



A TRIBUTE TO
RUTH L. KIRSCHSTEIN, M.D.

INSPIRING

the best in Others

MONDAY, MAY 17, 2010

9 AM–7:30 PM

BUILDING 45,

NATCHER AUDITORIUM

NATIONAL INSTITUTES OF HEALTH
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
BETHESDA, MARYLAND

A TRIBUTE TO RUTH L. KIRSCHSTEIN, M.D. INSPIRING THE BEST IN OTHERS

MAY 17, 2010 9:00 A.M.-7:30 P.M.
NATCHER CONFERENCE CENTER
NATIONAL INSTITUTES OF HEALTH

9:00 a.m. – 10:30 a.m.

Opening Session: Remembering Ruth L. Kirschstein, M.D.

NIH Director Dr. Francis S. Collins; Dr. Jeremy Berg, NIGMS Director; Dr. Arnold Rabson (son of the late Dr. Kirschstein); U.S. Representative David R. Obey, Wisconsin; U.S. Senator Tom Harkin, Iowa; Louis Stokes, former Congressman, Ohio; DHHS Deputy Secretary Bill Corr; Dr. Marvin Cassman, former NIGMS Director; Charlette Bronson, NIA; John Edward Porter, former Congressman, Illinois; Constance Albanese "Connie" Morella, former Congresswoman, Maryland; Dr. Shirley Malcom, AAAS; Dr. Donald Wilson, former dean, UMD School of Medicine; Wendy Wertheimer, OAR; Dr. Yvonne Maddox, NICHD Deputy Director.

Pre-session music by Ann Brewer, NIH, a series of Beethoven Sonatas on piano; closing music by Dr. Agnes Donahue, DHHS (soprano) accompanied by Dr. Jeffrey Watson, DHHS (piano), "The May Night," by Johannes Brahms.

10:30 a.m. – 11:00 a.m.

Break

11:00 a.m. – 12:30 p.m.

Ruth L. Kirschstein NRSA Symposium: Session I. Stem Cells

Introduction to the scientific sessions by Dr. Michael Gottesman, Deputy Director for Intramural Research

Scientific presentations by Dr. Sara Cherry, University of Pennsylvania; Dr. Francis Lee, Weill Cornell Medical College; Dr. Julie Pfeiffer, University of Texas Southwestern; Dr. Laurie Boyer, Massachusetts Institute of Technology.

Session Co-Chairs: Dr. Josephine Briggs (NCCAM Director) and Dr. Nora Volkow (NIDA Director)

12:30 p.m. – 1:15 p.m.

Lunch

(OVER)

1:15 p.m. – 2:30 p.m.

Ruth L. Kirschstein NRSA Symposium: Session II. Cancer Metastasis

Scientific presentations by Dr. Howard Chang, Stanford University; Dr. Levi Garraway, Harvard Medical School; Dr. Dorothy Sipkins, University of Chicago.

Session Co-Chairs: Dr. Stephen Katz (NIAMS Director) and Dr. John Niederhuber (NCI Director)

Short break

2:40 p.m. – 4:15 p.m.

Ruth L. Kirschstein NRSA Symposium: Session III. Neuroscience

Scientific presentations by Dr. Mark Johnson, Harvard Medical School; Dr. Alfredo Quiñones-Hinojosa, Johns Hopkins University; Dr. Anna Penn, Stanford University; Dr. Gonzalo Torres, University of Pittsburgh.

Session Co-Chairs: Dr. Richard Hodes (NIA Director) and Dr. Story Landis (NINDS Director)

Short break

4:40 p.m. – 5:30 p.m.

Ruth L. Kirschstein NRSA Symposium: Session IV. Panel Discussion: The Importance of Mentoring, Nurturing, and Inspiring the Best in Others

Drs. Boyer, Penn, Torres and Lee discuss how mentors helped shaped their careers and how they are now inspiring the next generation of scientists.

Session Co-Chairs: Dr. Joan Schwartz (Assistant Director, OIR) and Dr. Alfred Johnson (ORS Director)

5:30 p.m. – 7:30 p.m.

Dr. Ruth L. Kirschstein NRSA Poster Session and Reception

Former RLK NRSA recipients and poster presenters include: Dr. Kristin L. Bigos (NIMH), Dr. Harold Burgess (NICHD), Dr. Bashira A. Charles (NHGRI), Sophia Cleland (NIAMS), Dr. Arseima Del Valle-Pinero (NINR), Dr. Laura Elnitski (NHGRI), Dr. Wendy A. Henderson (NINR), Dr. Joshua Hunsberger (NIMH), Dr. Wei Li, (NEI), Dr. Zheng Li (NIMH), Alexandra McPherron (NIDDK), Dr. Lilia Mijares (CC), Dr. Kumaran Ramamurthi (NCI), Dr. Laura A. Thomas (NIMH).

Session Co-Chairs: Dr. Griffin Rodgers (NIDDK Director), Dr. Belinda Seto (NIBIB Deputy Director), Dr. Richard Wyatt (Executive Director, OIR)

A TRIBUTE TO RUTH L. KIRSCHSTEIN, M.D.
INSPIRING THE BEST IN OTHERS

A Tribute to Ruth L. Kirschstein, M.D.: Inspiring the Best in Others is a day dedicated to the accomplishments of Dr. Kirschstein and her contributions to science. This daylong event touches upon her far-reaching impact on the world of biomedical research and her ability to inspire the next generation of researchers.

Both current and former NIH scientists and staff as well as Members of Congress will honor Dr. Kirschstein for the positive impact she made as a leader in the scientific community. Recipients of the Ruth L. Kirschstein National Research Service Award (NRSA) will present current research in scientific sessions and a poster session, and they will participate in a panel discussion that will explore Dr. Kirschstein's lasting legacy.

The day's agenda includes:

- Opening Session: Remembering Dr. Kirschstein
- Ruth L. Kirschstein NRSA Symposium:
Session I. Stem Cells
- Ruth L. Kirschstein NRSA Symposium:
Session II. Cancer Metastasis
- Ruth L. Kirschstein NRSA Symposium:
Session III. Neuroscience
- Ruth L. Kirschstein NRSA Symposium:
Session IV. Panel Discussion: The Importance of
Mentoring, Nurturing and Inspiring the Best in Others
- Poster Session and Reception

See the insert for a full schedule of the day's events and list of speakers.

REMEMBERING RUTH L. KIRSCHSTEIN



Ruth L. Kirschstein, 1926–2009

Ruth Kirschstein was a scientist and administrator beloved throughout the NIH. An acting director of NIH twice and the first woman director of an NIH institute—the National Institute of General Medical Sciences—Dr. Kirschstein was known for her mentorship of young researchers, especially women and minorities. In a career spanning half a century, she played key roles in the development of a safety test for polio vaccines and in the fight against HIV/AIDS. She died in October 2009 at the age of 82.

A Brooklyn native, Dr. Kirschstein wanted to be a doctor from a very young age, even before high school. Although graduating magna cum laude in 1947 from Long Island University, she quickly met resistance. She applied to every medical school in the country, she recounted to an NIH historian, and at least one school replied flat out that it did not accept women. Her journey took her to Tulane University School of Medicine, where she was one of 10 women in a class of 100 men.

She interned in medicine and surgery at Kings County Hospital in Brooklyn and completed residencies in pathology in Detroit, New Orleans and the then new NIH Clinical Center. In 1957 Dr. Kirschstein joined the federal government, beginning a 15-year stint as an experimental pathologist at the NIH Division of Biologics Standards (now the FDA Center for Biologics Evaluation and Research). The polio vaccines were among the hottest topics in science at the time, promising to eliminate a scourge that was striking hundreds of thousands of children worldwide. In the mid-1950s, vaccine safety moved to the forefront of public attention by the infamous Cutter incident, in which a pharmaceutical company produced several batches of the Salk polio vaccine that unintentionally contained a live poliovirus. The contaminated vaccine caused 10 deaths, led to more than 200 cases of paralysis, and seriously sickened thousands of children.

In her first major accomplishment as a scientist, Dr. Kirschstein led the development in the 1950s and 1960s of a safety net for the polio vaccine. Ultimately this led to widespread adoption of the Sabin oral vaccine, especially in developing countries. Dr. Kirschstein continued to work to develop tests for the safety of vaccines for measles and other diseases, as well.

In 1974, after two years with the FDA—first as the deputy director of the Division of Biologics Standards, then as the FDA's deputy associate commissioner for science—Dr. Kirschstein was

appointed director of the National Institute of General Medical Sciences (NIGMS), a post she held for nearly 20 years. Though established in 1962, the NIGMS was a small and little-known institute, and was poorly understood by the scientific community when Dr. Kirschstein took the helm. She is widely lauded for transforming the NIGMS into the major institute that it is today for supporting basic research, dramatically increasing its budget and, more important, convincing Members of Congress that seemingly mundane basic research could lead to breakthrough cures. Indeed, NIGMS has funded the work of more than 50 scientists who have won a Nobel Prize.

One of Dr. Kirschstein's most significant accomplishments as NIGMS director was her dedication to funding HIV/AIDS research and drug development despite vociferous opposition in the 1980s from some lawmakers. She also helped to establish the Genbank nucleic acid sequence database, which has been a critical tool for biomedical research. Dr. Kirschstein championed myriad programs in basic biomedical research and research training that have helped to transform biomedical research. Among her many scientific awards and honors from this period was her election to the Institute of Medicine in 1982.

In 1993, Dr. Kirschstein, at age 67, became acting director of NIH and then served as the deputy director under NIH Director Harold Varmus for the next six years. She was acting director again from 2000 to 2002. Throughout her tenure at NIH, Dr. Kirschstein was exceptionally supportive of women and minorities in science, and she maintained a deep interest in the careers of postdoctoral fellows and scientific training in general. She knew hundreds of young researchers across the United States by name and actively followed their careers. It was of little surprise when, in 2002, Congress renamed the National Research Service Awards (NRSA) the Ruth L. Kirschstein NRSA program. Past recipients now number in the thousands, and the quality of their research has elevated the program and Dr. Kirschstein's name to the ranks of Fulbright Awards and Rhodes Scholarships. Dr. Kirschstein remained active at the NIH in her later years as a senior advisor; she was on a conference call with NIH Director Francis Collins a week before her death.

Ruth Lillian Kirschstein embodied the spirit of NIH and was responsible for the career development of innumerable scientists and administrators. She was a valued mentor, wise counselor, and avid promoter of research who was loved and admired by many at the NIH and throughout the scientific world.

RUTH L. KIRSCHSTEIN NRSA SCIENTIFIC SYMPOSIUM AND PANEL DISCUSSION PARTICIPANTS

Funds from the Ruth L. Kirschstein National Research Service Award (RLK NRSA) have supported the work of thousands of scientists around the country who represent excellent science and diverse backgrounds. Today, many top-tier investigators can credit some portion of their early work through the support of an RLK NRSA.

The scientific sessions and panel discussion participants represent some of this country's young research all-stars, all who share the designation of RLK NRSA "alumni."

Kirschstein's interest in young scientists was . . . in assuring that future generations of researchers would keep science vigorous.

— Maxine Singer, former president of the Carnegie Institution of Washington
(in an interview with Science Careers, December 2009)



Laurie Boyer, Ph.D.
Massachusetts Institute of Technology
How Stem Cells Manage Multiple Personalities

Laurie Boyer received her Ph.D. in Biomedical Science from the University of Massachusetts Medical School and completed postdoctoral work at the Whitehead Institute for Biomedical Research, where she made important contributions to the fields of gene regulation and stem cell biology. This work led to Boyer being named to *Scientific American's* 2006 annual list of the world's 50 top leaders in research, business or policy.

Boyer has been an assistant professor in the Biology Department at the Massachusetts Institute of Technology since 2007. She has recently been selected as a Pew Scholar in the Biomedical Sciences and is a recipient of early career awards from the Massachusetts Life Sciences Center and the Smith Family Foundation for Excellence in Biomedical Research. Boyer's research is focused on understanding the processes through which embryonic stem cells commit to a single cell type within a particular part of the body. These cells give rise to functionally diverse cell types that become the basis for all tissues and organs. Ultimately, this knowledge could be used to design new ways to efficiently control cell fate decisions for stem cell therapeutics.



Howard Y. Chang, M.D., Ph.D.
Stanford University
Programming Chromatin States by Long Noncoding RNAs

Howard Chang is an associate professor of Dermatology at Stanford University School of Medicine and an early career investigator for the Howard Hughes Medical Institute. He received his Ph.D. in Biology from the Massachusetts Institute of Technology, under advisor David Baltimore, and his M.D. from Harvard Medical School. Chang completed his postdoctoral fellowship with Patrick Brown at Stanford University and then joined the faculty in 2004.

Chang's research addresses how individual cells know where they are located in the human body, which is important in normal development and in cancer metastasis. He discovered that a new class of genes, termed long noncoding RNAs, can control gene activity throughout the genome, illuminating a new layer of biological regulation. Chang's honors include the Damon Runyon Scholar Award, American Cancer Society Research Scholar Award, California Institute for Regenerative Medicine New Faculty Award, elected membership to the American Society for Clinical Investigation, and the Vilcek Prize for Creative Promise.



Sara Cherry, Ph.D.
University of Pennsylvania
Using Genomic Approaches to Study Viral-host Interactions

Sara Cherry completed her postdoctoral work with Norbert Perimon at Harvard Medical School, where she pursued interests in virus biology by developing a new model system in *Drosophila* to study virus-host interactions. She used pioneering work on high-throughput RNAi screening to complete the first genome-wide RNAi screen for cellular factors involved in viral replication. In 2006 she joined the faculty at the University of Pennsylvania Medical School in the Department of Microbiology and the Penn Genome Frontiers Institute, where she is associate director of the Cell-based Screening Core.

Cherry's lab has identified autophagy as a key effector mechanism required for antiviral defense. Her lab has found new genes involved in antiviral RNA silencing in *Drosophila* that also play a role in mammalian RNA silencing pathways. More recently her lab has focused on the class of arthropod-borne human viruses for which there are no therapeutics or vaccines. Genome-wide screens of host cells challenged with these viruses have led to the discovery of hundreds of genes that are required for viral infection, with the goal of producing new therapeutic opportunities.



Levi Garraway, M.D., Ph.D.
Harvard University
Integrative and Functional Genomic Studies of Human Cancer

Levi Garraway is an assistant professor of Medicine in the Department of Medical Oncology at the Dana-Farber Cancer Institute, Harvard Medical School; a faculty member of Dana-Farber's Center for Cancer Genome Discovery; and an associate member of the Broad Institute, where he leads several large cancer genome analyses and functional genomics efforts.

Garraway leads a 16-member investigative team in cancer genomics at Dana-Farber and the Broad Institute. His research has informed several gene targets and "druggable" pathways relevant to the genesis and therapeutic vulnerabilities of melanoma and other malignancies. Garraway's group developed OncoMap, a platform for systematic cancer mutation profiling that has led to multiple personalized cancer medicine efforts across the United States and beyond. He has received the Minority Scholar Award from the American Association of Cancer Research, the Partners in Excellence Award from the Massachusetts General Hospital, and the Career Award in the Biomedical Sciences from the Burroughs-Wellcome Fund. In 2007, Garraway was awarded one of the first NIH New Innovator Awards, and in 2009 he was inducted into the American Society for Clinical Investigation.



Mark D. Johnson, M.D., Ph.D.
Harvard University
When Less is More: MicroRNAs in Glioblastoma

Mark Johnson, a native of Memphis, Tenn., earned his M.D. and a Ph.D. in neurobiology at Harvard Medical School in 1995 as part of the NIH Medical Scientist Training Program. He subsequently completed a residency in neurological surgery at the University of Washington. While there, he received a Postdoctoral National Research Service Award and a KO8 award from the NIH to investigate the cell biology and proteomics of neuronal cell death.

Johnson returned to Harvard Medical School in 2003, where he established a clinical practice involving the neurosurgical management of brain tumors. His research is focused on the genomics, proteomics and cell biology of gliomas and meningiomas. He is the recipient of numerous clinical, community service and research awards, including the Harvard Medical School Young Mentor Award, the Sontag Distinguished Scientist Award, and the NIH Director's New Innovator Award.



Francis Lee, M.D., Ph.D.
Weill Cornell Medical College
Neurotrophic Factors and Anxiety-Related Psychiatric Disorders

Francis Lee is an associate professor in the Department of Psychiatry at Weill Cornell Medical College and an associate attending psychiatrist at New York Presbyterian Hospital. He received his undergraduate degree in physiological psychology from Princeton University, and an M.D. and Ph.D. from the University of Michigan, followed by psychiatry residency training at Payne Whitney Clinic, New York Presbyterian Hospital. He is the recipient of numerous awards, including the Presidential Early Career Award for Scientists and Engineers (PECASE) and the Burroughs Wellcome Clinical Scientist Award.

Lee is a pioneer in using cell biological and animal model systems to understand the pathophysiology of neuropsychiatric disorders. In particular, his research is focused on using genetic models to delineate the role of growth factors, such as brain derived neurotrophic factor (BDNF), in complex behaviors related to affective disorders. His laboratory has recently produced one of the first mouse models of a human genetic variant that has led to novel insights into the molecular and genetic basis of anxiety, as well as drug response. This line of research provides not only a first step in creating animal model systems of human genetic variants to test novel therapeutics, but also to devise biomarker strategies to determine who will and will not respond to psychiatric medications.



Anna A. Penn, M.D., Ph.D.
Stanford University
Preterm Brain Injury: Hormones and Hypoxia

Anna Penn is an assistant professor of Pediatrics at Stanford University School of Medicine and an attending neonatologist who leads a translational neuroscience laboratory focused on fetal and preterm brain injury. In 2009 she received an NIH Director's New Innovator Award to develop a genetic model to assess the impact of placental hormones in fetal brain development.

Penn's laboratory investigates the role of placental hormones in brain development and damage. To directly determine the effect of specific hormones on fetal brain development, her lab is creating novel mouse models in which individual placental

hormones are modulated to evaluate their physiological, behavioral and anatomical impact offspring. Her laboratory also studies a model of hypoxia-related preterm damage that she has recently shown to mimic the sex-linked difference in injury seen in human preterm infants, in which boys fare worse than girls. Her group is now working to determine the hormonal contribution to this damage and potentially ameliorate it. Recently, Penn has extended her research into the intensive care nursery, investigating neuroactive hormone levels associated with specific behavioral outcomes in human infants.



Julie Pfeiffer, Ph.D.
University of Texas Southwestern
Complex Interactions in the Gut: Enteric Viruses,
Commensal Bacteria, and Host Mucosa

Julie Pfeiffer did her postdoctoral research in Karla Kirkegaard's laboratory at Stanford University from 2001 through 2005, with a focus on viral evolution and pathogenesis. Since 2006 she has been an assistant professor of Microbiology at the University of Texas Southwestern Medical Center, where her lab studies viral genetics and evolution, viral pathogenesis, and antiviral drug resistance. She was named a Pew Scholar in 2007.

Pfeiffer's lab is interested in several areas related to RNA viruses, pathogenesis, viral evolution, viral population dynamics, host barriers, vaccines, and antiviral treatment response. The overall goal is to understand virus-host interactions and antiviral drug responses that impact the development of disease. Current research in her lab includes: assessment of poliovirus and yellow fever virus population dynamics during trafficking in an infected host, and identification of host barriers that limit viral spread; mechanistic dissection of neurotropic virus trafficking barriers in peripheral neurons; determining the effect of the gut microbiota on enteric virus replication, shedding, and pathogenesis; and defining mechanisms and consequences of host-based ribavirin resistance in cultured cells and hepatitis C virus patients.



Alfredo Quiñones-Hinojosa, M.D.
Johns Hopkins University
Brain Cancer: From Origin to Treatment

Alfredo Quiñones-Hinojosa is an associate professor of Neurological Surgery and Oncology, Neuroscience and Cellular and Molecular Medicine, and Director of the Brain Tumor Stem Cell Laboratory at the Johns Hopkins School of Medicine and Sidney Kimmel Comprehensive Cancer Center. He is also the Clinical Director of the Brain Tumor Surgery Program at the Johns Hopkins Bayview Hospital and the Director of the Neurosurgical Pituitary Center at Johns Hopkins University. He received his medical degree from Harvard, where he graduated with honors. He then completed his residency in neurosurgery at the University of California, San Francisco, where he also completed a postdoctoral fellowship in developmental and stem cell biology.

Quiñones conducts numerous research efforts on elucidating the role of stem cells in the origin of brain tumors and the potential role stem cells can play in fighting brain cancer and regaining neurological function. His research currently focuses on Adult Neural Stem Cell Markers, Brain Tumor Cell Migration, Chemorepulsive Proteins, and Ultrastructural Mapping of SVZ. He also heads the Neuro-Oncology Outcomes Laboratory, which identifies pre- and postoperative treatment measures that influence hospital-based morbidity and mortality in an effort to improve patient safety and maximize the efficacy of current treatment paradigms for patients with brain tumors. The Outcomes Lab also aims to discover novel clinical, radiographic, and physiological parameters that may influence survival in patients with malignant brain tumors.



Dorothy Sipkins, M.D., Ph.D.
University of Chicago
In Vivo Imaging of Benign and Malignant Bone Marrow Niches

Dorothy Sipkins received her M.D. and Ph.D. degrees from Stanford University. She completed internship and residency training in Internal Medicine at Massachusetts General Hospital and subspecialty training in Adult Hematology/Oncology in the Dana Farber Cancer Institute/Massachusetts General Hospital Partners Cancer Care Program. After completing her clinical fellowship, Sipkins pursued postdoctoral research at Massachusetts General Hospital before establishing her independent research laboratory at The University of Chicago, where she is an assistant professor.

Sipkins' research focuses on defining the molecular characteristics of tissue microenvironments, or "niches," that foster the survival and regeneration of both normal and cancerous hematopoietic stem cells. Her laboratory also examines the impact of malignant growth on the function of the normal hematopoietic stem cell niche. In combination with classical molecular and cell biology approaches, her lab utilizes state-of-the-art multiphoton and confocal optical imaging techniques to explore these questions in vivo, in real-time. Sipkins' work has been recognized with an NIH Director's New Innovator Award.



Gonzalo E. Torres, Ph.D.
University of Pittsburgh
Protein-Protein Networks Regulating Brain Dopamine Homeostasis

Gonzalo Torres was born in Punta Arenas, Chile, and graduated from the Catholic University of Valparaíso, Chile, in 1990 with a master's degree in Biochemistry. In 1994 he began graduate studies at St. Louis University School of Medicine, where he researched the cellular and molecular properties of P2X receptors, a family of ion channels activated by ATP. For his postdoctoral position in the laboratory of Marc Caron at Duke University, Torres studied the function and regulation of monoamine transporters in the brain.

In 2004, Torres accepted an assistant professor position in the Department of Neurobiology at the University of Pittsburgh. His research focuses on the study of neurotransmitter transporters and the function of the dystonia-related protein torsinA. His work promises to provide fundamental molecular insights into neuronal cell biology. Recently, he obtained his first competitive R01 from the National Institute on Drug Abuse to study the role of dopamine transporter protein-protein interactions in the mechanisms associated with psychostimulants. His work has appeared in high profile journals such as *Neuron*, *PNAS*, *Molecular Pharmacology*, *Journal of Neuroscience*, *JBC*, *Current Opinions in Neuroscience*, and *Nature Reviews Neuroscience*. Recent honors include the International Society for Neurochemistry Young Scientist Lecture Award (2004, Avignon, France), the National Alliance for Research on Schizophrenia and Depression Young Investigator Award (2006-2008), and the Presidential Early Career Award for Scientists and Engineers - PECASE award (2009). Torres is also committed to the training and mentoring of minority students and has organized a variety of related activities and workshops.

POSTER SESSION

Funds from the Ruth L. Kirschstein National Research Service Award have supported the work of innumerable scientists, some of whom are now part of the intramural research community at the NIH. This poster session highlights the work of some of those individuals currently at the NIH who have directly benefited from this award.

"Ruth Kirschstein was a remarkable leader, a change-agent who promoted both research and research training through strengthening programs, initiating novel programs and creating new outreach and training opportunities. She had an equally enormous impact on individuals, mentoring and encouraging a myriad of people. . . . I was the beneficiary as well as an admiring observer of the way she connected with diverse trainees and faculty members associated with NIGMS programs, people at all stages of training or careers."

— Terry Ann Krulwich, Professor, Pharmacology and Systems Therapeutics,
Mount Sinai School of Medicine (New York)

Kristin L. Bigos, Ph.D.
National Institute of Mental Health
Genetic Variation in CACNA1C Affects Brain Circuitries
Related to Mental Illness

Kristin Bigos was a 2005 recipient of a Ruth L. Kirschstein NRSA predoctoral fellowship for her work on the acute effects of selective serotonin reuptake inhibitors on brain circuitry involved in mood and emotion. She received her Ph.D. in Clinical Pharmaceutical Sciences at the University of Pittsburgh in 2007. She is currently a postdoctoral fellow in the Genes, Cognition, and Psychosis Program at NIMH. Her research focuses on using a neuroimaging genetics approach to identifying novel drug targets and then testing potential therapeutics using pharmacological fMRI.

Harold Burgess, Ph.D.
Eunice Kennedy Shriver National Institute of
Child Health and Human Development
Neural Circuits Underlying Motor Control in Zebrafish

Harold Burgess received his B.S. from the University of Melbourne in Australia and his Ph.D. from the Weizmann Institute of Science in Israel, where he studied molecular interactions underlying cortical development. He completed postdoctoral training with Michael Granato at the University of Pennsylvania, where he developed computational tools for high-throughput analysis of behavior in larval zebrafish. Burgess joined NICHD as an investigator in 2008. His laboratory now combines genetic and imaging techniques to study neural circuits required for sensory guided behavior in zebrafish.

Bashira A. Charles, Ph.D.
National Human Genome Research Institute
Genetic Epidemiology of Uric Acid in African-Americans

Bashira Charles was a Ruth L. Kirschstein NRSA fellow during her doctoral studies at the University of Pittsburgh, School of Nursing, where she investigated the genetic basis of diabetic retinopathy. Following the completion of her doctoral studies, she came to the NIH as a fellow in the National Institute of Nursing Research. She subsequently transferred to the NHGRI's Center for Research on Genomic and Global Health, where she is a postdoctoral fellow investigating the genetic epidemiology of diabetes, its phenotypes and related complications. Charles said she was honored to receive the Ruth L. Kirschstein award and the opportunities it granted her that have led to her current position.

Sophia Cleland, B.S.

National Institute of Arthritis and Musculoskeletal and Skin Diseases
Wiskott-Aldrich Syndrome Protein Deficiency Results in
Systemic Autoimmunity and Defective Fas Ligand Secretion

Sophia Cleland became interested in science when she wanted to understand how the water quality on her mother's reservation affected the health of the Montana Sioux tribe. She received a B.S. in Chemistry with a Biochemistry Emphasis from the Arizona State University before pursuing evolutionary genetics research at Cornell University and the University of Oklahoma Health Sciences Center, to understand how evolutionary dynamics may contribute to the health of populations. Her experience in evolutionary genetics led to her decision to pursue a Ph.D. in Immunology at the George Washington University. Cleland expects to finish her doctoral dissertation thesis work by 2011.

Arseima Del Valle-Pinero, Ph.D.

National Institute of Nursing Research

N-methyl-D-aspartate (NMDA) Receptors Activation Increases
In Vivo Colonic Contractility After Trinitrobenzene Sulfonic Acid
(TNBS) Induced Colitis

Arseima Del Valle-Pinero received her Ph.D. in Biomedical Sciences from the University of Florida College of Medicine in 2009, where she had worked in the laboratory of Robert Caudle. She was the lead author on "Expression of the N-methyl-D-aspartate receptor NR1 splice variants and NR2 subunit subtypes in the rat colon," featured on the cover of *Neuroscience* in June 2007. In 2008, she became the recipient of a Ruth L. Kirschstein National Research Service Award for Individual Predoctoral Fellowships to Promote Diversity in Health-Related Research, through the National Institute of Diabetes and Digestive and Kidney Disease. Del Valle-Pinero currently works with Wendy Henderson in the Biobehavioral Unit in NINR's Symptoms Management Branch.

Laura Elnitski, Ph.D.

National Human Genome Research Institute

Ascertainment and Prediction of Genomic Sequence
Variants that Cause Exon Skipping

Laura Elnitski received her Ph.D. in Molecular and Cellular Biology from Penn State, working in the laboratory of Ross Hardison. She was the recipient of a Ruth L. Kirschstein NRSA fellowship while working in Penn State's Computer Science Department under

the mentorship of Webb Miller. Elnitski's work addressed the use of genomic sequence alignments to detect conserved regulatory regions. She has been a member of the Mouse, Rat, Chicken, and Bovine Sequencing Consortia as well as a participant of ENCODE (Encyclopedia of DNA Elements Consortium) since its inception. Elnitski currently develops novel computational approaches to identify functional elements in the human genome, the disruption of which can cause disease.

Wendy A. Henderson, Ph.D.

National Institute of Nursing Research

**Relationship Between Pediatric Gastrointestinal Pain,
Mast Cells, Serotonin, and Substance P**

Wendy Henderson is an assistant clinical investigator in the Biobehavioral Unit in NINR's Symptoms Management Branch. She is a nurse practitioner and a Clinical and Translational Science Institute fellow from the University of Pittsburgh. Henderson's research and clinical interest is in symptomatology in patients with gastrointestinal and liver disorders. The focus of her current research is to better understand the immunogenetic mechanisms involved in symptom distress related to digestive and liver diseases, specifically the biobehavioral relationships between inflammation and patient symptoms. She is the primary investigator of multiple studies at the NIH, including a natural history study to assess brain-gut interactions in normal weight and overweight patients with recurrent abdominal pain of unknown origin.

Joshua Hunsberger, Ph.D.

National Institute of Mental Health

**Possible Involvement of Bax Inhibitor1, a Modulator of
Endoplasmic Reticulum Cellular Stress, in Affective Resilience**

Joshua Hunsberger completed his thesis work in Ron Duman's laboratory at Yale University, where he studied the antidepressant effects of an exercise regulated neuropeptide VGF. This work was funded by a Ruth L. Kirschstein NRSA. Hunsberger is now in his second postdoctoral fellowship in De-Maw Chuang's laboratory at NIMH, where he is studying microRNAs involved in the neuroprotective effects of two mood stabilizers, lithium and valproate. This work may lead to new treatments targeting microRNAs that could have broad clinical applicability ranging from Alzheimer's disease to Huntington's disease.

Wei Li, Ph.D.

National Eye Institute

**The Functions of the Synaptic Ribbon: A Study of
the Hibernating Ground Squirrel Photoreceptor Synapse**

Wei Li received his medical degree in 1997 from Zhejiang University School of Medicine in China and his Ph.D. in Neuroscience in 2003 from the University of Texas at Houston, where he studied the organization of reciprocal feedback synapse of the retinal bipolar cell. From 2003 to 2007 as a postdoctoral fellow, he worked with Steven DeVries at Northwestern University where he investigated synaptic connections between photoreceptors and bipolar neurons in a mammalian retina. Li joined NEI as the principal investigator of the Unit of Retinal Neurophysiology in 2007. His unit uses a variety of techniques to explore retinal synapses and circuits and their functions in vision.

Zheng Li, Ph.D.

National Institute of Mental Health

BAD and BAX are Required for Long-term Synaptic Depression

Zheng Li received a Ph.D. from State University of New York at Stony Brook. Her graduate studies were carried out with Hollis Cline at Cold Spring Harbor Laboratory on the role of Rho GTPases in dendrite morphogenesis; and she completed postdoctoral training with Morgan Sheng at the Massachusetts Institute of Technology on the molecular and cellular mechanism of synapse development and plasticity. Li joined NIMH as an investigator in 2006. Her laboratory uses molecular and cellular biology, live imaging, and electrophysiological approaches to investigate the mechanisms underlying synaptic plasticity in development, cognition and psychiatric disorders, with an emphasis on schizophrenia.

Alexandra McPherron, Ph.D.

**National Institute of Diabetes and Digestive and Kidney Disease
Myostatin Inhibition Improves Diabetes in Lipodystrophic Mice**

Alexandra McPherron received her Ph.D. from The Johns Hopkins University School of Medicine in Se-Jin Lee's laboratory in the Department of Molecular Biology and Genetics. Her thesis described the discovery and genetic deletion of a TGF-beta family member, myostatin, demonstrating that myostatin is a negative regulator of muscle growth. In her postdoctoral work at Hopkins, she showed that myostatin inhibition ameliorates diabetes and obesity. McPherron received a Presidential Early Career Award for Scientists and Engineers (PECASE) in 2007. The focus of her current work is the role of myostatin and other family members on metabolism, particularly in relation to the development and treatment of insulin resistance.

Lilia Mijares, Ph.D.

NIH Clinical Center

**Multi-strain genome comparison of the skin commensal
*Staphylococcus epidermidis***

Lilia Mijares received her Ph.D in 2008 from Yale University's Microbial Pathogenesis Section, where she was a Ruth L. Kirschstein NRSA recipient. After graduation she trained in the use of high-throughput sequencing and genomic applications under the guidance of Julia Segre of the National Human Genome Research Institute while working on the Human Microbiome Project. She is currently a clinical microbiology fellow in the Microbiology Service of the Department of Laboratory Medicine in the Clinical Center. Mijares' training has enabled her to integrate the disciplines of basic microbiology research and genomic advances for the immediate application to patient service and future clinical research.

Kumaran Ramamurthi, Ph.D.
National Cancer Institute
Morphogenesis of Bacterial Spores

Kumaran Ramamurthi received his Ph.D. in Molecular Biology from the University of California, Los Angeles, where he studied secretion of bacterial virulence proteins with Olaf Schneewind. He then studied subcellular protein localization as a Ruth L. Kirschstein NRSA postdoctoral fellow with Richard Losick at Harvard University. He arrived at the NIH in 2009, where he is an investigator in the NCI Laboratory of Molecular Biology and head of the Cell Biology Unit. His research aims to understand how organisms construct large structures that ultimately help define how that organism looks. His lab approaches this problem by examining the morphogenesis of a simple organism, a bacterial spore, trying to understand how a spore ends up looking like a spore.

Laura A. Thomas, Ph.D.
National Institute of Mental Health
Neural Engagement to Emotional Faces: Pediatric Bipolar Disorder Differs from Healthy Youth and those with Severe Mood Dysregulation

Laura Thomas received her Ph.D. in Cognitive Neuroscience from Duke University in 2007. Her graduate research focused on the influence of emotion on nonconscious (implicit) memory in healthy adults. With the funding she received as a predoctoral Ruth L. Kirschstein NRSA recipient, Thomas could extend her time at Duke to complete the fMRI portion of the study. She has since altered the focus of her research to a different population, children with severe affective disorders such as bipolar spectrum disorder. She is applying the tools and techniques she learned in graduate school to investigate the nonconscious processing of faces (some emotional and some not) in these very sick children. The results from such work will increase our understanding of emotional processing in children with bipolar disorder and help better characterize these children for diagnostic purposes.

SINCE JUNE 2002, WHEN THE NATIONAL
RESEARCH SERVICE AWARD (NRSA) PROGRAM
WAS NAMED THE RUTH L. KIRSCHSTEIN NRSA,
MORE THAN 60,000 PREDOCTORAL AND POST-
DOCTORAL TRAINEES AND FELLOWS HAVE RECEIVED
RESEARCH OR RESEARCH TRAINING SUPPORT IN
THE BIOMEDICAL AND BEHAVIORAL SCIENCES.

KIRSCHSTEIN NATIONAL RESEARCH SERVICE AWARDS

From House Conference Report 107-593, the fiscal year 2002 supplemental appropriations bill:

Section 804. The conferees have included bill language from the Senate bill identifying the "National Research Service Awards" program as the "Ruth L. Kirschstein National Research Service Awards" program. This action is being taken to honor the career of Dr. Ruth L. Kirschstein. A native of Brooklyn, New York, Dr. Kirschstein received a B.A. degree magna cum laude in 1947 from Long Island University. In 1951, she received her M.D. from Tulane University School of Medicine.

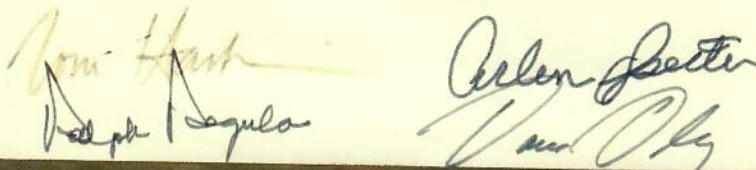
From 1957 to 1972, Dr. Kirschstein performed research in experimental pathology at the Division of Biologics Standards (now the Center for Biologics Evaluation and Research, Food and Drug Administration). During that time, she helped develop and refine tests to assure the safety of viral vaccines for such diseases as polio, measles and rubella. Her work on polio led to the selection of the Sabin vaccine for public use.

Since 1974, Dr. Kirschstein has been serving in leadership positions at the National Institutes of Health (NIH). When she first began her service to NIH, she served as Director of the National Institute of General Medical Sciences. She held this position for 14 years. From 1990 to 1991, Dr. Kirschstein also served as Acting Associate Director of the NIH on research on women's health.

Dr. Kirschstein served as Acting Director of the National Institutes of Health between January 2000 and May 2002. Prior to that post, Dr. Kirschstein served as the Deputy Director between 1993 and 1999. Dr. Kirschstein has received many honors and awards, including the Presidential Meritorious Executive Rank Award, 1980; election of the Institute of Medicine, 1982; a doctor of science degree from Mr. Siani School of Medicine, 1984; the Presidential Distinguished Executive Rank Award, 1983; an honorary doctor of laws degree from Atlanta University, 1985; an honorary doctor of science degree from the Medical College of Ohio, 1986; an honorary doctor of humane letters from Long Island University, 1991; and election as a fellow of the American Academy of Arts and Sciences, 1992. In 2001, she received honorary degrees from Spelman College and from Georgetown University Medical School.

Dr. Kirschstein has been both a visionary and a leader during her service at NIH and has helped to make it the world's premier biomedical research agency. In particular, Dr. Kirschstein led the cutting edge of two of the most important research trends of this generation. She played a pivotal role in launching the Human Genome Project. She is also credited with providing early and crucial support to women's health studies, services and programs for the NIH and pioneering the NIH Office of Women's Health Research.

While serving as Acting Director of NIH, Dr. Kirschstein has worked with Congress to achieve a doubling of the NIH budget. Through her leadership, commitment, contributions and unselfish service to the biomedical research community and NIH, Dr. Kirschstein continues to serve her nation. The conferees believe the naming of the National Research Service Awards as the Ruth L. Kirschstein National Research Service Awards is a fitting tribute to her outstanding service to this country.



"DR. KIRSCHSTEIN HAS BEEN BOTH A VISIONARY AND LEADER DURING HER SERVICE AT NIH AND HAS HELPED TO MAKE IT THE WORLD'S PREMIER BIOMEDICAL RESEARCH AGENCY."

— U.S. Congress, July 19, 2002, excerpted from the House Conference Report 107-593 (above), which renamed the National Research Service Awards program in Dr. Kirschstein's honor. The signees in the document above are U.S. Senators Tom Harkin and Arlen Specter and U.S. Representatives Ralph Regula and David Obey.