRS), could ablate parenchymal cells in various organs and create a microenvironment that promotes the engraftment, growth and differentiation of progenitor / stem cell in vivo.

**Immunomodulation of radiation therapy: Radiation-enhanced tumor vaccines:** Irradiated tumors can potentially serve as a source of tumor antigens in vivo, where dying tumor cells would release various tumor antigens slowly over time. The long-term goal is to design novel tumor vaccines and amplify the immune response to such vaccines with primary tumor irradiation. Upon completion of these preclinical studies, we have designed a proof-of-principle clinical trial that will examine whether a combination of a pancreatic vaccine (PANVAC – vaccinia virus vectors expressing CEA and MUC1) and conventional 5-FU based chemo-radiation therapy would improve overall survival and induce strong tumor-specific immunity in patients with unresectable pancreatic cancer. We are also investigating whether High Frequency Ultrasound (HIFU) can augment the immune response to prostate cancer tumor vaccines.

**Development of novel radiosensitizers: ATM and polo-like kinase 1 as a target:** Our long-term goal is to screen for drugs that can radiosensitize tumor cells without having undue normal tissue toxicity. Since, majority of tumor cells have aberrant G1 checkpoint, irradiated tumor cells depend upon the G2 checkpoint for survival. In order to increase the intrinsic radiosensitivity of tumor cells, novel drugs are being designed that target the cell cycle checkpoints, especially the G2 checkpoint. Molecular targets include proteins that participate in the DNA damage surveillance pathway, such as, ATM and Plk1.

**Key Words:** cell transplantation, radiation
Meredith A. Hawkins, M.D.

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Professional Interests

Dr. Meredith Hawkins is a Professor of Medicine in the Diabetes Research and Training Center at the Albert Einstein College of Medicine. Dr. Hawkins earned her M.D. degree cum laude from the University of Toronto and a Master of Science in Clinical Research Methods cum laude from the Albert Einstein College of Medicine. She has served as Associate Editor of the American Journal of Physiology, and as Secretary Treasurer of the American Federation of Medical Research. Dr. Hawkins’ current research interests include the effects of nutrient deficiency and excess on insulin resistance, nutritional regulation of adipose tissue inflammation, and the regulation of hepatic glucose production in diabetes mellitus.

Dr. Hawkins is a Beeson Scholar of the American Federation of Aging Research, and has received research grants from the National Institutes of Health, the American Diabetes Association, the Juvenile Diabetes Foundation International and the Diabetes Action Foundation International. She is the recipient of numerous honors and awards, including the Junior Physician Scientist Award (2001) and the Outstanding Investigator Award (2012) from the American Federation of Medical Research, the Novartis Young Investigator award in Diabetes Research (2007), and election to the American Society for Clinical Investigation (2012).

Dr. Hawkins founded and directs Einstein's Global Diabetes Institute (http://www.einstein.yu.edu/centers/global-health/global-diabetes-institute/), with the goal of building strategic partnerships in medical research and education to combat the burgeoning global diabetes epidemic.

Key Words: diabetes, global diabetes, global health, glucose effectiveness, insulin resistance, malnutrition diabetes, type 2 diabetes
Betsy Herold, M.D.

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Professional Interests

Betsy Herold, M.D. directs a basic and translational research program, which focuses on the prevention of HIV and HSV and other sexually transmitted infections. Basic research in the lab focuses on defining the cellular signaling pathways that HSV-2 usurps to promote infection. Current work from our laboratory demonstrates that HSV activates calcium (Ca^{2+}), integrin, and phosphorylation signaling pathways and that these pathways play critical roles in the establishment of infection and in cell-to-cell spread of virus. More recently, the lab has identified a novel cellular protein that plays a key role in the initiation of viral protein expression and could serve as a novel target for prevention strategies. Identification of the viral and cellular factors required for infection has led to development of candidate drugs, which have been formulated for vaginal delivery to prevent both HSV and HIV infection.

Studies with vaginal microbicides have resulted in the expansion of studies to focus on soluble mucosal immunity in the genital tract. We found that female genital tract secretions collected from healthy women provide variable, but significant protection against both HSV and HIV. Mechanistic studies suggest that this endogenous activity is mediated by defensins and other antimicrobial peptides. This endogenous activity may serve as a biomarker of a "healthy mucosal immune environment" and thus provide a surrogate marker to evaluate the safety of vaginal microbicides. In addition, identification of the mediators that contribute to this endogenous activity could lead to development of new strategies to boost this host defense and help protect against infection. These studies are being conducted in collaboration with the proteomics core facility at AECOM. Additionally, we are testing the hypothesis that HSV triggers changes in the mucosal environment, which allow it to escape cervical secretion defenses, enhance its own infectivity and facilitate HIV co-infection. Our preliminary observations support the paradigm that HSV disrupts the epithelial barrier by targeting tight junction and adherens junction proteins, and interferes with host defenses by triggering an inflammatory response and a loss in protective proteins such as SLPI. These changes could facilitate both its own infectivity and enhance HIV co-infection.

Results obtained from this bench research are critical to the laboratory’s translational studies. The focus of the Translational Microbicide Research Program is to identify optimal combinations of topical microbicides that are safe and target different steps in HIV life cycle, thus reducing the risks of drug resistance and providing greater protection than could be achieved with a single agent, and also target HSV infection. Candidate combinations are evaluated using a multi-tiered approach for anti-viral activity and safety using human cervical cultures, as well as primary T cells and macrophages, in the presence of cervicovaginal secretions and seminal plasma. Leading combinations are then evaluated in human explant cultures (cervical, vaginal) and in murine genital models and a new cotton rat model for anti-viral activity and for the impact on mucosal immunity. If results of these pre-clinical studies suggest that candidate microbicides are safe and effective, the drugs are advanced for regulatory testing, and undergo evaluation in Phase I clinical studies.

*Key Words: HIV/AIDS, human papilloma virus, infectious diseases, microbicides, sexually transmitted infections*
Professional Interests

Extensively Drug Resistant *Mycobacterium tuberculosis*: The Death Defying Pathogen

Tuberculosis, caused by *Mycobacterium tuberculosis*, causes one in four avoidable deaths in the Third World and kills more adults than malaria, AIDS, and all tropical diseases combined. In recent years, there have been dramatic increases in the numbers of new cases worldwide - one of the consequences of the AIDS epidemic. In addition to these increasing incidences, there has been an emergence of *M. tuberculosis* strains that are resistant to all seven anti-tuberculosis agents. These alarming trends have caused the World Health Organization to declare tuberculosis a global health emergency, a distinction never accorded another disease. My laboratory has focused its efforts on developing systems to genetically manipulate mycobacteria, particularly *M. tuberculosis*. These tools have allowed us to: 1) develop the luciferase reporter phage assay for rapid assessment of drug susceptibilities, 2) analyze the genes involved in resistance to tuberculosis drugs such as isoniazid, ethionamide, and etyhambutol, and 3) to identify specific phenotypic properties associated with a tuberculosis pathogenesis. Current research efforts are aimed at identifying genes involved in the virulence of *M. tuberculosis*, identifying novel drug targets, generating rapid and robust phage diagnostics for drug resistant strains of *M. tuberculosis*, and engineering attenuated mutants of *M. tuberculosis* and other mycobacteria that can be used as live-cell tuberculosis vaccines.

*Key Words: infectious diseases, molecular genetics, tuberculosis, vaccines*
Ongoing research includes:

Hispanic Community Health Study / Study of Latinos (SOL): Dr. Kaplan is Principal Investigator of SOL, is a major NIH-funded cohort study of the health of US Hispanic/Latino populations. A population of 16,000 adults is being recruited in the Bronx and other SOL Field Centers for this multi-center investigation of cardiovascular disease and other conditions.

Cardiovascular Health Study (CHS): Dr. Kaplan serves on the Steering Committee of CHS, an NIH cohort study of 5,888 adults 65 years and older. Dr. Kaplan's research within the CHS examines the role of insulin-like growth factors (IGFs) in risks of cardiovascular disease and other age-related chronic conditions.

Women's Interagency HIV Study (WIHS) Cardiovascular Substudy: As the Chair of the Cardiovascular Working Group in the NIH-funded WIHS cohort, Dr. Kaplan is investigating whether vascular risks in HIV-infected individuals may be due to side effects of antiretroviral medications, inflammation or coagulation perturbation, coinfections, or other sequelae of HIV infection.

**Key Words:** aging, cardiovascular disease, HIV, observational studies
Frederick J. Kaskel, M.D., Ph.D.

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Professional Interests

Frederick J. Kaskel, M.D., Ph.D., is an internationally recognized clinical investigator and educator in pediatric nephrology. He is a Professor and Vice Chairman of Pediatrics and Director of Pediatric Nephrology at the Albert Einstein College of Medicine of Yeshiva University. He is a Past President of the American Society of Pediatric Nephrology and the Congress President of the 15th Scientific Congress of the International Pediatric Nephrology Association.

He received his undergraduate bachelor's degree in Biology from Monmouth College, Monmouth, Ill., and his doctorate in Physiology and Medical Degree from the University of Cincinnati College of Medicine and is a Distinguished Alumnus from both of these institutions. He trained in Pediatrics and Pediatric Nephrology at Montefiore Medical Center and Albert Einstein College of Medicine, respectively and was a recipient of an NIH National Research Service Award. Prior to returning to Montefiore Medical Center and the Albert Einstein College of Medicine in 1998 to become the Director of Pediatric Nephrology, he was a tenured Professor of Pediatrics at the State University of New York at Stony Brook.

Dr. Kaskel's research interests range from basic science contributions in developmental renal physiology and mechanisms of renal toxicity and hypertension, to clinical and translational research in the etiologies and treatment of progressive kidney diseases secondary to nephrotic syndrome and focal segmental glomerulosclerosis and hypertension. His current research is aimed at preventing the epidemic of obesity and cardiovascular risk factors and hypertension. He has received continuous research support from the National Institutes of Health and directs the Training Program in Pediatric Nephrology which prepares new physician investigators for careers in Pediatric Nephrology.

He published over 100 peer-reviewed articles, book chapters, and co-edited a major textbook on Fluids and Electrolytes in Pediatrics. He has numerous collaborations nationally and internationally and is expanding the communications between pediatric nephrology basic and clinical investigators worldwide. He currently plays a major role representing the Department of Pediatrics in the Einstein's prestigious Clinical Translational Science Award.

Key Words: Biomarkers, hypertension, kidney failure, obesity, observational studies
Marla Keller, MD is Professor of Medicine (Division of Infectious Diseases), Obstetrics & Gynecology and Women’s Health. She has a long-standing interest in the prevention and treatment of HIV-infection in women. Dr. Keller graduated from New York University School of Medicine, completed residency training in Internal Medicine at Beth Israel Hospital, and a fellowship in the combined Infectious Disease training program at Beth Israel Hospital and Brigham & Women’s Hospital in Boston, MA. She completed the Clinical Research Training Program at Mount Sinai School of Medicine.

Dr. Keller leads a research program focused on early phase clinical trials to assess the safety of candidate vaginal microbicides, drugs in development to prevent the sexual transmission of human immunodeficiency virus, herpes simplex virus and human papilloma virus. Her studies also focus on defining the factors that contribute to innate mucosal immunity in the female genital tract of HIV-infected and uninfected US and African women. She has completed safety and pharmacokinetic studies of candidate microbicide gels (PRO 2000, Tenofovir, Dapivirine, Acidform), tablets (Tenofovir/Emtricitabine) and vaginal rings (Acyclovir) and tested laboratory assays, which may prove to serve as biomarkers predictive of microbicide safety and efficacy.

Dr. Keller is a co-investigator of the Bronx/Manhattan consortium of the NIH-funded Women’s Interagency HIV Study (WIHS), a multi-center, prospective cohort established in 1994 to investigate the impact of HIV infection on women in the United States. Her work in the WIHS focuses on genital mucosal immunity and HPV screening practices in HIV-infected and at-risk women.

Dr. Keller is a fellow of the Infectious Disease Society of America (IDSA), a member of the HIV Medical Association (HIVMA) and a Councilor of the Infectious Diseases Society of New York. She leads the Clinical Investigation Services Core and is Director of the Clinical Research Center, components of the Harold and Muriel Institute for Clinical and Translational Research at Einstein and Montefiore, which is funded as an NIH Clinical and Translational Science Award (CTSA) consortium member. She is also an active member of the Einstein-Montefiore Center for AIDS Research.

Key Words: clinical trials, genital tract mucosal immunity, herpes, HIV, microbicides
Professional Interests

Dr. Kim is Professor of Medicine (Infectious Diseases), of Microbiology & Immunology, and of Pathology. She runs a basic science laboratory focused upon understanding the pathogenesis of toxoplasmosis and malaria. Recently she has developed collaborations with clinical investigators at the Blantyre Malaria Project in Malawi to understand the clinical impact of HIV co-infection upon cerebral malaria. She is also interested in understanding epigenetic and genetic factors that govern the host response to parasitic infections, opportunistic pathogens and tuberculosis. Dr. Kim is co-director of the NIH-funded Training Program in Geographic Medicine and Emerging Infections (with Dr. Herb Tanowitz) that supports graduate students and post-doctoral fellows (MD or PhD) pursuing mentored basic science and translational global infectious diseases research.

Dr. Kim graduated magna cum laude in biology from Harvard University and received her medical degree from the Columbia College of Physicians and Surgeons. She trained in internal medicine at Columbia Presbyterian Medical Center and in infectious diseases at University of California, San Francisco. Following her clinical training, she did a postdoctoral fellowship in the Department of Microbiology & Immunology at Stanford University School of Medicine, after which she joined the faculty at Einstein in the departments of medicine, microbiology and immunology and pathology.

Key Words: global health, infectious diseases, malaria
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Professional Interests

Dr. Kim’s research focuses on statistical methods for designing and analyzing clinical trials and epidemiologic studies (research of the factors affecting health and illness). Most clinical trials aim to demonstrate superiority of an experimental treatment relative to a standard treatment or placebo. An increasing number of trials, however, seek to show that the effects of two treatments on a particular outcome are equivalent, or that one treatment is not inferior to another. These goals are of interest when the new therapy offers benefits such as reduced cost, toxicity, or invasiveness. Dr. Kim is investigating the effects of non-compliance, outcome misclassification and measurement error on equivalence and non-inferiority trials and developing new approaches for defining the non-inferiority margin. Her research interests also include the development of methods for analyzing multivariate and interval-censored survival data. In addition, she collaborates on studies in cancer, rheumatology, and HIV/AIDS.

Dr. Kim has been head of the Division of Biostatistics since 2003 and also directs the Biostatistics Shared Resources in the Albert Einstein Cancer Center, the Institute of Clinical and Translational Research, and the Center for AIDS Research. She has served on numerous NIH grant review panels and is currently a member of the NIAMS AMSC Clinical Trials Review Committee.

Key Words: biostatistics, clinical trials, epidemiologic methods, statistical modeling
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**Professional Interests**

**Cell Death: Fundamental Mechanisms and Roles in Human Disease**

The most basic decision that any cell makes is to grow, differentiate, or die. Our laboratory is interested in basic mechanisms of cell death, and the roles of cell death in normal biology and human disease.

**Basic Science:**

From a fundamental perspective, we are particularly interested in how different cell death pathways interconnect. In previous and ongoing work, we have explored this question using ARC, an endogenous inhibitor of apoptosis with the unusual property of inhibiting both extrinsic (death receptor) and intrinsic (mitochondrial/ER) apoptosis pathways (see Nam et al. Molecular Cell, 2004; Foo et al. PNAS, 2007; and others below). Our basic interests are currently focused on understanding how the pathways that mediate apoptotic and non-apoptotic cell death interconnect in what may be a unified program of cell death. In particular, we would like to understand the factors that determine whether a cell dies by apoptosis versus necrosis in the mitochondrial death pathway (see Whelan et al. PNAS, 2012). These studies involve a wide array of approaches including molecular and cellular biology, biochemistry, and chemical, mouse, and lower organism genetics.

**Translational Science**

Although our disease-related interests have ranged from cancer (see Wu et al. JBC, 2010; Medina-Ramirez et al. Cancer Res, 2011) to diabetes (see McKimpson et al. Diabetes, 2012), our major contributions involve heart disease, including myocardial infarction (“heart attack”) and heart failure (see reviews Whelan et al. Annu Rev Physiol, 2010; Kung et al. Circ Res, 2011; Konstantinidis et al. Arterioscler Thromb Vasc Biol, 2012). In collaboration with Dr. Evripidis Gavathiotis (Department of Biochemistry), we are employing a powerful combination of chemical biology, structural biology, biochemistry, molecular and cellular biology, and small and large animal in vivo models in an attempt to translate basic insights into cardiac cell death mechanisms into novel small molecule therapies to decrease heart damage during heart attacks. We are also employing a small molecule approach to limit the deaths of transplanted cardiac progenitor cells.

**Key Words:** cancer, diabetes, cardiovascular disease
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Professional Interests

Richard B. Lipton, M.D., is the Edwin S. Lowe Professor and Vice Chair of Neurology, Professor of Epidemiology and Population Health and Professor of Psychiatry and Behavioral Sciences at the Albert Einstein College of Medicine. Dr. Lipton earned his medical degree at the University of Chicago Pritzker School of Medicine. After a medical internship at Northwestern Memorial Hospital, he completed his neurology residency and clinical neurophysiology fellowship at the Albert Einstein College of Medicine. He also completed a fellowship in neuroepidemiology at Columbia University. He is a diplomate of the American Board of Psychiatry and Neurology and a fellow of the American Academy of Neurology.

His research focuses on cognitive aging, Alzheimer's disease and migraine headaches. He is the Principal Investigator of the Einstein Aging Study, an NIH funded Program Project, and several R01s. His research focuses on risk factors and biomarkers of cognitive decline and Alzheimer’s disease. His recent studies examine cognitive aging across the lifespan with an emphasis on the effects of pain and stress on brain function.

His headache research focuses on the epidemiology of migraine and on clinical trials. His epidemiologic studies have evaluated trigger factors for headache attacks and risk factors for headache progression. Dr. Lipton has published more than 500 original articles, many with trainees. He is a 3 time winner of the H.G. Wolff Award for excellence in headache research from the American Headache Society and the Enrico Greppi award from the European Headache Federation. Dr. Lipton is co-Director of the Montefiore Headache Center, an interdisciplinary subspecialty center focused on headache, patient care, research and education.

Dr. Lipton holds leadership positions in several professional societies. He is a Past-President of the American Headache Society (AHS). He serves on the editorial boards of several journals, including Neurology. He has written 11 books. Dr. Lipton enjoys mentoring medical students, residents, PhD students and fellows. Over the last decade he has mentored 7 CRTP students and 6 K-award recipients. He has received both the CRTP Mentor of the Year Award and the Einstein Faculty Mentoring Award.

Key Words: aging, Alzheimer's disease/dementia, cognitive aging, headache, migraine
**Ruth Macklin, Ph.D.**

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**Professional Interests**

Interests: Research involving human subjects, multinational research, global health, ethics in reproductive health, ethical aspects of research and treatment of HIV/AIDS, human rights.

Dr. Macklin is an adviser to the World Health Organization and the Joint United Nations Programme on HIV/AIDS (UNAIDS), an elected member of the Institute of Medicine, and a member of the Board of Directors of the International Association of Bioethics.

She is co-director of an NIH Fogarty International Center training program in research ethics.

*Key Words: bioethics, HIV/AIDS, international collaborative research/Global Health, reproductive health research, research ethics*
Paul R. Marantz, MD, MPH, is Associate Dean for Clinical Research Education, and Professor in the Departments of Epidemiology and Population Health, and Medicine, at the Albert Einstein College of Medicine. Dr. Marantz is Associate Director of the Einstein-Montefiore Institute for Clinical and Translational Research, funded under a CTSA grant from the NIH (Harry Shamoon, PI). He is also Director of Einstein's Center for Public Health Sciences.

Dr. Marantz graduated from medical school at Brown in 1981, and was a resident in primary care internal medicine, and chief resident in medicine, at Montefiore Medical Center in the Bronx from 1981-1985. He then served as a research fellow in cardiovascular epidemiology under Dr. Michael Alderman (funded by a NRSA grant from NHLBI), and received a MPH from Columbia in 1987. He is board certified in internal medicine and in preventive medicine.

He has been on the Einstein faculty since 1987, and has been the Principal Investigator on National Institutes of Health grants; currently, he serves as co-PI on the CTSA grant and as PI of an R25 award from the NIH/OBSSR to develop an innovative medical school curriculum in behavioral and social sciences at Einstein. Dr. Marantz served as a member of the Scientific Foundations for Future Physicians Committee, a group convened by the Howard Hughes Medical Institute (HHMI) and the Association of American Medical Colleges (AAMC) to develop competencies in the natural sciences for entering and graduating medical students. He then served on a panel convened by the AAMC that developed competencies in the behavioral and social sciences. These reports inform current efforts to reform premedical and medical education.

Dr. Marantz is a member of Einstein’s Davidoff (teaching honor) Society, and in 2000 was named the F. Marion Bishop Educator of the Year by the Association of Teachers of Preventive Medicine (ATPM, now APTR). He also served as a 2003 Department of Health and Human Services Primary Health Care Policy Fellow. In 2004, he received Einstein’s Harry Eagle Award for Outstanding Basic Science Teaching, and was named Teacher of the Year from Einstein’s Clinical Research Training (MS) Program in 2005. In 2006, Dr. Marantz was awarded tenure at Einstein – making him the first faculty member on Einstein's Clinician-Educator Track to be so honored. He received the Distinguished Educator Award from the Association for Clinical Research Training (ACRT) in 2011.

Currently, he oversees the educational and training programs of the Institute for Clinical and Translational Research (ICTR). The ICTR offers degree-granting (MPH, MS, PhD) programs, as well as certificate programs and courses, that provide research skills to health professionals.

Key Words: clinical research methods, medical education, public health, translational medicine
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Professional Interests

Since 1979, Dr. Moshé’s research has focused on translational approaches to understand the mechanisms underlying the development of epilepsy and its consequences in infants and children. His laboratory has developed and patented an animal model that replicates human infantile spasms. In collaboration with Dr. Aristea Galanopoulou, this model is being used to identify novel treatments of this devastating condition. His work has identified an endogenous brain circuit that can control the expression of seizures as a function of age and gender. In addition to his laboratory research, he is actively involved in several large, multi-center studies examining the outcomes of prolonged, febrile seizures (seizures occurring with fever) and absence epilepsy to identify predictive biomarkers of the course and response to treatment. In more than 20 years, Dr. Moshé has mentored numerous scientists and clinicians from around the world in clinical epilepsy and basic science epilepsy-related research.

Dr. Moshé is active in numerous professional societies and elected President of the American Epilepsy Society, the American Clinical Neurophysiology Society, the Eastern Association of Electroencephalographers, and past President of The International League against Epilepsy. He is an elected member of the American Neurological Association and the American Pediatric Society

Key Words: epilepsy, seizure disorders
**Professional Interests**

My research interests are in tuberculosis (TB), HIV, and global health including ethical issues in global health research. Current research is centered in South Africa and involves collaboration with the Jacobs' lab at Einstein, the KwaZulu-Natal Research Institute on TB/HIV (K-RITH), and the Centre for AIDS Programme of Research in South Africa (CAPRISA).

Drug-resistant tuberculosis is an important global public health concern because of increasing incidence, low cure rates, and high reported mortality. Nowhere has this increased incidence generated more concern than in South Africa where interactions between TB and generalized HIV/AIDS epidemics are causing explosive increases in TB incidence and TB case-fatality rates. The most drug-resistant form of tuberculosis, extensively drug resistant tuberculosis (XDR-TB), is increasingly prevalent in South Africa.

**Epidemiology**

Our team has published describing widespread transmission of MDR-TB and XDR-TB among South African health care workers. We have also shown that female gender is an independent risk factor for XDR-TB in South Africa not explained by higher rates of HIV infection or increased previous treatment for TB.

**Clinical**

Our team has described clinical treatment outcomes for patients with XDR-TB and HIV co-infection. Ongoing work includes a cohort study of using later generation fluoroquinolones, and clofazamine, a leprosy drug, for XDR-TB treatment.

**Translational**

Working with the Jacobs lab, I am involved in designing clinical studies to use the fluoromycobacteriaphage assay to quantify response to treatment, predict early treatment outcome, and detect worsening of drug-resistance in real-time among XDR-TB patients on treatment.

*Key Words: global health, HIV, tuberculosis, clinical trials*
Professional Interests

The focus of our laboratory is immunity to encapsulated pathogens, specifically Cryptococcus and Pneumococcus, which are acquired by inhalation. Pneumococcus is the leading cause of pneumonia in the United States and globally, causing more than one million deaths annually in children under the age of five years. It also occurs widely in the elderly and in those with compromised antibody immunity. Cryptococcus is the leading cause of fungal meningitis globally, causing more than 900,000 cases of disease and 600,000 deaths annually, primarily in sub-Saharan Africa. Cryptococcal disease occurs primarily in patients with AIDS and those with solid organ transplants.

Antimicrobial therapy for both microbes suffers from limitations, stemming from antimicrobial resistance for Pneumococcus and an inability to eradicate the organism in immunocompromised patients for Cryptococcus. Pneumococcal vaccines are in use, but their efficacy is limited in immunocompromised patients. There is no vaccine for Cryptococcus. The main virulence factor of both is a polysaccharide capsule, which surrounds the organism. These capsules inhibit cellular and antibody immunity, enhancing susceptibility to disease. We seek to identify the mechanisms that govern immunity to encapsulated microbes. We hope to better predict disease susceptibility and to improve therapies and vaccines. Much of our work is based on the Damage-response framework, a theory of microbial pathogenesis.

Key Words: bacterial infections, fungal infections, immunology, infectious diseases, pneumonia, vaccines
Professional Interests

Research in our laboratory is focused on three areas of HIV/AIDS: replication mechanisms, therapeutics and pathogenesis.

**HIV Replication Mechanisms**: We have a long-standing interest in elucidating the mechanistic basis of key steps in HIV-1 replication. In earlier work, we delineated the determinants of fidelity of DNA synthesis by RT. We are currently focused on the interaction between the cellular factors and viral proteins that are crucial for HIV-1 replication.

**RNA aptamers targeting HIV**: For over a decade, we are developing and testing the efficacy of novel, anti-HIV-1 RNA aptamers to inhibit HIV-1 replication in cell culture. Aptamers are sequences isolated by the iterative process of SELEX and are highly specific to their targets. The most efficacious aptamers identified in our laboratory as well as combinations of them could be tested in nonhuman primates (macaques). We will introduce such aptamers into hematopoietic stem cells, which will then be used in bone marrow transplantation followed by challenge with chimeric, pathogenic SHIVs. In earlier work, we have done considerable amount of work on anti-RT aptamers. We have now generated new aptamers to other viral targets including structural, catalytic and accessory proteins of HIV (Gag, Protease and Nef). Perturbation of HIV-1 Gag and viral RNA interaction using anti-Gag aptamers has provided new insights showing that preventing Gag-RNA binding causes down-modulation of viral RNA thus inhibiting virus production. We are currently characterizing the Nef aptamers to understand the specific Nef functions in HIV replication that are affected by each aptamer.

**HIV associated Dementia**: The severe form of HIV associated dementia (HAD) is common among clade-B HIV-infected individuals in the US, but less common among individuals infected with clade-C HIV-1 such as in India, suggesting that there are clade-specific differences in neuropathogenicity. Understanding clade-specific determinants of neuropathogenesis may shed light on the disease mechanism and help develop targeted drugs for HAD. We previously showed that clade C Tat lacks the chemokine function of Clade B Tat that plays a crucial role in the increased brain infiltration of monocyctic phagocytes in HAD. We study neuropathogenesis induced by the two HIV-1 clades using SCID mouse HIV encephalitis (SCID-HIVE) model, where it has been shown that introduction of clade B HIV into SCID mouse brain recapitulates the key features of the human HAD disease. We found that, mice exposed to similar inputs of HIVIndie-C1 (clade C) made fewer memory errors than those exposed to HIV-1ADA (clade B). HIV-1ADA also caused greater astrogliosis and loss of neuronal network integrity.

Our results indicate that Tat dicysteine motif determines neurovirulence. If confirmed in population studies, it may be possible to predict neurocognitive outcomes of individuals infected with HIV-1C by genotyping Tat.

**Key Words: global health, HIV/AIDS**
Professional Interests

In 1999 we developed a multidisciplinary group including surgery, oncology, pathology, molecular biology, protein chemistry, computational biology and biostatistics to study Head and Neck Squamous Cell Carcinoma (HNSCC). Our initial studies on molecular classification of HNSCC using microarray technology demonstrated that patient segregation by gene expression profiling is a better predictor of outcome than established clinicopathological variables. The Head and Neck Program includes multiple laboratories with research exploring basic mechanisms of tumor behavior, developing biomarkers and identifying molecular classifiers that define distinct subsets of patients. Studies in the Prystowsky Laboratory focus on identifying proteomic signatures that predict tumor behavior. The Head and Neck program goals are:

- To develop new diagnostics that will identify optimal treatments at initial diagnosis.
- To identify potential new targets for drug development.

*Key Words: biomarkers, cancer, clinical research, genomics, proteomics, translational research*
Systemic lupus erythematosus (SLE) is a prototypical systemic autoimmune disease, characterized by the presence of numerous autoantibodies and involvement of multiple organ systems. Inflammation of the kidneys, or lupus nephritis, appears in up to 50% of lupus patients during the course of their disease. Unfortunately, major strides forward in understanding lupus and the advent of newer “biologic” therapies in the field of Rheumatology have yet to translate into measurable benefits for the majority of patients with SLE. Current treatments, while effective, only control disease activity but are not curative. Furthermore, therapeutic modalities that are employed at this time for the treatment of patients with lupus are non-specific – and commonly affect normal cells that are essential for the defense against foreign pathogens, in addition to suppressing the disease-relevant autoreactive B cells. Nevertheless, early diagnosis and prompt treatment can still significantly improve long-term prognosis.

Anti-double stranded (ds) DNA antibodies are a serologic hallmark of patients with SLE. In recent years it has been increasingly clear that not only are anti-dsDNA antibodies an important diagnostic marker for lupus, but that these autoantibodies are also instrumental in the pathogenesis of lupus nephritis. The mechanisms by which anti-dsDNA antibodies induce renal injury, however, are not completely understood. One major long-term goal of the laboratory is to study the renal pathogenicity of anti-dsDNA antibodies. We are determining the cross-reactive kidney antigen bound by anti-DNA antibodies in human lupus and in mouse models of the disease to understand what determines the nephritogenic potential of these antibodies. We made significant progress in defining one renal antigen bound by cross-reactive anti-DNA antibodies. We discovered that a-actinin is a major cross-reactive target for the anti-dsDNA antibody response in murine lupus, and that both human monoclonal and polyclonal anti-dsDNA antibodies bind to a-actinin as well. In current studies, we are investigating if a-actinin can serve not only as a target but also as an antigenic trigger for anti-DNA antibodies, whether anti-a-actinin antibodies are associated with specific disease features (analysis of patient cohorts), and what might be the mechanism by which these antibodies induce damage in kidney cells (proteomic and microarray approaches). Understanding the renal pathogenicity of cross-reactive anti-dsDNA antibodies by identifying the target antigen for these antibodies in the kidney could allow us to develop novel approaches to the treatment of lupus, by blocking the effects of anti-DNA antibodies on target organs or by specifically tolerizing pathogenic B cells.

In a second group of related projects in the laboratory, we are investigating the role of a relatively new member of the TNF superfamily (TWEAK) and its receptor Fn14 in the pathogenesis of lupus, specifically lupus nephritis. We have shown that TWEAK induces a pro-inflammatory profile of cytokines and chemokines in kidney epithelial and mesangial cells, and thus contributes to the influx of inflammatory cells observed in the early stages of lupus nephritis. Modulation of the TWEAK/Fn14 pathway in SLE may be an important target for novel therapies for this disease. Furthermore, we are exploring the role of TWEAK as a biomarker for disease activity in lupus nephritis. Indeed, such as serum or urinary biomarker would have tremendous value for patient care, allowing early and accurate diagnosis and more precise management, without the need for an invasive kidney biopsy.

Key Words: anti-DNA antibodies, arthritis, autoimmune diseases, lupus, nephritis, rheumatoid arthritis, SLE
Professional Interests

As a community psychologist, I seek to improve access to quality of life and to care among diverse, medically underserved patients, families and communities. My research focuses on how community-academic partnerships can reduce barriers and improve standard of care. My colleagues and I have conducted several projects to promote evidence-based clinical practice through collaborative research. Some examples include:

- Our current Queens Library HealthLink Project, which uses community organizing to provide cancer education to diverse, underserved communities;
- Our ACCESS Project, which worked with community organizations to promote breast health awareness and mammography screening among medically underserved women;
- Our Family Access to Care Study, which joined frontline providers and health researchers in providing mental health interventions for families affected by HIV/AIDS; and
- A series of studies -- for which I also am principal investigator -- examines the quality of life of patients living with HIV/AIDS, bladder cancer and prostate cancer.

Our collaborative research with community organizations and health providers led to new research designs and assessment methodology to promote evidence-based interventions in public health. For example, the Quality of Life Appraisal Model accounts for differences in the ways that health states are evaluated across people and over time. More recently, we have established Comprehensive Dynamic Trial designs to describe multi-level interventions in community-based, participatory research.

Key Words: cancer detection, community capacity building, community psychology, health disparities and inequities, HIV prevention, participatory research, quality of life
Dr. Rohan is a cancer epidemiologist who studies the role of genetic/molecular, nutritional, and hormonal factors in the etiology and pathogenesis of a wide range of cancers. Much of his work has focused on breast cancer, in relation to which he has a particular interest in the molecular pathogenesis of breast cancer, where his work focuses on identifying molecular changes in benign breast disease tissue that predispose to the development of subsequent breast cancer. Many of his other studies have involved cohort investigations, mostly within the Women’s Health Initiative cohorts, the Canadian National Breast Screening Study dietary cohort, and more recently within a new cohort that he established, the Canadian Study of Diet, Lifestyle, and Health. He has published many scientific articles on cancer epidemiology, and he has co-edited books on cancer precursors and on cervical cancer. In addition to being chair of the department of epidemiology and population health, Dr. Rohan is associate director for population sciences in the Albert Einstein Cancer Center, and he is a member of the Board of Scientific Counselors of the National Cancer Institute. He is on the editorial board of several journals, and is a member of several professional societies.

*Key Words: cancer etiology, molecular epidemiology, nutritional epidemiology*
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Professional Interests

Current research focuses on the molecular epidemiology of cancer and precursor lesions. Projects under development will investigate biomarkers involved in the development of upper aerodigestive tract, lung and cervical cancers.

Aerodigestive Tract Cancers: Head and neck cancers (including the oral cavity, pharynx and larynx) are among the 10 most common malignancies of both men and women worldwide, with 5-year survival rates of only 50%. While early studies by our group have shown tobacco smoking, alcohol drinking and their joint effects to be the most important risk factors for head and neck cancer (Cancer Causes Control 2001; 12:579-87; Arch Otolaryngol Head Neck Surg 2002; 128:313-8; J Cancer Epidemiol Prev 2002; 7:131-41), recent evidence has identified additional etiological links between HPV and genetic events and head and neck cancer (Oncol Rep 2005; 14:1239-46; Cytogenet Genome Res 2007; 118:92-109; Int J Cancer 2007; 118:1976-83). Furthermore, along the upper aero-digestive tract, there may be a higher frequency of genetic and epigenetic events as a result of exposure to smoking, alcohol and viral pathogens like HPV. My current research focuses on early gene expression profiles in the head and neck in subjects with cancer and precursor lesions (J Pathol 2007; 213:283-93; Head Neck 2006; 28:1018-27; Cytogenet Genome Res 2006; 114:16-23), as well as those who have been exposed to oral risk factors for carcinoma development including tobacco smoking (Laryngoscope 2006; 116:1375-9) and HPV (Oncol Rep 2005; 14:1239-46; J Pathol 2007; 213:283-93).

Cervical Cancer: Cervical cancer is one of the most common neoplastic diseases affecting women, with a combined worldwide incidence of almost half a million new cases annually, which is second only to breast cancer. Evidence from our research and others show that infection with certain types of sexually-transmitted HPV plays a causal role in cervical cancer. We have also found that precursor lesions of the cervix detected by cytology persist longer and are more likely to progress in women with oncogenic HPV infections (JNCI 2003; 95:1336-43) and high viral load (Int J Cancer 2003; 103:519-24), and that in women with normal cervical cytology, the risk of developing cervical lesions was 2-4-fold greater for women who had persistent oncogenic HPV infection (JAMA 2001; 286:3106-14). My research continues to focus on understanding the natural history of HPV, genetic profiles and their affect on the development of neoplasia in the cervix and other sites in adults and adolescents (J Low Genit Tract Dis 2006; 10:229-37; J Gen Virol 2005; 86:2709-20; Gynecol Oncol 2004; 92:856-65; AJE 2003;

Head and Neck Cancer Research Program

Head and Neck Cancer Research Program at Einstein focuses on patients with head and neck squamous cell carcinoma (HNSCC). The multidisciplinary group of investigators utilizes molecular genetic perspectives and technologies established at the Albert Einstein Cancer Center (AECC).

Key Words: adolescents, biomarkers, cancer, epidemiology, human papilloma virus
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Professional Interests

My current focus is training the next generation of clinical researchers at Einstein. I run two training programs that offer a strong foundation in clinical research methods. (Please see the formal NIH definition of clinical research below.) I bring my own clinical research career studying HIV and drug use to my current focus on Education, Training and Career Development under the auspices of the Institute for Clinical and Translational Research which supports the Clinical Research Training Program (CRTP) and the Ph.D in Clinical Investigation. The CRTP is a two-year master’s program that combines a structured program of courses in epidemiology, biostatistics, data analysis and bioethics with a mentored research experience, leading to the completion of a hypothesis-driven, original research paper suitable for publication. The Ph.D. in Clinical Investigation is a track in Einstein’s graduate division through which Ph.D. and M.D.-Ph.D. students study with a member of Einstein’s growing clinical and translational research faculty. It is expected that with receipt of the Ph.D. and M.S., these scientists meaningfully contribute to improving the health and welfare of our society using clinical and translational research methods.

*Key Words: biostatistics, clinical investigation, clinical research, epidemiology, medical education, population studies*
Professional Interests

Since 2002, he has been Baumritter Professor and University Chairman of the Department of Medicine at Einstein and at Montefiore Medical Center. The Department has ~270 full-time and ~750 voluntary faculty members. It receives ~$40 million annually in NIH dollars, generates clinical practice collections of ~$40 million annually, and manages a hospital budget of ~$25 million annually. The Department administers the fifth largest Internal Medicine house staff training program in the country and accounts for over half of Montefiore’s hospital admissions. Since becoming Chairman, Dr. Schuster and his team have significantly expanded the medical practice, and have simultaneously created the basis for additional investment and growth through attention to the "revenue cycle" (i.e. billings & collections). In part as a result of recruiting new physician-scientists, the Department’s grant income increased by 36% between 2002-2005 (the comparable NIH extramural growth rate was 27%). Since 2002, Dr. Schuster and his colleagues in the Department have recruited/appointed six division chiefs; founded the first Einstein Division of General Internal Medicine, which is focused on expanding departmental "dry bench" research; expanded the teaching hospitalist program to an additional campus; and created & launched a performance/RVU-based compensation plan for the clinician-educators. To communicate to a far-flung and complex academic entity, Dr. Schuster writes and sends a weekly email departmental newsletter to over 800 recipients.

Scientifically, Dr. Schuster has focused for 25 years on vasoactive hormones and epithelial transport. His laboratory was the first to show that angiotensin II directly modulates fluid reabsorption by the proximal tubule. For a decade, he worked in acid-base physiology, characterizing the respective transporters of renal collecting duct a and b intercalated cells. In 1995, his laboratory discovered the prostaglandin (PG) transporter "PGT", a finding he has extended to human and mouse genetics, zebrafish, and drug discovery. His laboratory has advanced the hypothesis that PG signaling is akin to neuronal signaling, i.e. the signaling molecule is released and then taken up again by the same cell. Because PGT regulates the expression of, and signaling via, PG receptors, it comprises a new therapeutic target for modulating prostanoid signaling. The NIH has continuously funded his research program since 1983. He is currently the PI on an R01 in its 11th year, funded through 2011, and an NIH O'Brien Kidney Center, funded through 2008. In recognition of his research accomplishments, he was elected to the American Society for Clinical Investigation (1992) and the Association of American Physicians (1998).

Dr. Schuster is active in clinical medicine and teaching. He serves as the Renal Consult Service attending physician for two months each year; is a frequent discussant of clinical cases with the house staff ("morning report" and "chief of service rounds"); and regularly lectures on renal physiology, pathophysiology, and disease to the Einstein medical students, MD-PhD students, and renal fellows.

Key Words: cardiovascular disease, eicosanoids, membrane transport, prostaglandins, signaling
Professional Interests

Dr. Shlomo Shinnar is a neurologist, pediatrician and epidemiologist. His expertise focuses on comprehensive epilepsy management, child neurology and epilepsy with a focus on long term studies the prognosis of childhood seizures disorders.

Dr. Shinnar conducts research on a variety of topics relating to childhood seizures, including when to initiate and discontinue antiepileptic drug therapy, prognosis following a first seizure, and prognosis following discontinuation of medications in children with seizures. He studies status epilepticus, a life-threatening condition of persistent continuous and unremitting brain seizure lasting longer than 30 minutes. He is also involved in research in autism, an increasingly common neurological condition in childhood.

His current research focuses on the consequences of prolonged febrile seizures, the most common seizure seen in children and on the long term outcomes of childhood absence (petit-mal) seizures which are the most common form of epilepsy in children. He is also involved in clinical trials that test how well different treatments work in neurological disorders and is the Co-PI of the Einstein Center of Excellence for Clinical Trials in Neurology (Einstein NeuroNEX)

Dr. Shinnar is the senior editor of the book *Childhood Seizures* and co-editor of the book *Febrile Seizures*. He has published over 170 original papers and over 120 reviews and chapters. He is the recipient of the prestigious Research Recognition Award of the American Epilepsy Society and the CURE research award. His continuing research on the Consequences of Prolonged Febrile Seizures in Children (FEBSTAT) study was recently recognized with the prestigious Javits award by the NINDS.

**Key Words:** pediatrics, epidemiology, epilepsy, febrile seizures, prognosis, seizure disorders, treatment
Professional Interests

I am a Developmental Psychologist and health services researcher with expertise in methodology and statistics. I am currently involved in several studies focusing on sexual risk behavior in urban adolescents, including randomized trials of several STD/HIV risk reduction interventions. I am a member of the Social and Behavioral Research Faculty at the Einstein-Montefiore Center for AIDS Research, the Einstein HIV/STD Translational Working Group, and the Center for Public Health Sciences, and I am working on projects for adolescents and young adults in India and Kenya through the Global Health Center. I also am a co-investigator on a project using community participatory research (CBPR) methods to study health disparities for Bronx minority youth, through which we designed and are evaluating a community-based mental health intervention for teens. My other work has examined a variety of risk and resilience factors influencing children's health and psychological adjustment, including studies of the impact of childhood chronic illness on families and the role of parenting stress. I also am working on evaluations of programs focusing on early child development and socio-emotional health with other Pediatric faculty and I am involved in research training of medical and social science graduate students and fellows.

Key Words: adolescents, chronic illness, mental health, pediatrics, prevention, risk, sexual behavior
Professional Interests

Focusing diagnostics and therapeutics on those most likely to benefit is a key to successful intervention at both the public health and clinical levels. The translational goal of the Spivack laboratory is to identify individuals at particularly high risk for lung malignancy, and selected non-malignant lung diseases, upon whom to focus smoking/toxin exposure cessation (primary prevention), chemoprevention (secondary prevention), and early disease detection efforts (disease screening, tertiary prevention).

The laboratory is currently exploring individual Gene x Environment signatures as susceptibility markers by exploring quantitative gene (mRNA) expression phenotypes, and the DNA sequence, methylation, microRNA, and other epigenetic features potentially underlying these expression phenotypes, in vitro and in human populations. This is performed in the setting of defined tobacco, diet, and other exposures. There are both mechanistic and translational components to the studies.

Mechanistically, the role of epigenetic variation in promoter regions in the 5’ and 3’ regulatory regions of carcinogenesis and oxidant pathway genes is being explored in vitro, using human genomic DNA reporter constructs, and native gene regulation models. High resolution technologies include the real-time quantitation of native mRNA and microRNA by the laboratory’s RNA-specific strategy (patented); the tagged-bisulfite genomic sequencing strategy to determine single base resolution CpG methylation status (tBGS, patented); evaluation of functional consequences of DNA methylation detail, using a novel patch reporter construct, not previously reported (patent pending); and an experimental strategy for assaying microRNA binding to mRNA, for determining the role of miRNA in candidate gene regulation, not previously reported (patent pending).

Whole (epi)genome approaches to identify molecular events unique to lung cancer are being completed, which will represent one of the initial cross-platform ‘omics level discovery examinations of lung tissues. The execution of each individual discovery platform involves expert local collaborators and cores in (epi)genetics and genomics, and the “integromics” is critically reliant on Einstein strengths in informatics and biostatistical analyses.

Translationally, human lung carcinogenesis biomarkers are being established by pairing laser capture microdissected lung and several unique, non-invasively collected surrogate specimens developed in the laboratory. These include mRNA expression signatures from brush-exfoliated buccal mucosa cells, and DNA methylation and microRNAs detected in exhaled breath condensate, representing first reports for a new exhaled airway biomarker class. These airway-derived specimens continue to accrue from a sampling (currently n>950) of a population assembled in a lung cancer case-control context. The specimens are being studied with a view toward non-invasive assays in populations.

The overall aim is to develop informative non-invasive risk profiling, preventive, and early disease detection strategies for the lung in human populations.

Key Words: airway biomarkers, early lung cancer detection, gene regulation, lung cancer, lung disease
Professional Interests

Primary research interests involve viral and cancer epidemiology, especially as it relates to:

(i) The viral causes of cancer such as human papillomavirus (HPV) and hepatitis C virus (HCV)

(ii) Immunogenetic factors that influence viral infection with HPV, human immunodeficiency virus (HIV), and hepatitis C virus (HCV)

(iii) The hormonal and growth factors influences on viral pathogenesis and tumorigenesis. These include obesity, diabetes, the insulin / insulin-like growth factor axis, sex hormones, and related pathways.

Key Words: hepatitis C, HIV, human papilloma virus, insulin, insulin like growth factors, molecular epidemiology, observational studies, viral and cancer epidemiology, viral natural history
Professional Interests

My research is in the field of Cognitive Neuroscience and is focused on understanding the neural bases of auditory information processing in adults and children. Our laboratory’s research uses a combination of non-invasive recordings of human brain activity (event-related potentials [ERPs]) and functional magnetic resonance imaging (fMRI), in conjunction with behavioral performance measures, to specify the processes and brain structures that contribute to the organization, storage and perception of a coherent sound environment.

Key Words: attention, auditory, cognitive neuroscience, electrophysiology, memory
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**Professional Interests**

Dr. Joe Verghese graduated from St. Johns Medical College, Bangalore, India in 1989. He did his postgraduate training in Internal Medicine and Neurology in United Kingdom. He completed his Neurology residency at the Albert Einstein College of Medicine, Bronx, NY in 1998. He did his fellowship training in Neurophysiology as well as Aging & Dementia in 1999 at the same institution. He received a Master of Science degree in Clinical Research Methods with Distinction in 2001. Dr Verghese is board-Certified in Neurology.

Dr. Verghese is Professor of Neurology and Medicine, Murray D. Gross Memorial Faculty Scholar in Gerontology, and Director, Resnick Gerontology Center at Einstein. He is the Chief of the Integrated Divisions of Cognitive and Motor Aging (Neurology) and Geriatrics (Medicine).

Dr. Verghese is a recipient of the Beeson award from the National institute on Aging and the Outstanding Scientific Achievement for Clinical Investigation Award from the American Geriatrics Society. His research interest is the effects of disease and aging on mobility and cognition in older adults. He has over 100 peer-reviewed publications and several federally funded grants in this area. His current projects include studying the influence of cognitively stimulating activities on reducing risk of dementia, the role of divided attention tasks such as walking while talking in predicting outcomes such as disability and cognitive decline, cognitive interventions, and global health.

*Key Words: aging, Alzheimer’s disease/dementia, cognition, falls, frailty, gait/immobility*
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Professional Interests

Elizabeth A. Walker, PhD, RN, is the director of the Prevention and Control Core for the Diabetes Research and Training Center at the Albert Einstein College of Medicine. Dr. Walker is currently the principal investigator of a large NIH-funded behavioral intervention study in minority diabetes populations, using telephonic interventions in Spanish and English to promote medication adherence, lifestyle change, screening for complications, and other self-management behaviors. She has completed several National Eye Institute funded studies to promote ophthalmic examinations to screen for retinopathy in minority diabetes participants. She is a behavioral scientist and co-investigator for the multi-center Diabetes Prevention Program Outcomes Study, and she co-chairs the DPP Medication Adherence Workgroup. Dr. Walker was also PI of a community-based study, Los Caminos, in which a culturally-sensitive diabetes self-management program was developed based on our focus group and survey findings, and will be implemented using community/peer educators in the Bronx. Through the Prevention and Control cores of the DRTC, she provides or facilitates various intervention and evaluation services to multiple health disparities grants in the New York City community.

She collaborates in NIH-funded research with the New York City Department of Health and Mental Hygiene and its Diabetes Prevention and Control Division. Dr. Walker is a diabetes nurse specialist; she has been a certified diabetes educator (CDE) since 1986. She was co-chair of a Centers for Disease Control and Prevention (CDC) Expert Panel on Risk Perception and Decision Making in Chronic Disease. In 1999-2000, she served as the national President, Health Care & Education, of the American Diabetes Association. In 2008, she was named a Fellow of the American Association of Diabetes Educators (FAADE).

Key Words: behavioral intervention research, measuring risk perception, medication adherence, research ethics, telephonic interventions, type 2 diabetes
Professional Interests

*Toxoplasma gondii*, microsporidiosis, stage differentiation, polar tube structure and function

**Toxoplasmosis:** *Toxoplasma gondii* is a well described ubiquitous Apicomplexan protozoan parasite of mammals and birds. Despite recent progress in understanding the biology and antigenic structure of the rapidly replicating form (tachyzoite), very little is known about the cyst form (bradyzoite). The bradyzoite stage of *Toxoplasma gondii* plays a critical role in maintenance of latent infection. The identification of cyst wall specific proteins as well as stress related proteins and their effects on bradyzoite development is proceeding in the laboratory.

**Microsporidiosis:** The phylum Microspora consists of organisms collectively known as microsporidia, that are "emerging" human and veterinary pathogens. A microsporidian-specific organelle, the polar tube, is involved in invasion. While the description of the polar tube as a unique microsporidian structure occurred over 100 years ago, the biochemical components of this structure and the mechanism of its formation during invasion remain to be definitively determined. The laboratory is focused on projects involving the: (1) characterization of the structure and composition of the polar tube and spore wall, and (2) the identification of therapeutic targets for the treatment of microsporidiosis.

*Key Words: global health, infectious diseases*
Professional Interest

Dr. Wylie-Rosett’s research focuses on nutrition’s role in preventing and controlling chronic diseases—particularly diseases such as type 2 diabetes and heart disease in which obesity is an important risk factor. She is associate editor of the journal *Diabetes Care* and author of *The Complete Weight Loss Workbook*. Dr. Wylie-Rosett has helped the American Diabetes Association and American Heart Association develop nutrition-related recommendations and position statements.

Dr. Wylie-Rosett is now conducting a clinical trial evaluating how a comprehensive approach to family weight management affects biomarkers that are known to reflect cardiometabolic health. She has also been an investigator in multicenter trials that changed the way healthcare is administered to millions of people, including the Diabetes Prevention Program, the Diabetes Control and Complications Trial and the Women’s Health Initiative. Dr. Wylie-Rosett directs the Behavioral Evaluation and Intervention Methodology Functional Unit of the Diabetes Research and Training Center at Einstein and is a member of the Albert Einstein Cancer Center.

*Key Words: behavioral intervention, behavior modification, clinical trials, epidemiology, lifestyle, nutrition, obesity, type 2 diabetes, weight management*