

2009 ANNUAL REPORT

BURROUGHS
WELLCOME
FUND 



2009 Annual Report

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About the Burroughs Wellcome Fund

The Burroughs Wellcome Fund is an independent private foundation dedicated to advancing the biomedical sciences by supporting research and other scientific and educational activities. Within this broad mission, BWF seeks to accomplish two primary goals—to help scientists early in their careers develop as independent investigators, and to advance fields in the basic biomedical sciences that are undervalued or in need of particular encouragement.



Burroughs Wellcome Fund
Research Triangle Park, North Carolina

“The importance of curiosity-driven research, as endorsed by Henry Wellcome, guides the mission of the Burroughs Wellcome Fund...”

Financial support is channeled primarily through competitive peer-reviewed award programs, which encompass seven major categories—biomedical sciences, infectious diseases, interfaces in science, population and laboratory sciences, reproductive sciences, translational research, and science education. Grants are made primarily to degree-granting institutions on behalf of individual researchers, who must be nominated by their institutions. To complement these competitive award programs, grants are also made to nonprofit organizations conducting activities intended to improve the general environment for science.

BWF was founded in 1955 as the corporate foundation of Burroughs Wellcome Co., the U.S. branch of the Wellcome pharmaceutical enterprise, based in the United Kingdom. In 1993, BWF received a \$400 million gift from the Wellcome Trust to become a fully independent foundation.

Legacy The Wellcome enterprise was begun in 1880 by two young American pharmacists, Henry Wellcome and Silas Burroughs, who moved to London to manufacture and sell “compressed medicines”—that is, pills—which they believed could replace the potions and powders of the day.

The firm prospered. After Burroughs died in 1895, Wellcome directed the growth of the company into an international network with subsidiaries in numerous countries on several continents. As the business grew, Wellcome held firm to his belief that research was fundamental to the development of excellent pharmaceutical products and established the industry’s first research laboratories.

When Wellcome died in 1936, his will vested all of the corporate shares in a new organization—the Wellcome Trust—devoted to supporting research in medicine and allied sciences and to maintaining museums and libraries dedicated to these fields. The Trust grew to become the world’s largest charitable foundation devoted exclusively to the biomedical sciences.

The importance of curiosity-driven research, as endorsed by Henry Wellcome, guides the mission of the Burroughs Wellcome Fund and its commitment to the belief that fostering research by the best and brightest scientists offers the fullest promise for improving human health.

President's Message

A year ago, I was concerned about our declining endowment and the potential impact of that decline. Of course at that time I had no idea that it would drop so far so fast, nor did my crystal ball reveal any premonitions about the stimulus package or the rate of the market's recovery. Fortunately, the end of the year was considerably more positive than the ups and downs we suffered in the course of the year, and I'm pleased to report that our endowment has recovered from its March 2009 low of \$445 million to end fiscal year 2009 on August 31 at \$587 million.

John E. Burris, Ph.D.



In order to minimize the effects of the decline in the endowment caused by the collapse of markets worldwide, BWF shifted to half-payments in our competitive grants programs and reduced the number of awards made. We appreciate our awardees' patience and understanding during this period and hope to return to full payments in FY 2011.

Although this has been a year of stress for everyone, we at the Fund remain committed to providing our resources in areas that we view as undervalued, such as infectious diseases, reproductive sciences, and science education. This decision has enabled us to establish an important presence and profile in these areas, where we have carved out a niche in which we are well-respected and make a difference.

In the overall funding landscape, considerable optimism has arisen from the stimulus funding devoted to scientific research, and from clearly positive statements on science by President Obama, including his inaugural address assertion that we will "restore science to its rightful place." But what does the future hold?

As noted, we have a president who has publicly stated his support for science. We have strong cabinet officers and advisors with a commitment to and understanding of science and research. We have a huge stimulus package. But there are still

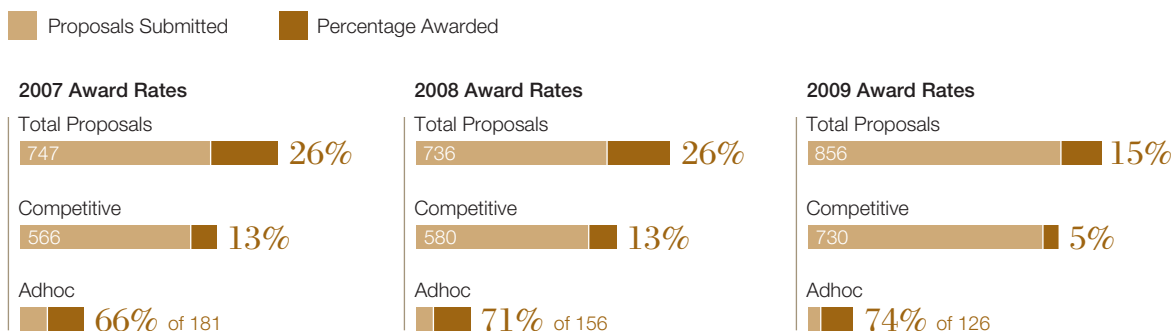
elements that need to change for the research environment to thrive.

For one thing, foundation philanthropic giving is down. We do not yet have the final data, but from our own experience we know it to be the case. I would note that this is caused not by a lack of will, but a lack of money. Private foundations in calendar year 2008 reported a median decline in endowments of 25.4 percent. Also, the number of job openings has declined, a result of reduced budgets and the postponement of retirements. With the two-year spend-out requirement for the stimulus funds, even a positive situation has raised concerns about what will happen when the two years have elapsed.

There is also considerable uncertainty in the biomedical community about the future of federal grants. With the exception of stimulus dollars, NIH has not seen an increase in real dollars for a number of years. NIH funding peaked in 2004-05, followed by a 16 percent decline in constant dollars through 2009 for research grants. Proposals are now rejected more often, not just for young investigators but also for continuing ROIs (in some ways, this has been even more traumatic to the community). Postdocs continue to be long-term.

In contrast to this financial gloom, there is great excitement about the many opportunities on the

Overall, BWF award rates were considerably lower in fiscal year 2009.



horizon in biomedical and medical research. The New Biology is upon us, and there is little doubt that the new technologies and the innovative applications of the physical and computational sciences and mathematics are going to continue to revolutionize biology and medicine. There is tremendous anticipation about what can be discovered and accomplished in the years ahead.

Although clearly we are not immune to the vagaries of the economy, I would also argue that in these

were given NIH Director's Pioneer Awards, one received a Presidential Award in Excellence, two were NIH Director's New Innovators, and five received Transformative RO1 Awards.

I note in particular the awarding of the Lasker-DeBakey prize to Brian Druker. He was an awardee in our Translational Research program in 2000, and we take pride in our early support of an area that now has large federal funding support (the NIH is granting 60 Clinical and Translational Science

Awards to help establish centers in this area) and has become almost a household word (*Science* is publishing a new journal *Translational*

“In contrast to this financial gloom, there is great excitement about the many opportunities on the horizon in biomedical and medical research.”

tight times our role is more important than ever. With our reduced endowment, we need to continue to spend our money wisely, but we must still be willing to take risks that have the potential to catalyze and strengthen undervalued areas and contribute to the enormous potential growth in biological understanding and its application.

That we have been making wise investments is reflected in the successes of our awardees. This past year, three were elected to the Institute of Medicine, four received Presidential Early Career Awards, five

Medicine). This is one example of how BWF can help catalyze the development of an area that is undervalued at the time.

Although we are considerably reducing our funding for programs this coming year, we did run our usual complement of competitive grant programs this past year. The results of those programs are well summarized later in this report. We also initiated two new programs. One is the Career Awards for Science and Mathematics Teachers, in which outstanding North Carolina teachers will receive

In fiscal year 2009, BWF awarded \$21.9 million in grants.



significant funding to reward them for their successes and fund them to expand opportunities both for themselves and their students. I continue to feel strongly that we must not abandon our commitment to precollege education, where we have made important contributions in North Carolina, and where the Fund looks to participate even more in the national discussion.

During 2009, we also funded investigators in our new program designed to bring multidisciplinary teams together to study the causes of preterm birth. In December 2008, BWF partnered with the March of Dimes to hold a preterm birth symposium to look at trends in research. It was at this meeting that we announced our program and have since awarded ten planning grants. Next year, we will announce the recipients of larger grants to continue their research.

Our terrain mapping, our prudent expenditures of funds, and our conservation of capital are positioning us to be even more important in the biomedical

community when things turn around. We will still be able to help junior investigators, even when ROIs are scarce. We will be able to expand our funding interests into new areas, which we have been exploring in our recent strategic planning sessions, and we will continue to support existing areas where we remain a key funder.

In contrast to the uncertainty I felt a year ago, today I feel more confident in the solid continuity of our role and the strength and importance of our future position. This is not to imply that we do not still have a great deal of effort in the days ahead. After all, we are not running most of our programs in FY 2010, and are still making reduced grant payments. But we have the clear outline of a plan (to be finalized in February 2010) that will map our future for the next five years. We have a strong and innovative foundation that will continue to serve the community well.

Top 10 U.S. Foundations Awarding Grants for Medical Research (circa 2007)

Foundation	Amount in U.S. \$	Number of Grants
1) Bill and Melinda Gates Foundation	294,471,668	41
2) Burroughs Wellcome Fund	39,450,388	131
3) The Starr Foundation	33,085,000	13
4) The Lincy Foundation	32,898,000	31
5) Donald W. Reynolds Foundation	25,843,441	5
6) The Bristol-Myers Squibb Foundation, Inc.	19,529,299	84
7) Flight Attendant Medical Research Institute, Inc.	19,294,900	61
8) The Dana Foundation	17,205,859	78
9) W.M. Keck Foundation	14,990,000	15
10) Doris Duke Charitable Foundation	14,298,500	28

Based on all grants of \$10,000 or more awarded by a national sample of 1,339 larger U.S. foundations.
Source: The Foundation Center, 2009.



Information for Applicants

The Burroughs Wellcome Fund makes 90 percent of our grants through competitive award programs that support investigators in targeted areas of basic biomedical research relevant to human health.

Most of BWF's award programs are open only to citizens or permanent residents of the United States and Canada. (Programs with different requirements are noted in the descriptions that follow.) Awards are made with the advice of our advisory committees, which are comprised of scientists and educators selected for their expertise in the program areas.

Most grants are made only to degree-granting institutions on behalf of individual researchers, who must be nominated by their institution. Institutions receiving grants must be tax-exempt 501(c)(3) organizations. Government agencies, such as the National Institutes of Health and the Centers for Disease Control and Prevention, generally are not eligible for grants.

Throughout the following program descriptions, references to M.D. and Ph.D. degrees include all types of medical and scientific doctoral degrees.

BWF does not support activities that are primarily related to health care and health care policy. We generally do not provide support for research projects or other activities outside our competitive programs, nor do we generally support endowments, development campaigns, ordinary operating expenses, capital facilities and equipment, or publications.

BWF believes that diversity within the scientific community enhances the well-being of the research enterprise; therefore, we encourage applications from women and from members of underrepresented minority groups.

Visit www.bwfund.org for current information.

Biomedical Sciences

Research in the biomedical sciences provides a firm foundation for improving human health. The Burroughs Wellcome Fund is committed to fostering the development of the next generation of academic medical scientists. By providing funding to help bridge the gap between the postdoctoral and early faculty years, BWF hopes to bolster the careers of the most promising up and coming scientists. But BWF's support doesn't stop with its funding. Through meetings and mentoring networks, BWF helps provide vital career advice to give scientists early in their careers the information they need to be successful.

Competitive Award Program

Career Awards in the Medical Sciences

Awards foster the development and productivity of physician-scientists who are early in their careers and help them make the critical transition to becoming independent investigators.

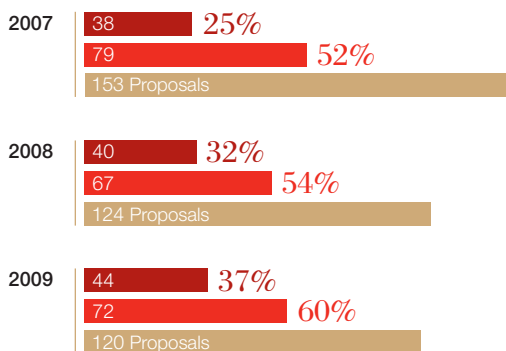
The award provides \$700,000 over five years to bridge advanced postdoctoral/fellowship training and the early years of faculty service. Candidates should have an M.D., D.D.S., D.V.M., or equivalent clinical degree. Proposals must be in the area of basic biomedical, disease-oriented, translational, or molecular, genetic, or pharmacological epidemiology research. Researchers who want to work in the area of epidemiology should contact BWF to determine the eligibility of the proposal. Proposals in health services research or involving large scale clinical trials are ineligible. During the postdoctoral/fellowship period, awardees may train at degree-granting institutions in the United States or Canada. All faculty positions must be taken at U.S. or Canadian degree-granting institutions. During the award period, at least 75 percent of the awardee's time must be devoted to research-related activities. Researchers who hold a faculty appointment as an assistant professor or the equivalent, or who know they will hold such an appointment within a year of the application deadline, are not eligible.

Visit www.bwffund.org for complete program information.

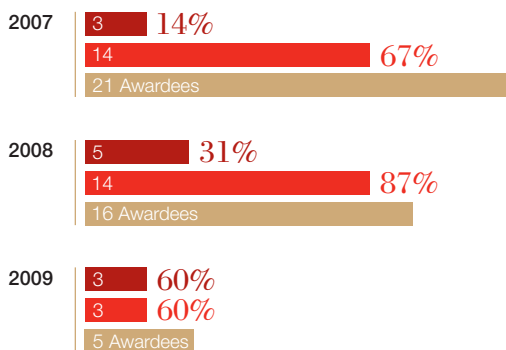
Career Awards in the Medical Sciences Program (2007 – 2009)

■ Female ■ M.D., Ph.D. ■ Total

Proposals



Awardees



Significant Ad Hoc Grants

Gairdner Foundation \$50,000

Support for three major symposiums to bring internationally recognized biomedical scientists (Gairdner awardees) to Canada

American Society for Cell Biology \$15,000

Support for the annual meeting

American Society for Cell Biology \$15,000

Support for the Minorities Affairs Committee activities at the annual meeting

Joseph C. Wu, M.D., Ph.D.

2007 Career Award for Medical Scientists

Joseph C. Wu was among the first recipients of the Career Awards for Medical Scientists in 2007. The assistant professor of medicine and radiology at Stanford University primarily studies molecular imaging, gene therapy, and stem cell therapy. In a paper published by the *Proceeding of the National Academy of Sciences*, Wu was part of a Stanford team that found that human embryonic cells trigger an immune response in mice.

Human embryonic stem cells were injected into the leg muscles of mice with either normal or compromised immune systems. The team followed the fate of the transplanted cells with a novel molecular imaging technique that can visualize whole, living animals. Previous studies of this type relied on microscopic examination of tissue samples from sacrificed animals, but this new approach allowed researchers to watch the life or death of cells in real time.

Although the cells died within about seven to 10 days in mice with functioning immune systems, they survived and proliferated in the immunocompromised mice. Repeated injections of cells into the immune-normal mice led to more rapid cell death, indicating that the immune system was becoming more efficient at recognizing and rejecting the cells.

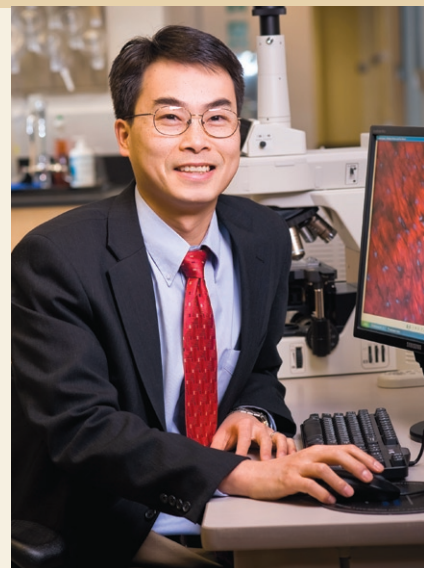
It's not known what triggers the immune system to attack the embryonic stem cells, but the scientists believe it may be a protein that begins to appear on the surface of the cells as they differentiate into

more-specialized tissues. Once the immune system has been primed to recognize the foreign molecules, it responds even more quickly to repeated invasion.

Because the aggressive reaction of the immune system somewhat mimics the way the body reacts to transplanted organs, the researchers wondered if common antirejection medications would increase cell survival.

Wu and his colleagues will continue to investigate whether different combinations can more effectively mitigate the immune response in mice. They also plan to conduct similar experiments in a mouse model that more closely approximates what would happen in humans.

—Stanford University Medical Center



Infectious Diseases

The Burroughs Wellcome Fund has supported research in infectious diseases since 1981, when it began funding modern molecular approaches to understanding what have been called the great neglected diseases—malaria, the pathogenic fungi, and human parasites—that primarily affect people in underdeveloped countries. Since that time, much more attention has been paid to the urgent needs of these fields. In 2000, the Fund decided to turn its attention to the larger issues of human-pathogen interactions in these infectious diseases and others, opening the door for funding work in bacterial and viral diseases. BWF's Investigators in the Pathogenesis of Infectious Disease program is designed to incorporate elements of previously funded areas of research, and to focus primarily on the interaction of pathogens with their human hosts.

Competitive Award Program

Investigators in the Pathogenesis of Infectious Disease

Five-year awards provide \$500,000 for opportunities for accomplished investigators at the assistant professor level to study pathogenesis, with a focus on the intersection of human and microbial biology. The program is intended to shed light on the overarching issues of how human hosts handle infectious challenge. The awards are intended to give recipients the freedom and flexibility to pursue new avenues of inquiry and higher-risk research projects that hold potential for advancing significantly the biochemical, pharmacological, immunological, and molecular biological understanding of how infectious agents and the human body interact.

Visit www.bufund.org for complete program information.

Significant Ad Hoc Grants

California Institute of Technology \$50,000
Support for WormBook, an online open-access publication

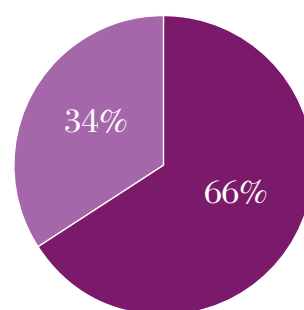
North Carolina State University College of Veterinary Medicine \$45,000
Support for the National Veterinary Scholars Symposium and the Burroughs Wellcome Fund Workshop: "Becoming faculty: a short course on launching a scientific career"

Institute of Medicine \$32,500
Support for activities of the Forum on Microbial Threats for 2008-2011

Historical Program Observations

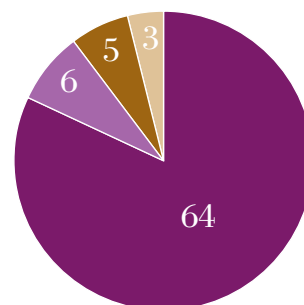
Gender

Female Male



Degrees

PhD MD/PhD MD DVM/PhD



SNAPSHOT

Blossom Damania, Ph.D.

2006 Investigator in the Pathogenesis of Infectious Disease

Scientists know that some cancers are triggered by viruses, which take over cellular systems and cause uncontrolled cell growth. Some viruses, particularly



the herpes virus, can lie dormant in a person's cells for long periods of time and then reactivate, causing disease. These viruses are particularly damaging in immunosuppressed people and those living with HIV/AIDS.

A study led by Blossom Damania, associate professor of microbiology and immunology at the University of North Carolina-Chapel Hill, focuses on the intersection of these

two scientific puzzles, resulting in new discoveries about how one herpesvirus known to cause cancer may reactivate when the infected cell senses another type of virus entering it.

Damania focused on Kaposi's sarcoma-associated herpesvirus (KSHV), an agent associated with Kaposi's sarcoma, primary effusion lymphoma and another syndrome called Castleman's disease.

"We hypothesized that a secondary viral infection could serve as the trigger for KSHV, so we took

cells infected with KSHV and activated immune receptor proteins called toll-like receptors that are present on the body's cells. Toll-like receptors are the guardians of the cell and essentially function to alert the cell to the presence of an intruder. These proteins act as an alarm system to tell the cell that a foreign organism is trying to enter it," said Damania.

Ten human toll-like receptors have been identified by scientists thus far, but the UNC team found that activation of only two of them, TLR7 and TLR8, reactivated the virus, allowing it to reproduce itself. The cells self-destruct in an attempt to kill the virus, but by the time the cell dies, the virus has already replicated and escaped, moving on to infect other cells in the body.

"This is a very exciting finding because it helps us better understand how a latent virus can suddenly reactivate, replicating and spreading throughout the body. Additionally, since Kaposi's sarcoma is a cancer that is associated with this phase of viral infection, it is plausible that the virus' activation and replication may eventually lead to the development of Kaposi's sarcoma in an infected individual.

"Laboratory experiments in a controlled research environment often do not reflect the real world, where we are constantly exposed to many different environmental factors and other microorganisms. This finding is an important reminder that multiple factors are involved in causing disease," she added.

— University of North Carolina-Chapel Hill

Interfaces in Science

The biological sciences are changing. Advances in genomics, quantitative structural biology, modeling of complex systems, and nanotechnology have opened up new realms of research for ambitious investigators with backgrounds in physics, mathematics, computer science, and engineering who want to explore the new frontier of biology. In recognition of the vital role such cross-trained scientists will play in furthering biomedical science, the Burroughs Wellcome Fund has made a major investment in the training and support of young investigators with backgrounds in the physical, chemical, or computational sciences whose work addresses biological questions and who are dedicated to pursuing a career in academic research.

Competitive Award Program

Career Awards at the Scientific Interface

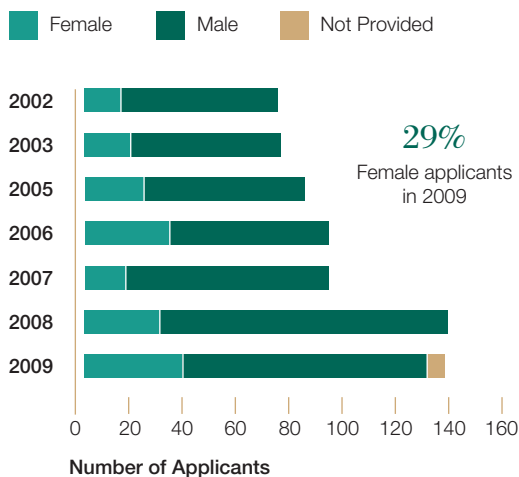
Five-year awards provide \$500,000 to bridge advanced postdoctoral training and the first three years of faculty service. These awards are intended to foster the early career development of researchers with backgrounds in the physical/mathematical/computational sciences whose work addresses biological questions. These awards are open to U.S. and Canadian citizens or permanent residents. There is limited eligibility for temporary residents.

Visit www.bwfund.org for complete program information.

Spectrum of Grantmaking

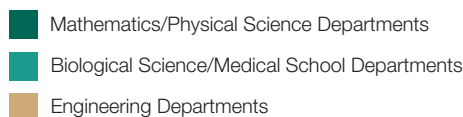
In addition to funding research at the Interface in Science, BWF understands that a strong community of scientists creates unique opportunities for innovative science. We have funded projects from the theoretical side of the spectrum, such as the Kavli Institute for Theoretical Physics Interdisciplinary Biology Initiative, which looks at emerging scientific opportunities involving physics and biology. From the experimental end of the spectrum, we've funded the Marine Biological Laboratory's Physiology: Modern Cell Biology Using Microscopic, Biochemical, and Computational Approaches course, which targets the interface of cell and computational biology. Creating a strong environment for emerging scientists is central to BWF's mission.

Historical Applicant Observations



CASI Faculty Appointments

as of September 10, 2009



Joshua Weitz, Ph.D.

2007 Career Award at the Scientific Interface

A study funded by the Burroughs Wellcome Fund suggests that whether or not a virus decides to kill a host cell is not random. Rather, cell fate is controlled by the number of infecting viruses in a coordinated fashion.

The research, published in the *Biophysical Journal*, shows that when multiple bacteria-infecting viruses—called phages—infect a cell, it increases the number of viral genomes and therefore the overall level of viral gene expression. Changes in viral gene expression can have a dramatic effect on gene networks that control whether viruses choose to burst out of the host cell—the “lytic” pathway—or instead remain latent—the “lysogenic” pathway.

“A single infecting phage can lead to host cell death and viral release, whereas if two or more phages infect a host the outcome is typically latency,” said lead study author Joshua Weitz, an assistant professor in the School of Biology at the Georgia Institute of Technology. “We wanted to know why two viruses would behave differently than a single virus, given that the infecting viruses possess the same genetic circuit regulating this decision.”

The researchers modeled the gene regulatory dynamics and proteins produced at the switch

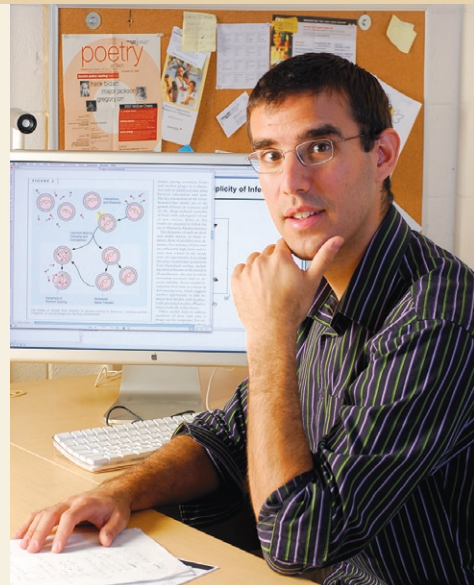
between lysis and latency for lambda phage, focusing on three key genes—cro, cI and cII.

With a single virus, cro dominated and the lytic pathway prevailed. If the number of co-infecting viruses exceeded a certain threshold, the switch flipped to the lysogenic pathway.

The cII gene acted as the gatekeeper. Increasing the number of viruses drove the dynamic level of cII proteins past a critical point, facilitating production of cI proteins and leading to the lysogenic pathway.

“The decision circuit is a race between two pathways,” explained Weitz. He and his colleagues propose a model in which increases in the overall amount of viral proteins produced from multiple viral genomes can have a dramatic effect on the gene networks that control cell fate.

—Georgia Institute of Technology



Population and Laboratory Based Sciences

The Burroughs Wellcome Fund launched a new institutional award program in 2008 supporting graduate education in programs that will train students for simultaneous expertise in both population approaches (for example, epidemiology) and science done “at the bench.” These students should emerge well-positioned to take on complex problems currently beyond the reach of most traditionally-trained individual investigators.

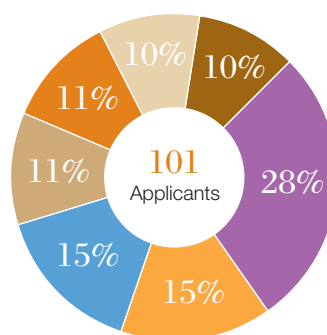
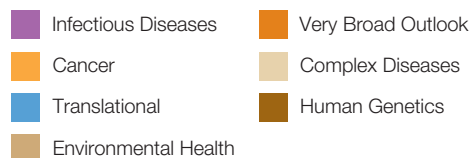
Competitive Award Program

Institutional Program Unifying Population and Laboratory Based Sciences

Five-year institutional training awards provide \$500,000 a year to bridge the gap between the population and computational sciences and the laboratory-based biological sciences. The award will support the training of researchers between existing concentrations of research strength in population approaches to human health and in basic biological sciences. The goal is to establish training programs by partnering researchers working in schools of medicine and schools (or academic divisions) of public health.

Visit www.bwffund.org for complete program information.

Applicants in the first year had a range of foci.



2009 Grant Recipients

Emory University \$2,500,000

Emory University's program will create a new doctoral pathway called Human Health: Molecules to Mankind (M2M), with the theme of "Understanding human health: integrating biology, behaviors, environments and populations." Each doctoral student will train within two existing Ph.D. programs, one in a laboratory science and one in a population science.

University of California-Los Angeles \$2,500,000

UCLA's next generation of scientists will be trained in multiple disciplines to fight diabetes through the newly established Burroughs Wellcome Fund Inter-school Training Program in Metabolic Disease. The BWF-ITP-MD is a Ph.D. education and research training program devoted entirely to the understanding of metabolic diseases and is the first-ever Ph.D. program to combine multiple disciplines in its approach to the study of metabolic diseases.

University of Texas-Houston Health Science Center \$2,500,000

A consortium led by the University of Texas Health Science Center at Houston, which also includes The University of Texas M. D. Anderson Cancer Center and Baylor College of Medicine, plans to recruit up to six students a year who will have the opportunity to pursue a doctorate program of their choice at participating institutions, so long as their research is in gene-environment interaction.

Reproductive Sciences

Many health and social problems in the United States can be attributed to preterm births. The Burroughs Wellcome Fund launched a new award initiative in 2009 to expand the limited understanding of the biological mechanisms underlying childbirth and spontaneous preterm birth using multidisciplinary approaches.

Competitive Award Program

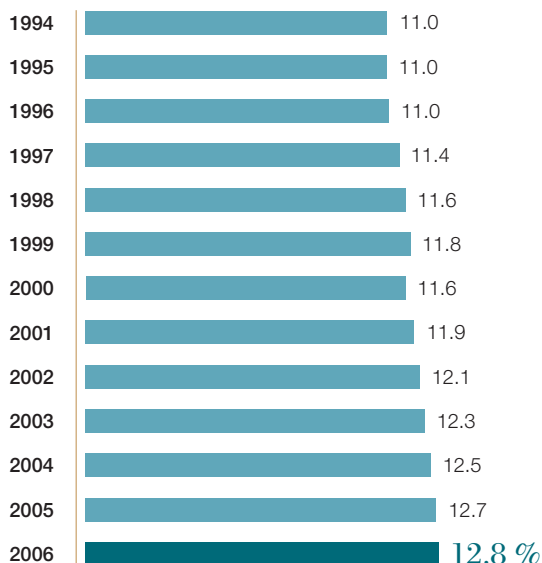
Preterm Birth Initiative

The initiative is designed to bring together a diverse interdisciplinary group with expertise in genetics/genomics, immunology, microbiology and proteomics along with the more traditional areas of parturition research such as maternal fetal medicine, obstetrics, and pediatrics to address scientific issues related to preterm birth.

BWF has made an initial 10 planning grants of which five full research grants are expected to be awarded. Full research grants will provide up to \$600,000 over a four year period (\$150,000 per year) and are expected to begin in 2011.

Visit www.bufund.org for complete program information.

Yearly percentage of preterm births in the U.S.



2009 Planning Grant Recipients

Vikki M. Abrahams, Ph.D.
Yale University

Julie Baker, Ph.D.
Stanford University

Ronald W. Davis, Ph.D.
Stanford University

Michal Elovitz, M.D.
University of Pennsylvania

Michael Douglas House, M.D.
Tufts Medical Center

Mala S. Mahendroo, Ph.D.
University of Texas Southwestern
Medical Center-Dallas

Jeffrey C. Murray, M.D.
University of Iowa

Indira Mysorekar, Ph.D.
Washington University

Ignatia Van den Veyver, M.D.
Baylor College of Medicine

Carl P. Weiner, M.D., M.B.A.
University of Kansas

Science Education

Engaging children in science has been a focus of the Burroughs Wellcome Fund since it became an independent, private foundation in 1994. We are convinced that all children, regardless of their future career path, need basic science literacy to participate fully in civic life.

We believe that the best method for achieving the goal of science literacy is to get students involved in the scientific process and let them do what comes naturally: ask questions and participate in hands-on activities and experiments that convey basic scientific principles.

Competitive Award Program

Student Science Enrichment Program

Three-year awards provide up to \$180,000 (\$60,000 per year) to support diverse programs with a common goal: to enable primary and secondary students to participate in hands-on scientific activities and pursue inquiry-based exploration. Since 1996, BWF has awarded 141 grants totaling \$20 million to 69 organizations that reach nearly 33,000 North Carolina students.

Visit www.bwfund.org for complete program information.

Science Education Catalytic Program: North Carolina Science, Mathematics, and Technology Education Center

The SMT Center was founded in 2002 by BWF as an organization to serve as a leader to improve science, mathematics, and technology education in North Carolina. The SMT Center has been working with the N.C. State Government and others to ensure that all levels of the educational process are engaged and enlightened in the importance of sound science, mathematics, and technology instruction in North Carolina.

For more information, visit www.ncsmt.org.

Significant Ad Hoc Grants

Wilson County Schools \$50,000

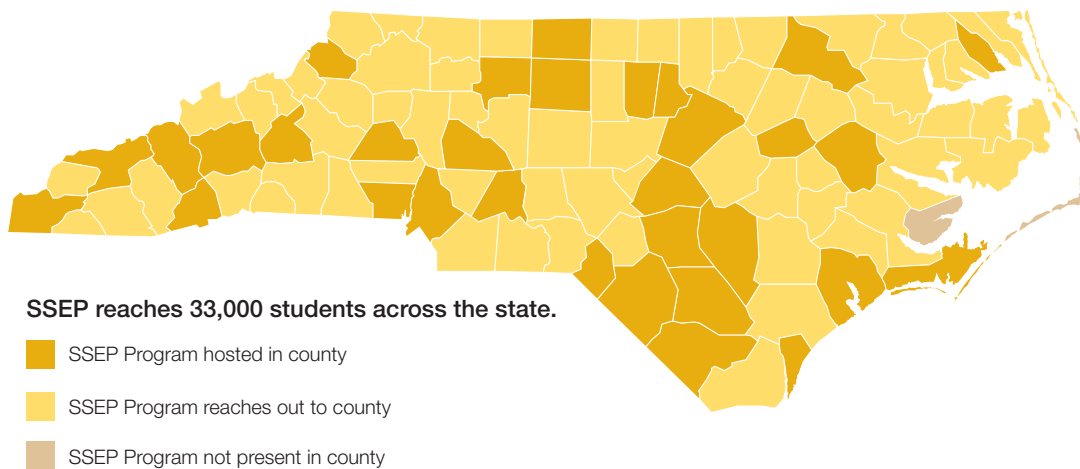
Support for the NC Leadership and Assistance for Science Education Reform (LASER) Demonstration and Professional Development Center

James B. Hunt Jr. Institute for Educational Leadership and Policy \$50,000

Support for the North Carolina Science Summit, Best Practices in STEM Education

National Research Council \$35,000

Support for the integration and testing of the publication, *Learning Science in Informal Environments*, at the proposed LASER Demonstration Site



Competitive Award Program

Career Awards for Science and Mathematics Teachers

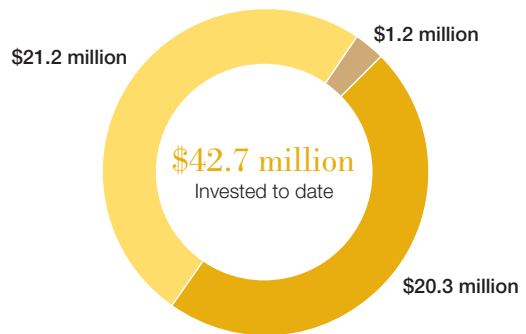
The Career Award for Science and Mathematics Teachers is a new five-year award available to outstanding science or mathematics teachers in the North Carolina public primary and secondary schools. The purpose of this award is to recognize teachers who have demonstrated solid knowledge of science or mathematics content and have outstanding performance records in educating children. This five-year award presents opportunities for professional development and collaboration with other master science or mathematics teachers who will help to ensure their success as teachers and their satisfaction with the field of teaching. Special consideration will be given to teachers working in hard to staff, economically deprived classrooms in North Carolina. The award also offers schools and school districts the opportunity to fully develop teachers as leaders in the field.

Career Awards for Science and Mathematics Teachers provide \$175,000 over a period of five years (\$35,000 per year) to eligible teachers in the North Carolina public school system. BWF will support five awards.

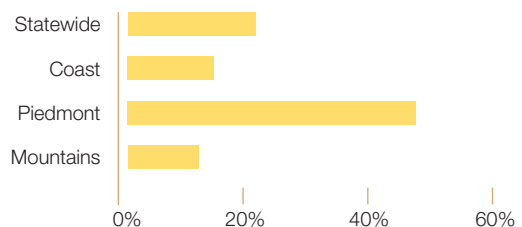
Visit www.bwfund.org for complete program information.

BWF has invested over \$42 million in science education since 1996.

■ SSEP (141 Awards, 69 organizations, 33,000 students)
 ■ Ad hoc grants ■ Visiting Professors



Grants awarded by region



Catawba Conservation Camp

“Tell me what you feel,” Dr. Joe Poston asks as he places a bird, tagged with a tiny piece of metal, into his student’s fingers.

“Warm,” says the student, laughing cautiously. More giggles erupt from the surrounding group, then silence as everyone waits to see what happens next. Before long the student breaks from the circle, marches into a nearby clearing and tosses the bird into the air. And with that, the creature is aloft.

This is just a glimpse into the Catawba Conservation Camp, a week-long summer camp funded by the Burroughs Wellcome Fund’s Student Science Enrichment Program. Middle school girls participating in the camp spend a week on Catawba College’s campus, exploring and gathering data from the natural world.

“It has been a personal dream of mine to have something just for girls, to have a place where girls could engage in science, to have strong teachers, and [to] help them realize they can get excited about science,” said Dr. Cyndi Osterhus, who co-directs the camp alongside Dr. Poston.

To that end, the students dive head-first into a challenging and fun guided itinerary on an environmental area called the Catawba College Ecological Preserve.

The location encompasses more than 180 acres of wilderness for the girls to explore as they participate in learning modules facilitated by camp organizers. They go out on the lake, wrangle turtles and assist in the capture and release of birds for the purpose of data collection.

While the camp is only a week long, a component of it continues in the form of Saturday sessions, where former participants return to continue learning about the themes they explored.

“One of the limitations that classroom teachers face is helping students actually witness the things they’re trying to teach them, especially when it comes to science,” Poston said. “This is an opportunity for these young ladies to go out and witness firsthand some of the stuff they’re being told in the classroom.”



Translational Research

Physician-scientists play a crucial role in the continuum of research that ensures a free flow of information and new treatments from the laboratory to the patient bedside and back again. BWF created the Clinical Scientist Awards in Translational Research to foster the productivity of independent physician-scientists at the mid-career level who will strengthen translational research in academic health centers, both through their own studies as well as their mentoring of the next generation of physician-scientist trainees.

BWF also supports activities that impact the environment in which translational research is conducted. Of particular interest are efforts that provide career development resources to young investigators.

Competitive Award Program

Clinical Scientist Awards in Translational Research

Five-year awards provide \$750,000 (\$150,000 per year) to foster the development and productivity of established independent physician-scientists whose work bridges the gap between basic research and patient care. The awards are intended to give recipients the freedom and flexibility to explore fundamental scientific questions, to apply the resulting knowledge at the bedside, and to bring insights from the clinical setting back to the laboratory for further exploration.

Visit www.bwfund.org for complete program information.

Significant Ad Hoc Grants

Institute of Medicine \$40,000

Support for the Forum on Drug Discovery, Development, and Translation

American Medical Informatics Association \$25,000

Support for the creation of a research informatics forum

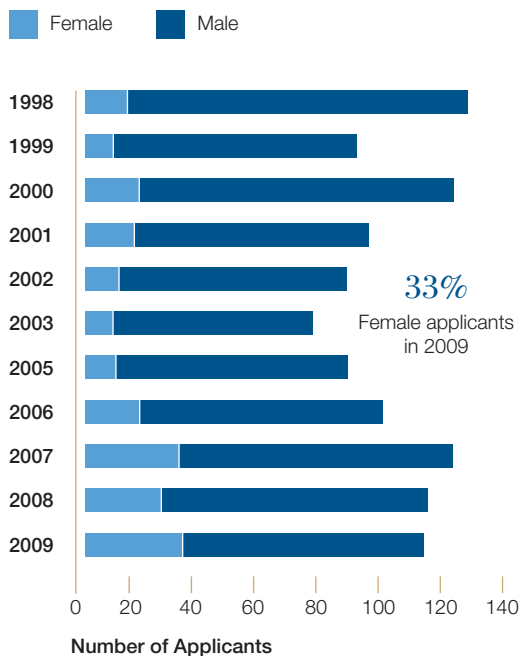
American Society for Clinical Investigation/ Association of American Physician \$20,000

Support for the 2009 joint meeting

Clinical Research Foundation \$20,000

Support for the annual meeting

Historical Applicant Observations



SNAPSHOT

Sofia Merajver, M.D., Ph.D.

2003 Clinical Scientist Award in Translational Research



Traditional cancer biology involves taking a sample of cells and holding them in time so they can be studied. Then the researchers look at that slice of cells to understand what signals and pathways are involved. But that doesn't capture the full picture, says Sofia Merajver, M.D., Ph.D., co-director of the Breast Oncology Program at the University of Michigan Comprehensive Cancer Center.

"The living cell is really a dynamic process. We need to consider the properties of physics to help us understand these data. In order to develop a drug directed against a given molecule that has real hope of treating cancer, we need to understand how that molecule is sitting in the cell, interacting with other molecules," says Merajver.

Merajver and her colleagues were successful in getting the journal *Cancer Research* to add a new regular section to the twice-monthly journal precisely focused on mathematical modeling. The journal has also added new editors to its board who have expertise in this discipline. Merajver and Trachette Jackson, Ph.D., professor of mathematics at U-M, will lead this effort as senior editors.

Merajver and her team have developed a sophisticated mathematical model to help researchers apply these concepts to cancer. The mathematical model is designed to help give researchers a complete picture of how a cell interacts with its surrounding environment. By understanding the full complexity of signaling pathways, researchers can better target treatments and identify the most promising potential new drugs.

Researchers have learned from this modeling that a well-known and major type of signaling pathway naturally transmits information not just in a forward direction, but also backwards. That implies new considerations for developing drugs to inhibit major growth and metastasis pathways in cancer.

This crosstalk was missed by conventional methods. Typically, when scientists begin to look at a cell, they must make assumptions to simplify the picture of what is happening in cells.

"When you make simplifying assumptions, you always run the risk of eliminating critical aspects of your system, but you have no way of knowing what was discarded. When you simplify, you don't know exactly what you're throwing away because you never looked at the complex case," Merajver says. Mathematical modeling allows researchers to look at the complex case more thoroughly.

"To understand how the laws of physics can be applied to biological systems is a new frontier," she says.

—*University of Michigan Health System*



Science and Philanthropy

The Burroughs Wellcome Fund makes noncompetitive grants for activities and career development opportunities for scientists that fall outside of our competitive award programs, but are closely related to our targeted areas.

We place special priority on working with nonprofit organizations, including government agencies, to leverage financial support for our targeted areas of research, and on encouraging other foundations to support biomedical research. Proposals should be submitted to BWF by email. Mailed requests should be no more than five pages.

Applicants should describe the focus of the activity, the expected outcomes, and the qualifications of the organization or individuals involved; provide certification of the sponsor's Internal Revenue Service tax-exempt status; and give the total budget for the activity, including any financial support obtained or promised. Proposals are given careful preliminary review, and those deemed appropriate are presented for consideration by BWF's Board of Directors.

Applications are accepted throughout the year.



Report on Finance

The Burroughs Wellcome Fund's investments totaled \$586.8 million at August 31, 2009, the end of our fiscal year. BWF's primary financial goal is to pursue an investment strategy that will support annual spending needs and maintain a constant real level of assets over the long term.

To achieve this goal, a high percentage of our investments are placed in strategies that derive the bulk of their returns from exposure to U.S. and international capital markets. Hence, fluctuations in BWF's investment results will be due largely to variability in capital market returns.

BWF's investment policies are developed with the recommendations and review of the Investment Committee, which is appointed by and reports to BWF's Board of Directors. The committee, which meets three times a year, has seven voting members, including four representatives from outside BWF and three representatives of our Board. The Board's chair, BWF's president, and BWF's vice president for finance also serve on the committee as nonvoting members.

As part of BWF's investment strategy, we have established "allocation targets"—that is, percentages of our total assets to be invested in particular asset classes. Investment managers hired by BWF pursue more focused mandates within each sector. As of the end of the fiscal year, BWF's asset mix and market values were:

- U.S. large capitalization equity assets had a market value of \$110.3 million. The sector's target allocation was 25 percent, and actual holdings stood at 18.8 percent.
- U.S. small capitalization equity assets had a market value of \$81.1 million. The sector's target allocation was 18 percent, and actual holdings stood at 13.8 percent.

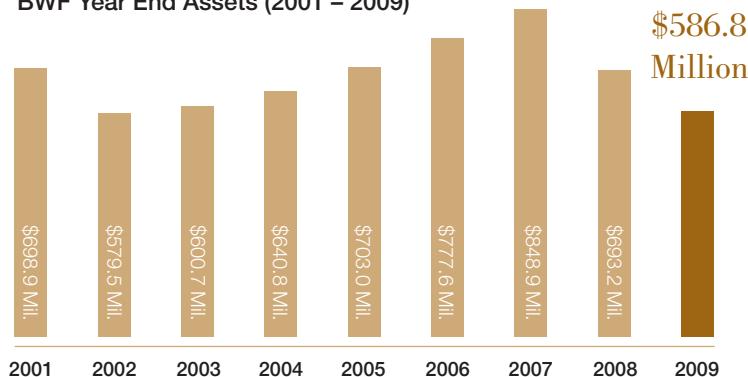
- International equity assets had a market value of \$145.8 million. The sector's target allocation was 32 percent, and actual holdings stood at 24.8 percent.
- Fixed income assets had a market value of \$115.5 million. The sector's target allocation was 22 percent, and actual holdings stood at 19.7 percent.
- Cash equivalent assets had a market value of \$13.9 million. The sector's target allocation was 3 percent, and actual holdings stood at 2.4 percent.
- Alternative assets had a market value of \$120.2 million. The sector did not have a target allocation, and actual holdings stood at 20.5 percent. The maximum permitted allocation to alternative assets stood at 20.0 percent at cost.

The total market value of BWF's investments decreased by \$106.4 million, or 15.3 percent, from the end of the previous fiscal year. This decrease in assets was due primarily to the large declines in global equity markets in late 2008 and early 2009. Only bonds had positive returns for the 12 month period. BWF's total investment return before investment management fees for the fiscal year was -11.0 percent. Returns in all three equity sectors

were negative for the fiscal year, while bonds posted a positive result. The U.S. large capitalization equity sector returned -19.5 percent, the U.S. small capitalization equity sector had a -18.5 percent result, the international equity sector posted a return of -14.5 percent for the fiscal year, and fixed income produced a +10.3 percent result.

As of August 31, 2009, BWF employed nine marketable securities investment managers. In the U.S. large capitalization equity sector, the managers were State Street Global Advisors; LSV Asset Management; and Enhanced Investment Technologies. State Street Global Advisors and FAF Advisors managed U.S. small capitalization equities. Pacific Investment Management Company and Smith Breeden Associates were the fixed income managers. Capital Guardian Trust Company; Northern Cross; and Hansberger Global Investors managed international equities. BWF also held investments in seven venture capital funds: Intersouth Partners IV, V and VI, Spray Venture Funds I and II, Mission Ventures II and A. M. Pappas Life Science Ventures II. Barlow Partners and Winston Partners managed funds of equity oriented hedge funds. Blackrock Alternative Advisors and Franklin Street Partners managed funds of absolute return strategies. Pacific Investment Management Company managed an absolute return strategy. Finally, Hamilton Lane Advisors managed a fund of private equity strategies.

BWF Year End Assets (2001 – 2009)



STATEMENTS OF FINANCIAL POSITION

August 31, 2009 and 2008

(All dollar amounts presented in thousands)

	2009	2008
Assets		
Cash and cash equivalents	\$ 23,983	\$ 23,508
Marketable securities	566,868	695,415
Accrued interest and dividends receivable	1,484	1,867
Federal excise tax receivable	240	—
Other assets	42	44
Property and equipment, net	10,367	10,761
Total assets	\$ 602,984	\$ 731,595
Liabilities and Net Assets		
Transactions payable, net	\$ 6,052	\$ 27,200
Accounts payable and other liabilities	17	1,389
Federal excise tax payable	—	180
Deferred federal excise taxes	118	11
Unpaid awards	108,801	104,133
Total liabilities	114,988	132,913
Unrestricted net assets	487,996	598,682
Total liabilities and net assets	\$ 602,984	\$ 731,595

STATEMENTS OF ACTIVITIES

August 31, 2009 and 2008

(All dollar amounts presented in thousands)

	2009	2008
Revenues		
Interest and dividends, less investment expenses of \$2,116 and \$4,676 in 2009 and 2008, respectively	\$ 10,867	\$ 12,412
Net realized gain (loss) on sale of marketable securities	(98,001)	16,673
Total revenues	(87,134)	29,085
Expenses		
Program services	23,570	42,803
Management and general	5,220	6,796
Total expenses before net unrealized appreciation and deferred federal excise tax	28,790	49,599
Net unrealized appreciation (depreciation) of marketable securities, net of provision for (benefit from) deferred federal excise taxes of \$107 and \$(1,844) in 2009 and 2008, respectively	5,238	(90,366)
Change in net assets	(110,686)	(110,880)
Net assets at beginning of year	598,682	709,562
Net assets at end of year	\$ 487,996	\$ 598,682

For full audited financials visit bwfund.org/annualreport.



Grants Index

BWF makes all grants to nonprofit organizations. For most of the programs, the name of the individual on whose behalf the grant is made is listed first, the title of the award recipient's project is listed second, and the name of the organization that received the money is listed third. In the competitive grant sections, new awardees for FY 2009 are listed in red.

For programs that may have coaward recipients, the award recipients and their organizations are listed first, followed by the project title. For grants made directly to organizations and not on behalf

of an individual, the name of the organization is listed first, followed by the title of the project or a brief description of the activity being supported.

In addition to making competitive awards, BWF makes noncompetitive grants—Ad Hocs—for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

For full audited financials visit bwfund.org/annualreport.

PROGRAM SUMMARY

Year Ended August 31, 2009

(Amounts rounded to nearest dollar)

	Approved	Paid	Transferred/ Cancelled*
Biomedical Sciences			
Career Awards in the Biomedical Sciences	\$ 227,906	\$ 3,100,767	\$ 1,043,499
Career Awards in the Medical Sciences	3,975,000	2,558,000	475,000
Hitchings-Elion Fellowship	168,000	84,000	168,000
Ad Hoc	559,450	296,750	—
Total	\$ 4,930,356	\$ 6,039,517	\$ 1,686,499
Infectious Disease			
Investigators in Pathogenesis of Infectious Disease	\$ 3,200,000	\$ 2,241,915	\$ 985,585
Ad Hoc	326,250	586,250	15,000
Total	\$ 3,526,250	\$ 2,828,165	\$ 1,000,585
Interfaces in Science			
Career Award at the Scientific Interface	\$ 4,099,314	\$ 2,288,600	\$ 914,000
Ad Hoc	20,000	109,500	—
Total	\$ 4,119,314	\$ 2,398,100	\$ 914,000
Population Sciences			
Institutional Program Unifying Population and Laboratory-Based Sciences	\$ 7,500,000	\$ 450,000	\$ —
Total	\$ 7,500,000	\$ 450,000	\$ —
Science and Philanthropy			
Science and Philanthropy	\$ 107,500	\$ 107,500	—
Total	\$ 107,500	\$ 107,500	—

PROGRAM SUMMARY—CONTINUED

Year Ended August 31, 2009

(Amounts rounded to nearest dollar)

	Approved	Paid	Transferred/ Cancelled*
Science Education			
Student Science Enrichment Program	\$ 1,952,400	\$ 2,321,597	\$ —
Ad Hoc	368,900	958,015	—
Total	\$ 2,321,300	\$ 3,279,612	—
Translational Research			
Clinical Scientist Award in Translational Research	\$ 3,778,044	\$ 3,628,044	\$ 937,500
Ad Hoc	\$ 160,000	126,667	—
Total	\$ 3,938,044	\$ 3,754,711	\$ 937,500
Grand Total†	\$ 26,442,764	\$ 18,857,605	\$ 4,538,584

* The "Transferred/Cancelled" totals reflect grants made to award recipients who changed institutions, modified the terms of their grant at their current institution, or both changed institutions and modified their grant. In these cases, BWF's policy has been to cancel the remaining portion of the original grant and, as necessary, approve a new grant, which is why in the following index an approved amount has been noted, but the recipient is not a new awardee. When the award recipient has changed institutions, the new grant is made to the new institution; when the award recipient has not moved but has modified the terms, the new grant is made to the current institution.

† To more accurately reflect the total amount that BWF approved in actual "new" dollars during this fiscal year, the "Transferred/Cancelled" total must be deducted from the "Approved" total.

Competitive Grants

BIOMEDICAL SCIENCES

Recent awardees appear in red

Career Awards in the Medical Sciences

Jonathan Paul Alexander, M.D., Ph.D.

Isolation of a putative alveolar stem cell population and analysis of its role in development, maintenance, and repair of the lung epithelium
University of California-San Francisco

Antonios O. Aliprantis, M.D., Ph.D.

Novel regulators of the osteoclast differentiation program
Harvard School of Public Health

Robert Baloh, M.D., Ph.D.

Mechanism of peripheral neuropathy from Mitofusin 2 mutations
Washington University

James Elliott Bradner, M.D.

Design and characterization of highly potent inhibitors of HDAC6
Harvard University

Kathleen H. Burns, M.D., Ph.D.

Investigating the role of retrotransposons in hematopoietic neoplasias
Johns Hopkins University

Daniel Cahill, M.D., Ph.D.

Translational molecular genetic analyses of chemotherapeutic resistance in human brain tumors
University of Texas M.D. Anderson Cancer Center

Alice Siau-In Chen-Plotkin, M.D.

Genomic approaches to frontotemporal dementia
University of Pennsylvania School of Medicine

Sandeep Robert Datta, M.D., Ph.D.

Characterization of neural circuits that drive innate behaviors
Columbia University

Arlene Dent, M.D., Ph.D.

Acquisition of immunity to blood stage *Falciparum* malaria in infants
Case Western Reserve University

Mahalia Sabrina Desruisseaux, M.D.

Neuroparasitology: neurological complications of cerebral malaria
Albert Einstein College of Medicine of Yeshiva University

Jay F. Dorsey, M.D., Ph.D.

Identification of mSin3b and Mad4 as novel p53 target genes directing p53-mediated transcriptional repression
University of Pennsylvania

Chester Drum, M.D., Ph.D.

Protein nanoparticles for small molecule drug delivery
To Be Named North American Degree Granting Institution

Joseph Alexander Duncan, M.D., Ph.D.

Dissecting cryopyrin-mediated inflammatory signaling and its role in the pathogenesis of infectious diseases
University of North Carolina-Chapel Hill

Benjamin Levine Ebert, M.D., Ph.D.

Genomic approaches to disorders of erythroid differentiation
Harvard Medical School

Brian Todd Edelson, M.D., Ph.D.

Macrophage and dendritic cell development
Washington University

Rene L. Galindo, M.D., Ph.D.

Genetic dissection of the Rhabdomyosarcoma initiator PAX-FKHR and PAX-related signaling in skeletal muscle development
University of Texas Southwestern Medical Center-Dallas

Wendy Sarah Garrett, M.D., Ph.D.

Novel effectors and regulators of inflammation, chronic infection, and carcinogenesis in the colon
Harvard School of Public Health

Pradipta Ghosh, M.D.

Modulation of G-protein activity during oncogenic and metastatic progression
University of California-San Diego

Jeffrey Parker Henderson, M.D., Ph.D.

Iron acquisition by bacterial siderophores as a pathogenic determinant in urinary tract infections
Washington University School of Medicine

Darnell Kaigler, D.D.S., Ph.D.

Cell therapy for the treatment of alveolar bone defects
University of Michigan-Ann Arbor

Lu Quang Le, M.D., Ph.D.

Cell of origin and tumor microenvironment in NF1-associated neurofibroma development
University of Texas Southwestern Medical Center-Dallas

Roger Lo, M.D., Ph.D.

Melanoma in the skin: initiation, progression, and crosstalk with dermal fibroblasts
University of California-Los Angeles

Ravindra Majeti, M.D., Ph.D.

Identification and targeting of human acute myeloid leukemia stem cell-specific cell surface molecules
Stanford University

Emanuel Maverakis, M.D.

gC399tr an inhibitor of autoimmunity
University of California-Davis

Eric Matthew Morrow, M.D., Ph.D.

Identification of autism genes in special founder populations using high-density SNP microarrays
Brown University

Ken Nakamura, M.D., Ph.D.

Physiologic and pathologic interactions of alpha-synuclein with mitochondria in Parkinson's disease
University of California-San Francisco

Christopher Newton-Cheh, M.D.

Genomic dissection of QT interval duration and sudden death
Harvard Medical School

Dao Nguyen, M.D.

Stringent response in *Pseudomonas aeruginosa* biofilm formation and antibiotic tolerance
McGill University

Quyen T. Nguyen, M.D., Ph.D.

Testing surgery guided by molecular fluorescence imaging
University of California-San Diego

Robert M. Plenge, M.D., Ph.D.

Genotype-phenotype studies of rheumatoid arthritis susceptibility genes
Harvard Medical School

David Tevis Pride, M.D., Ph.D.

Bacteriophage communities in oral health and disease
Stanford University

Frank J. Probst, M.D., Ph.D.

Generation of mouse models for X-linked diseases
Baylor College of Medicine

Miguel Nicolas Rivera, M.D.

Characterization of a novel X-linked tumor suppressor, WTX, in pediatric cancer
Harvard Medical School

Agata Smogorzewska, M.D., Ph.D.

Role of the Fanconi Anemia and other DNA crosslink repair pathways in genome maintenance and cancer prevention
Harvard Medical School

Matthew Vander Heiden, M.D., Ph.D.

Metabolic control of cancer cell proliferation by pyruvate kinase M2
Massachusetts Institute of Technology

Joseph C. Wu, M.D., Ph.D.

Molecular and cellular mechanisms of cardiac regeneration
Stanford University

Mark Nan Wu, M.D., Ph.D.

Identification of novel genes that regulate sleep in *Drosophila melanogaster*
Johns Hopkins University School of Medicine

Ann Zovein, M.D.

Hemogenic endothelium: hematopoietic stem cell emergence from the vasculature
University of California-San Francisco

Career Awards in the Biomedical Sciences

Derek W. Abbott, M.D., Ph.D.

Regulation of innate immunity via non-traditional ubiquitin linkages
Case Western Reserve University School of Medicine

Geoffrey K. Aguirre, M.D., Ph.D.

fMRI studies of the process architecture of face perception
University of Pennsylvania School of Medicine

Karl Mark Ansel, Ph.D.

Endogenous RNA interference and gene silencing in T cell differentiation
University of California-San Francisco

Diana M. Bautista, Ph.D.

Molecular and cellular mechanisms of mechanotransduction in mammalian sensory neurons
University of California-Berkeley

Thomas G. Bernhardt, Ph.D.

Coordinating cell division and chromosome segregation in *Escherichia coli*
Harvard Medical School

Michael D. Blower, Ph.D.

Analysis of the role of RNA in spindle assembly
Harvard Medical School

Mark M. Churchland, Ph.D.

Experimental study of settling neural processes in the primate brain
Stanford University

William (Bill) M. Clemons, Ph.D.

Structural studies of complexes involved in protein translocation and synthesis
California Institute of Technology

Leah E. Cowen, Ph.D.

Hsp90 and the evolution of pathogens and their hosts
University of Toronto Faculty of Medicine

Nika N. Danial, Ph.D.

Integration of glycolysis and apoptosis by the pro-apoptotic protein BAD
Harvard Medical School

Jeremy S. Dasen, Ph.D.

Role of Hox proteins in sensory-motor neuronal connectivity and identity
New York University School of Medicine

Ruben L. Gonzalez, Jr., Ph.D.

Single-molecule fluorescence studies of eukaryotic translation initiation and regulation
Columbia University

Or P. Gozani, M.D., Ph.D.

Regulation of chromatin remodeling events by nuclear phosphoinositides
Stanford University

Ira M. Hall, Ph.D.

Investigation of DNA copy-number fluctuation and epigenetic inheritance using genomic microarrays
University of Virginia School of Medicine

Victoria G. Herman, Ph.D.

Defining the molecular code for synaptic target selection
University of Oregon

Chyi-Song Hsieh, M.D., Ph.D.

Determining the antigen specificity of CD25+ CD4+ regulatory T cells
Washington University School of Medicine

Christina M. Hull, Ph.D.

Cell identity, sexual development, and virulence in the human fungal pathogen *Cryptococcus neoformans*
University of Wisconsin Medical School

Alla Y. Karpova, Ph.D.

Using molecular inactivators of synaptic transmission to study cortical function and its modulation by subcortical systems in health and disease
Janelia Farm Research Campus

Leslie S. Kean, M.D., Ph.D.

Innate immunity and transplantation tolerance: Defining the role of natural killer (NK) cells in allograft rejection
Emory University School of Medicine

Dennis H. Kim, M.D., Ph.D.

Genetic analysis of innate immunity in *Caenorhabditis elegans*
Massachusetts Institute of Technology

Tobias R. Kollmann, M.D., Ph.D.

Induction of protective immunity to listeria in neonates
University of British Columbia Faculty of Medicine

Steven T. Kosak, Ph.D.

Genomic organization of hematopoietic differentiation
Northwestern University Feinberg School of Medicine

Mondira Kundu, M.D., Ph.D.

Role of Ulk1 and autophagy in erythroid maturation
University of Tennessee Health Science Center College of Medicine

Eric C. Lai, Ph.D.

Genome-wide analysis of microRNA function
in *Drosophila*
Memorial Sloan-Kettering Cancer Center

Cheng-Yu Lee, Ph.D.

Genetic regulation of neural stem cell self-renewal
University of Michigan-Ann Arbor

Anthony Leonardo, Ph.D.

Neuronal population dynamics underlying
the retinal code for motion
Janelia Farm Research Campus

Yaping Joyce Liao, M.D., Ph.D.

Neurophysiological dysfunction in calcium
channelopathies
Stanford University School of Medicine

George Y. Liu, M.D., Ph.D.

Role of Group B *Streptococcal* hemolysin/cytolysin
and pigment in the pathogenesis of invasive neonatal
infections
University of California-Los Angeles

Stephen B. Long, Ph.D.

Atomic structures of open and closed voltage-
dependent potassium channels and other eukaryotic
membrane proteins
Memorial Sloan-Kettering Cancer Center

Ania K. Majewska, Ph.D.

Imaging rapid plasticity in the visual cortex
University of Rochester

Aaron W. McGee, Ph.D.

Inhibition of plasticity in the adult central nervous
system by Nogo-66 receptor signaling
University of Southern California Keck School
of Medicine

Aaron W. McGee, Ph.D.

Inhibition of plasticity in the adult central nervous
system by Nogo-66 receptor signaling
Yale University School of Medicine

Marc D. Meneghini, Ph.D.

Regulating chromatin domains in yeast and during
animal development
University of Toronto Faculty of Medicine

Kakoli Mitra, Ph.D.

Probing the dynamics of protein integration into and
translocation across membranes using fluorescence
spectroscopy and cryo-electron microscopy
New York University School of Medicine

Vamsi K. Mootha, M.D.

Genomic approaches to mitochondrial biogenesis
Harvard Medical School

Suzanne M. Noble, M.D., Ph.D.

Identification of virulence genes in *Candida albicans*,
a diploid, commensal human fungal pathogen
University of California-San Francisco School
of Medicine

Feroz R. Papa, M.D., Ph.D.

Connection between endoplasmic reticulum stress and
type 2 diabetes
University of California-San Francisco

Bijan Pesaran, Ph.D.

Cortical mechanisms for hand-eye coordination
New York University

Margot E. Quinlan, Ph.D.

Collaboration between two actin nucleators – Spir and
Capu
University of California-Los Angeles

Kyu Y. Rhee, M.D., Ph.D.

Enzymes of intermediary metabolism in *Mycobacterium
tuberculosis*: Anti-mycobacterial targets of nitric oxide
Weill Medical College of Cornell University

Antonina I. Roll-Mecak, Ph.D.

Molecular anatomy and physiology of a microtubule
severing enzyme defective in hereditary spastic
paraplegia
University of California-San Francisco

Alvaro Sagasti, Ph.D.

Development of morphological diversity in trigeminal
sensory neurons
University of California-Los Angeles

Alan Saghatelian, Ph.D.

Identifying functional connections between the
proteome and metabolome by global metabolite
profiling
Harvard University

Annette E. Salmeen, D.Phil.

Reactive oxygen species as temporal coordinators of cell signaling pathways
Stanford University School of Medicine

Nirao M. Shah, M.D., Ph.D.

Genetic analysis of neural circuits mediating sexually dimorphic behaviors in mammals
University of California-San Francisco School of Medicine

Shu-ou Shan, Ph.D.

Mechanism of signal recognition particle-mediated protein targeting
California Institute of Technology

Michael D. Shapiro, Ph.D.

Genetic and developmental basis of skeletal diversity in ninespine sticklebacks
University of Utah

Collin M. Stultz, M.D., Ph.D.

Conformational free energy landscape of collagen and its relationship to atherosclerotic plaque rupture
Massachusetts Institute of Technology

Benjamin P. Tu, Ph.D.

Logic of the yeast metabolic cycle
University of Texas Southwestern Medical Center-Dallas

Sinisa Urban, Ph.D.

Exploring the role of rhomboid signalling in development and disease
Johns Hopkins University School of Medicine

Kevin B. Urdahl, M.D., Ph.D.

Role of MHC class I molecules against tuberculosis
University of Washington School of Medicine

David M. Weinstock, M.D.

Defining individual DNA double-strand break repair capacity using zinc-finger nucleases
Harvard Medical School

Hitchings-Elion Fellowship**Alan J. Herr, Ph.D.**

Probing the pathway of RNA mediated defense with viral suppressor genes
University of Washington

Ad Hoc**American Society for Cell Biology**

Support for the annual meeting

American Society for Cell Biology

Support for the Minorities Affairs Committee activities at the annual meeting

Association of Military Surgeons of the United States

Support for the Sir Henry Wellcome Medal and Prize

California State University-East Bay

Support for the 2009 College of Science Scholarship Fund

Canadian Institutes of Health Research Institute of Genetics

Support for the annual conference

Gairdner Foundation

Support for three major symposiums to bring internationally recognized biomedical scientists (Gairdner awardees) to Canada

Gordon Research Conferences

Support for the Gordon Research Conference entitled "Signal Transduction in the Nucleus"

National Postdoctoral Association

Support for the Biomedical Career Fair

Rosalind Franklin Society

Support for women scientists in the life sciences

Society for Neuroscience

Support for postdoctoral travel awards to the annual meeting

Society for the Study of Reproduction

Support for Minority Affairs Committee activities at the annual meeting

INFECTIOUS DISEASES

Recent awardees appear in red

Investigators in Pathogenesis of Infectious Disease**David Artis, Ph.D.**Tracking helminth-specific immune responses in vivo
University of Pennsylvania**Jody L. Baron, M.D., Ph.D.**Understanding immunopathogenesis of Hepatitis B virus
University of California-San Francisco School of Medicine**Choukri Ben Mamoun, Ph.D.**Function and regulation of host and parasite nutrient transporters during malaria infection
Yale University**Richard J. Bennett, Ph.D.**Phenotypic variation and host adaptation by the human fungal pathogen *Candida albicans*
Brown University**David C. Bloom, Ph.D.**Identification of neuron-specific factors that regulate HSV-1 chromatin structure and transcription during latency
University of Florida College of Medicine**Matthew S. Bogyo, Ph.D.**Chemical mapping of proteolytic networks involved in *Toxoplasma gondii* pathogenesis
Stanford University School of Medicine**Miriam Braunstein, Ph.D.**Identification of in vivo-secreted proteins of *Mycobacterium tuberculosis* with roles in host-pathogen interactions
University of North Carolina-Chapel Hill**John H. Brumell, Ph.D.**Recognition of bacteria in the cytosol of mammalian cells by protein conjugation systems
University of Toronto**James R. Carlyle, Ph.D.**MHC-independent recognition of infected cells by natural killer cells of the innate immune system
University of Toronto**Benjamin K. Chen, M.D., Ph.D.**Dissemination of HIV through virological synapses
Mount Sinai School of Medicine**Jen-Tsan Ashley Chi, M.D., Ph.D.**The sequence determinant of the *Plasmodium falciparum* gene regulation by human microRNAs
Duke University Medical Center**Andrew Darwin, Ph.D.**Mechanisms of *Pseudomonas aeruginosa* tolerance to secretin-induced stress during host infection
New York University School of Medicine**K. Heran Darwin, Ph.D.**Ubiquitin-like proteins in bacterial pathogens
New York University School of Medicine**Manoj T Duraisingh, Ph.D.**Epigenetic control of virulence gene expression in *Plasmodium falciparum*
Harvard School of Public Health**Peter J. Espenshade, Ph.D.**Oxygen-sensing and adaptation to host tissue hypoxia in the human fungal pathogen *Cryptococcus neoformans*
Johns Hopkins University**Michael R. Farzan, Ph.D.**Parallel identification of obligate viral receptors
Harvard Medical School

Stephen Girardin, Ph.D.

Nod-like receptor Nod9 links mitochondrial dynamics and innate immunity to bacterial pathogens
University of Toronto

Britt Glaunsinger, Ph.D.

Global modulation of cellular gene expression by an oncogenic human herpesvirus
University of California-Berkeley

Michael S. Glickman, M.D.

Role of regulated intramembrane proteolysis in controlling *Mycobacterium tuberculosis* virulence and cell envelope composition
Memorial Sloan-Kettering Cancer Center

Karen J. Guillemin, Ph.D.

Regulation of gut epithelial cell homeostasis by the microbiota
University of Oregon

Chuan He, Ph.D.

How *Staphylococcus aureus* senses host immune defenses
University of Chicago

Kent L. Hill, Ph.D.

Cell-cell communication and social motility in pathogenesis and development of African trypanosomes
University of California-Los Angeles

Lora V. Hooper, Ph.D.

Innate immune responses to commensal bacteria at gut epithelial surfaces
University of Texas Southwestern Medical Center-Dallas

Akiko Iwasaki, Ph.D.

Stromal cell contributions in innate and adaptive immune responses to mucosal viral infection
Yale University

Eckhard Jankowsky, Ph.D.

Molecular mechanisms of pathogen identification by the pattern recognition receptors RIG-I and MDA5
Case Western Reserve University

Barbara I. Kazmierczak, M.D., Ph.D.

Role of injury in *Pseudomonas aeruginosa* pulmonary infection
Yale University

D. Borden Lacy, Ph.D.

Structural mechanisms of *Helicobacter pylori* pathogenesis
Vanderbilt University Medical Center

Manuel Llinas, Ph.D.

Global analysis of the *Plasmodium falciparum* metabolome
Princeton University

John D. MacMicking, Ph.D.

Immune control of human phagosomal pathogens by a novel GTPase superfamily
Yale University School of Medicine

Harmit S. Malik, Ph.D.

Evolution-based identification and functional study of intracellular host-virus interactions
University of Washington

Dorian B. McGavern, Ph.D.

Chemical and molecular approaches to probe viral pathogenesis in real time
Scripps Research Institute

Yorgo Modis, Ph.D.

Cell entry and innate immune recognition of flaviviruses
Yale University

Denise M. Monack, Ph.D.

Host-pathogen interactions during persistent *Salmonella* infection
Stanford University

Christian Munz, Ph.D.

Regulation of macroautophagy by viral infection
Rockefeller University

Andrew S. Neish, M.D.

Transgenic analysis of prokaryotic effector proteins in the eukaryote, *Drosophila melanogaster*
Emory University School of Medicine

Kim Orth, Ph.D.

VopL, a *Vibrio* effector that nucleates actin
University of Texas Southwestern Medical Center-Dallas

John S. Parker, BVMS., Ph.D.

Reovirus-induced apoptosis: the role of the viral outer-capsid protein mu1
Cornell University College of Veterinary Medicine

Lalita Ramakrishnan, M.D., Ph.D.

Forward genetic screens in the zebrafish to identify host determinants of susceptibility to tuberculosis
University of Washington School of Medicine

Ana Rodriguez, Ph.D.

Role of hypoxanthine degradation in malaria-induced pathogenesis
New York University School of Medicine

Eric J. Rubin, M.D., Ph.D.

Cell signaling by bacterial cytokines in *Mycobacterium tuberculosis*
Harvard School of Public Health

Maya Saleh, Ph.D.

Regulation and molecular mechanisms of NLR-mediated innate immunity
McGill University

Erica O. Saphire, Ph.D.

Arenavirus GP: architecture, receptor binding sites, and immune recognition
Scripps Research Institute

Luis M Schang, D.V.M., Ph.D.

Silencing and antisilencing in the regulation of viral gene expression
University of Alberta

Neal Silverman, Ph.D.

Intracellular bacterial recognition in the *Drosophila* innate immune response
University of Massachusetts Medical School

Gregory A. Smith, Ph.D.

Coordination of herpesvirus assembly and transport in axons of sensory neurons
Northwestern University Feinberg School of Medicine

Vanessa Sperandio, Ph.D.

Interkingdom signaling in bacterial pathogenesis
University of Texas Southwestern Medical Center-Dallas

Adrie J.C. Steyn, Ph.D.

Carbon monoxide and *Mycobacterium tuberculosis* persistence
University of Alabama-Birmingham

Timothy L. Tellinghuisen, Ph.D.

Subversion of a host kinase and vesicle trafficking components for the production of infectious hepatitis C virus
Scripps Research Institute

Billy Tsai, Ph.D.

How cholera toxin hijacks cellular machineries to transport across the ER membrane
University of Michigan Medical School

Raphael H. Valdivia, Ph.D.

Role of secreted bacterial proteases in chlamydial pathogenesis
Duke University

Linda F. van Dyk, Ph.D.

Analyzing the role of tumor suppressors in the control of virus infection and inflammation
University of Colorado Health Sciences Center

Russell Vance, Ph.D.

Innate immune cytosolic immunosurveillance pathways for sensing bacterial pathogens
University of California-Berkeley

Andres Vazquez-Torres, D.V.M., Ph.D.

Effects of nitrosative stress on bacterial two component regulatory systems in innate host defense
University of Colorado at Denver and Health Sciences Center-Fitzsimons Campus

David Wang, Ph.D.

A genomics-based approach to novel viral etiologies of diarrhea
Washington University School of Medicine

Sean P. Whelan, Ph.D.

Exploration of the interaction of RNA viruses with their host cells
Harvard Medical School

Marvin Whiteley, Ph.D.

Mechanistic insight into host modulation of bacterial group activities
University of Texas-Austin

Wenqing Xu, Ph.D.

Innate immunity: how do toll-like receptors recognize microbial pathogens?
University of Washington School of Medicine

Dong Yu, Ph.D.

Modulation of the DNA damage response by human cytomegalovirus
Washington University School of Medicine

Thomas C. Zahrt, Ph.D.

Mycobacterium tuberculosis regulators modulating reactivation
Medical College of Wisconsin

Ning Zheng, Ph.D.

Viral hijacking of host ubiquitin ligase machinery
University of Washington

Ad Hoc**African Malaria Network Trust**

Support for the Pan African Malaria Conference

American Society for Microbiology

Support for a travel awards program for graduate and postdoctoral fellows

American Society for Microbiology

Support for the ASM Presentation Institute for Graduate Students prior to the general meeting

American Society for Microbiology

Support for one year for the ASM Kadner Institute for Graduate Students and Postdoctoral Scientists in Preparation of Careers in Microbiology 2009-2010

American Society of Tropical Medicine and Hygiene

Support for the annual meeting

American Society of Tropical Medicine and Hygiene

Support for the scientific program of the American Committee of Molecular, Cellular and Immunoparasitology annual meeting

American Society of Tropical Medicine and Hygiene

Support for the American Committee of Molecular, Cellular and Immunoparasitology's scientific program at the annual meeting

Brown University

Support for awardee Aaron Mitchell, Scholar Awardee to present a seminar

California Institute of Technology

Support for WormBook, an online open-access publication

Cornell University College of Veterinary Medicine

Support for awardee Andre Vazquez-Torres to give a seminar

Federation of American Societies for Experimental Biology

Support for the summer research conference "Microbial Pathogenesis: mechanisms of infectious disease"

Foundation for the National Institutes of Health, Inc.

Support for commemorating the John E. Fogarty International Centers 40 years of accomplishments

Foundation for the National Institutes of Health, Inc.

Support for travel for 20 graduate and postdoctoral fellows to the 2009 Ecology and Evolution of Infectious Diseases meeting in Salt Lake City

Hospital for Sick Children

Support for awardee Raphael Valdivia to present a seminar at the University of Toronto

Institut Pasteur

Support for the Federation of European Biochemical Societies course "Human fungal pathogens: molecular mechanisms of host-pathogen interactions and virulence"

Institute of Medicine

Support for activities of the Forum on Microbial Threats for 2008-2011

Keystone Symposia

Support for two 2009 Keystone Symposia "Frontiers in Reproductive Biology and Regulation of Fertility (B5)" and "Pathogenesis and Immune Regulation in Helminth Infections (B4)"

Loyola University Chicago

Support for two meetings of the Chicago Area Mycology and Parasites Club

Marine Biological Laboratory

Support for the Biology of Parasitism Course for 2007-2011

Marine Biological Laboratory

Support for the Molecular Mycology course 2009-2011

Midwest Microbial Pathogenesis Conference
Support for the annual meeting

**North Carolina State University
College of Veterinary Medicine**
Support for the National Scholars Symposium

**North Carolina State University
College of Veterinary Medicine**
Support for the National Veterinary Scholars Symposium and the Burroughs Wellcome Fund Workshop: "Becoming faculty: a short course on launching a scientific career"

Northwestern University
Support for awardee Meta Kuehn to give a seminar

**Northwestern University Feinberg
School of Medicine**
Support for awardee Blossom Damania to present a seminar

Scripps Research Institute
Support for awardee Michael Farzan to present a seminar

Society of Toxicology
Support for the annual meeting

Tufts University School of Medicine
Support for awardee Maya Saleh to present a seminar

University of Alabama-Birmingham
Support for awardee Kyu Rhee-Cornell University to give a seminar

University of California-San Francisco
Support for a scientific meeting to advance several platforms of the schistosomiasis research agenda

University of Cincinnati
Support for the 11th International Workshops on Opportunistic Protists

**University of Colorado at Denver and Health
Sciences Center-Fitzsimons Campus**
Support for awardee Chaun He to present a seminar

University of North Carolina-Chapel Hill
Support for awardee Lora Hooper to present a seminar

University of North Carolina-Chapel Hill
Support for awardee Greg Smith to present a seminar

University of Pennsylvania
Support for a meeting to initiate the shared biology of the eukaryote pathogens proposal to bring fungal data into EuPathDB

**University of Texas Southwestern
Medical Center-Dallas**
Support for awardee Lora Hooper to give a seminar at the National Institute of Allergy and Infectious Diseases

**University of Texas Southwestern
Medical Center-Dallas**
Support for awardee Kent Hill to present a seminar

**University of Texas Southwestern
Medical Center-Dallas**
Support for advisory committee member Kasturi Haldar to present a seminar

University of Washington
Support for awardee Karen Guillemin to present a seminar

University of Wisconsin-Madison
Support for the 6th International Symbiosis Society Congress

Vanderbilt University
Support for awardee Erica Saphire to present a seminar

INTERFACES IN SCIENCE

Recent awardees appear in red

Career Award at the Scientific Interface

Emre Aksay, Ph.D.

Neural mechanisms for control of eye position
Weill Medical College of Cornell University

Dirk R. Albrecht, Ph.D.

Investigating neural circuits governing chemotaxis
using microtechnology
Rockefeller University

David Biron, Ph.D.

Understanding small neural circuits
University of Chicago

Julie Suzanne Biteen, Ph.D.

Superresolution imaging in live cells using single-
molecule active-control microscopy
University of Michigan-Ann Arbor

Rachel Brem, Ph.D.

Genetics of transcription in budding yeast
University of California-Berkeley

Jasna Brujic, Ph.D.

Mechanical networks in biology: from proteins to cells
New York University

Nicolas E. Buchler, Ph.D.

Gene duplication and the evolution of function
in regulatory networks
Rockefeller University

Lynette Cegelski, Ph.D.

Mapping the structural and functional landscape of the
microbial extracellular matrix
Stanford University

Yann R. Chemla, Ph.D.

Single-molecule study of bacteriophage DNA packaging
and mitochondrial protein import
University of Illinois-Urbana-Champaign

Derek Cummings, Ph.D.

Natural and vaccine-induced immunity
and spatiotemporal dynamics of epidemic dengue
Johns Hopkins University

Rhiju Das, Ph.D.

High resolution prediction of new RNA folds
Stanford University

Alfredo Dubra-Suarez, Ph.D.

Understanding glaucoma through structural and
functional in vivo cellular imaging of the retina
University of Rochester

Alexander Dunn, Ph.D.

Single molecule characterization of the energetic
landscape underlying myosin force generation
Stanford University

Ofer Feinerman, Ph.D.

Cellular heterogeneity and cooperativity shape
decision-making in the immune system
Sloan-Kettering Institute for Cancer Research

Surya Ganguli, Ph.D.

The expression and acquisition of sequence memory
in neuronal networks
University of California-San Francisco

Margaret L. Gardel, Ph.D.

Dynamic force generation in cell migration
University of Chicago

Timothy J. Gardner, Ph.D.

Tracking neural programs for song
Boston University/Massachusetts Institute of Technology

Maria Neimark Geffen, Ph.D.

Perception and neural encoding of textured sounds
Rockefeller University

Andrea Mitchell Goforth, Ph.D.

Bimodal, luminescent/magnetic nanoparticle assemblies targeted to alpha-4-beta-1 integrin for tumor imaging and therapy
Portland State University

Daniel I. Goldman, Ph.D.

Dynamic locomotion on challenging substrates
Georgia Institute of Technology

Ming Hammond, Ph.D.

Large-scale discovery and analysis of regulatory RNAs using computational and chemical approaches
Yale University

Christine E. Heitsch, Ph.D.

Combinatorial and computational approach to deciphering the biological information encoded by single-stranded nucleotide sequences
Georgia Institute of Technology

Ajit P. Joglekar, Ph.D.

Building a mechanistic model of the structure and function of a kinetochore-microtubule attachment
University of North Carolina-Chapel Hill

Harold D. Kim, Ph.D.

Understanding the mechanisms of sensitivity in gene expression
Harvard University

Gavin McLean King, Ph.D.

Dynamic structural biology of ion channel proteins: an ultra-stable atomic force microscope study
University of Colorado-Boulder

Mary L. Kraft, Ph.D.

Composition analysis of the influenza virus pre-envelope by multiple isotope imaging mass spectrometry (MIMS)
University of Illinois-Urbana-Champaign

Mark A. Kramer, Ph.D.

Population rhythms of epilepsy
Boston University

Jeffrey R. Kuhn, Ph.D.

Total internal reflection fluorescence microscopy of actin branching dynamics in vivo
Virginia Polytechnic Institute and State University

Edo L. Kussell, Ph.D.

Evolution of microbial physiologies
New York University

Alison L. Marsden, Ph.D.

Engineering new treatments for cardiovascular disease via optimal design and physiologic simulation
University of California-San Diego

Laura A. Miller, Ph.D.

Developmental and evolutionary biofluid dynamics: case studies in locomotion and heart development
University of North Carolina-Chapel Hill

Celeste M. Nelson, Ph.D.

Biophysical dynamics in the regulation of tissue morphogenesis
Princeton University

Joshua B. Plotkin, Ph.D.

Novel methods to compute selection pressures on proteins at the genome-wide scale
University of Pennsylvania

Astrid A. Prinz, Ph.D.

Models of activity-dependent homeostatic regulation in neural networks on the basis of brute force exploration of high-dimensional parameter spaces
Emory University

Arjun Raj, Ph.D.

Stochastic gene expression in development: from phenomena to function
Massachusetts Institute of Technology

Benjamin J. Raphael, Ph.D.

High-resolution analysis of tumor genome architectures
Brown University

Aviv Regev, Ph.D.

From modules to mechanisms: the function and evolution of molecular networks
Massachusetts Institute of Technology

Jason T. Ritt, Ph.D.

Active sensing in natural and robotic organisms
Massachusetts Institute of Technology

Michael Rust, Ph.D.

Nonlinear dynamics underlying the cyanobacterial circadian clock
Harvard University

Sridevi Vedula Sarma, Ph.D.

Improved therapies for Parkinson's disease using advanced engineering methods
Johns Hopkins University

Georg Seelig, Ph.D.

Nucleic acid logic circuits for conditional gene regulation
University of Washington

Eric T. Shea-Brown, Ph.D.

Neurobiological dynamics of timing and decisions
University of Washington

Alexander Sher, Ph.D.

Investigation of retinal processing through large-scale multielectrode recordings
University of California-Santa Cruz

Hadley D. Sikes, Ph.D.

Well-defined, supramolecular assemblies of redox enzymes via templated self-assembly for use in mechanistic electron transport studies and targeted apoptosis
California Institute of Technology

Jan Skotheim, Ph.D.

Systems level approach to cell cycle control: from molecules to motifs to physiology
Stanford University

Megan T. Valentine, Ph.D.

Establishing the mechanism of kinesin processivity
University of California-Santa Barbara

Joshua Vaughan, Ph.D.

Discovery of new motility mechanism and high speed, *in vivo* imaging of motor protein dynamics
Harvard University

Daniel A. Wagenaar, Ph.D.

Neural circuitry and mechanisms of multisensory integration in a predatory invertebrate
California Institute of Technology

Lauren J. Webb, Ph.D.

Electrostatic fields at the protein-protein interface
University of Texas-Austin

Joshua S. Weitz, Ph.D.

Evolutionary ecology of bacterial viruses
Georgia Institute of Technology

Ahmet Yildiz, Ph.D.

Molecular mechanism of dynein *in vitro* and in living cells
University of California-Berkeley

Ad Hoc

Biophysical Society

Support for two career development sessions (postdocs & graduate students) and the child care program at the annual meeting

Marine Biological Laboratory

Support for the course "Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches" for 2008-2010

New York University

Support for Aspen Center for Physics conference "Populations, Evolution, and Physics"

Stanford University

Support for an open science workshop at the 2009 Pacific Symposium on Biocomputing

POPULATION AND LABORATORY BASED SCIENCES

Recent awardees appear in red

Institutional Program Unifying Population and Laboratory Based Science**Emory University**

Human health: molecules to mankind (M2M)

University of California-Los Angeles

University of California-Los Angeles inter-school program in metabolic diseases

University of Texas-Houston Health Science Center

Houston laboratory and population sciences training program in gene-environment interaction

REPRODUCTIVE SCIENCES

Marine Biological Laboratory

Support for the Frontiers in Reproduction course

Marine Biological Laboratory

Support for travel expenses for the annual Frontiers in Reproduction symposium

Marine Biological Laboratory

Support for the 2010-2012 sessions of the Frontiers in Reproduction course

University of California-San Francisco

Support for the 2009 RSDP scholar's annual research conference/retreat

SCIENCE EDUCATION

Recent awardees appear in red

Student Science Enrichment Program

Appalachian State University

Appalachian: Merging Math and Science in Intentional Natural Gains (AMMASING)

Appalachian State University

Appalachian student experience-based education (AppalSEED) academy: Integrating science across the high school curriculum

Campbell University

HISS – High School Science Seminars

Carolina Electric Vehicle Coalition

EV Challenge Junior Solar Sprint

Carolina Electric Vehicle Coalition

SMARTT Challenge H.S. Program:
Promoting Science Education through
Renewable Transportation Technologies

Catawba College

Catawba Conservation Camp

Cherokee Boys Club, Inc.

Sensational Science Saturdays at Cherokee
Elementary School

Cherokee Middle School

CSI:Cherokee Science Investigation

Contemporary Science Center

Contemporary Science Center at the Museum of Life
and Science Field Studies Program

Duke University

RoboCupJunior: exhibitions of problem solving,
teamwork, and creativity

Duke University

LASST: Leadership Academy for Students in Science
and Technology

Duke University Comprehensive Cancer Center

Summer on the Edge

Durham Academy

Mars Outreach for NC Students (MONS)

Durham Public Schools

Scientifica: DPS Nurturing Future Scientists

East Carolina University

Partnering with Industrial and Regional Assets for
Teaching and Enrichment in Science (PIRATES)
Summer Camp

Girl Scouts-North Carolina Coastal Pines

Girl Scouts Design and Discover

Lenoir-Rhyne College

North Carolina Stream Investigation Project

Meredith College

STEM Experience for Middle School Students

Montreat College

Center for Learning and Investigation in Backcountry
Ecosystems: Climate Education and Research Program

Mountain Area Health Education Center

CSI West: Investigative Adventures in Science

North Carolina A&T State University

Science and Technology Enrichment Program

North Carolina A&T State University

Students Hots On The Sciences (S.H.O.T.S.)

North Carolina Agricultural Foundation, Inc.

It's about T.I.M.E. to do Real Science

North Carolina Central University

Students Making Another Science Success Story
(SMASSS)

**North Carolina School of Science
and Mathematics Foundation**
Labs For Learning

North Carolina State University
Photonics Xplorers

Onslow Community Ministries
Sturgeon City Science Enrichment Program

Orange County Schools
iWalk on the Eno

Pfeiffer University
Intersections: Land, Water, Life

Pisgah Astronomical Research Institute
Space Science Lab

Sampson Early College High School
Inspiring Science

**Schiele Museum of Natural History
and Planetarium, Inc.**
Environmental Science Partnership

Scotland County Schools
Project QuEST (Quality Education
through Science Teams)

Southeastern Community College
Summer Science Camp in Invasive Species

Swain County Schools
Project EXPLORE

University of North Carolina-Asheville
Bug Camp: A Summer Experience
in Science Investigation

University of North Carolina-Chapel Hill
Climate Leadership and Energy Awareness Program

University of North Carolina-Greensboro
Slip Slidin' Away: Monitoring Local Reptile
and Amphibian Populations

University of North Carolina-Pembroke
Advanced Science Scholars Program

University of North Carolina-Wilmington
Camp Bones: A science enrichment program for
diverse middle school students that provides a
foundation for careers in nursing

Webb A. Murray Elementary School
Adventure de Ciencia: Connecting science content
to our world!

West Marion Elementary School
Unlocking The Mysteries! Guiding students to look
at the world as a science experiment.

Wingate University
Technological Advances in Reproductive Biology
Summer Science Program

Ad Hoc

Association of American Colleges and Universities
Support for the integration of Project Kaleidoscope into
the Association of American Colleges and Universities

Beloit College
Support for the international educational study by
undergraduate students

DonorsChoose
Support for North Carolina Teachers

Fort Valley State University Foundation
Support for the Fort Valley State University Scholarship
Fund

Friday Institute for Educational Innovation
Support for North Carolina's efforts to seek Race
to the Top education funding

Grantmakers for Education
Support for operations

Health Research and Education Foundation
Support for Project SEED

**James B. Hunt Jr. Institute for Educational
Leadership and Policy**
Support for the North Carolina Science Summit,
Best Practices in STEM Education

MentorNet

Support for operations

National Academies

Support for the National Academies Summer Institute on Undergraduate Education in Biology

National Research Council

Support for the integration and testing of the publication, *Learning Science in Informal Environments*, at the proposed LASER Demonstration Site

National Science Resources Center

Support for the National Science Education Leadership Development Forum

North Carolina Association of School Administrators

Support for the Dropout Prevention Coalition of the North Carolina Association of School Administrators

North Carolina Center for International Understanding Council

Support for operations

**North Carolina Community Foundation/
North Carolina Network of Grantmakers**

Support for operations

**North Carolina Community Foundation/
North Carolina Network of Grantmakers**

Continued support for the Education Funders' Initiative

North Carolina Museum of Life and Science

Support for the ScienceOnline '09 Conference

North Carolina Museum of Natural Sciences

Continued support for the Nature Research Center

**North Carolina School of Science
and Mathematics Foundation**

Support for the Student Academy of Science

North Carolina Science Leadership Association

Support for the fellowship program

Public School Forum of North Carolina

Support for the Institute for Educational Policymakers and the International Travel Program

Southern Illinois University Foundation

Support for the Dr. Willie Pearson, Jr. Academic Excellence Fund

University of North Carolina-Chapel Hill

Support for the 2008 North Carolina Alliance Day Conference

University of North Carolina-Chapel Hill

Support for the North Carolina DNA Day and outreach to high schools by postdocs and graduate students participating in the program

University of North Carolina-Chapel Hill

Support for 2009 Opportunity through Education Alliance Day Conference

University of Washington

Support for the research project on developing effective evaluation instruments to assess learning through hands-on, inquiry-based activities

Wilson County Schools

Support for the N.C. Leadership and Assistance for Science Education Reform (LASER) Demonstration and Professional Development Center

TRANSLATIONAL RESEARCH

Recent awardees appear in red

**Clinical Scientist Award
in Translational Research****Jayakrishna Ambati, M.D.**

Target-independent suppression of angiogenesis
by siRNAs
University of Kentucky

Mark Stuart Anderson, M.D., Ph.D.

Translating AIRE-control of immune tolerance
to human autoimmunity
University of California-San Francisco

Richard J Auchus, M.D., Ph.D.

Pharmacogenomics of hypertension
University of Texas Southwestern Medical Center-Dallas

Andrew D. Badley, M.D., F.R.C.P.

Novel antiapoptotic therapies for sepsis
Mayo Clinic-Rochester

Arul M. Chinnaiyan, M.D., Ph.D.

Autoantibody profiles for cancer diagnosis, prognosis,
and therapy
University of Michigan-Ann Arbor

Bruce E. Clurman, M.D., Ph.D.

Diagnostic and therapeutic approaches to cell
cycle-associated cancer
University of Washington

Kathleen Loretta Collins, M.D., Ph.D.

Viral mechanisms of persistence in HIV infected people
University of Michigan-Ann Arbor

Kenneth R. Cooke, M.D.

Acute lung injury after SCT: from laboratory insights
to novel strategies for diagnosis and treatment
Case Western Reserve University School of Medicine

Laurence Cooper, M.D., Ph.D.

Tumor-specific alloantigen-nergic donor-derived T-cell
therapy after hematopoietic stem-cell transplantation
University of Texas M.D. Anderson Cancer Center

James E. Crowe, Jr., M.D.

Immunology and cell biology of human
metapneumovirus infections
Vanderbilt University School of Medicine

Kenneth Cusi, M.D.

Non-alcoholic fatty liver disease in type 2 diabetes:
a novel intervention strategy targeting metabolic &
molecular defects
University of Texas Health Science Center-San Antonio

George Q. Daley, M.D., Ph.D.

Chemotherapy and stem cell transplantation
in leukemia
Harvard Medical School

Michael R. DeBaun, M.D.

Cysteinyl leukotriene receptor inhibitors: a target
for decreasing sickle cell disease-related morbidity
Washington University

Michael S. Diamond, M.D., Ph.D.

Epitope-based immunogens and diagnostics
for dengue virus
Washington University

Dean W. Felsher, M.D., Ph.D.

Pre-clinical validation of g-quadruplex drugs that target
MYC to treat cancer
Stanford University School of Medicine

Joseph G. Gleeson, M.D.

Causes and pathogenesis of cerebellar malformation
syndromes in humans: bedside to bench
University of California-San Diego School of Medicine

Jeffrey S. Glenn, M.D., Ph.D.

Hepatitis C virus: from molecular virology to effective
pharmacologic eradication
Stanford University School of Medicine

William M. Grady, M.D.

Novel biomarkers for the prevention and treatment
of colon cancer
University of Washington

Thomas Richard Hawn, M.D., Ph.D.

Variation and regulation of innate immunity
to *Mycobacteria*
University of Washington

Robert O. Heuckeroth, M.D., Ph.D.

Genetic and non-genetic risk for Hirschsprung disease
Washington University

Anna Huttenlocher, M.D.

Diagnosis and treatment of autoinflammatory disease
University of Wisconsin-Madison

S. Ananth Karumanchi, M.D.

Soluble endoglin in the pathogenesis and prediction
of preeclampsia
Harvard Medical School

Jane E. Koehler, M.D., M.A.

Genomic and clinical correlates of human *Bartonella*
quintana infection
University of California-San Francisco
School of Medicine

Francis Lee, M.D., Ph.D.

Role of BDNF in therapeutic strategies for affective
disorders
Weill Medical College of Cornell University

Ernst Robert Lengyel, M.D., Ph.D.

Development of novel therapeutic and diagnostic
strategies for ovarian cancer
University of Chicago

Dean Y. Li, M.D., Ph.D.

Therapeutic potential of vascular guidance cues
University of Utah

Ali J. Marian, M.D.

Molecular genetics and pathogenesis of human
arrhythmogenic right ventricular cardiomyopathy/
dysplasia
University of Texas Health Science Center-Houston

David M. Markovitz, M.D.

New approaches to inhibiting HIV replication
University of Michigan-Ann Arbor

Daniel L. Marks, M.D., Ph.D.

Maternal nutrition and fetal metabolic programming
Oregon Health and Science University

Ari Melnick, M.D.

Differentiation therapy for B-cell lymphomas
Weill Medical College of Cornell University

Sofia D. Merajver, M.D., Ph.D.

Genetic determinants of aggressive breast cancer
phenotypes: translation to the clinic
University of Michigan-Ann Arbor

Branch Moody, M.D.

Human T-cell responses to CD1 and lipid antigens
from *M. tuberculosis*
Harvard Medical School

Richard J. O'Brien, M.D., Ph.D.

Alzheimers disease and synaptic transmission
Johns Hopkins University School of Medicine

W. Cam Patterson, M.D.

Oxidative profiles in cardiovascular diseases
University of North Carolina-Chapel Hill
School of Medicine

Jonathan R. Pollack, M.D., Ph.D.

Pathogenesis and diagnosis of clinically-indolent
prostate cancer
Stanford University

Kerry J. Ressler, M.D., Ph.D.

Neurobiology of fear, neuroplasticity and posttraumatic
stress disorder
Emory University

Annabelle Rodriguez, M.D.

Deficiency of the lipoprotein receptor, scavenger
receptor class B type I, in women with infertility
Johns Hopkins University School of Medicine

Theodora S. Ross, M.D., Ph.D.

Abnormal HIP1 and cancer biology
University of Michigan-Ann Arbor

Charles M. Rudin, M.D., Ph.D.

Novel therapeutic strategies for small cell lung cancer
Johns Hopkins University

Jean E. Schaffer, M.D.

Lipotoxic cardiomyopathy: from molecular mechanisms
to human disease
Washington University

Norman E. Sharpless, M.D.

P16INK4 a tumor suppressor in stem cell aging
University of North Carolina-Chapel Hill

Warren D. Shlomchik, M.D.

Memory T cells for improved immune reconstitution and
GVL in allogeneic hematopoietic stem cell transplantation
Yale University

Pradeep Singh, M.D.

Gallium as an antimicrobial and anti-biofilm agent: a trojan horse strategy that disrupts bacterial iron metabolism
University of Washington

Donald Small, M.D., Ph.D.

Translating FLT3 inhibition into improved therapy for pediatric AML and infant ALL
Johns Hopkins University School of Medicine

Jeffrey A. Toretsky, M.D.

Novel cancer therapeutics based upon oncogenic fusion-protein transcription factors
Georgetown University

Russell Van Gelder, M.D., Ph.D.

Pathogenesis of inflammatory eye disease
University of Washington

Stephanie Ware, M.D., Ph.D.

Uncovering novel genetic causes and risks in congenital heart disease patients
University of Cincinnati

Edus Houston Warren, M.D., Ph.D.

Toward immune therapy for colon cancer: identification of antigens recognized by CD8+ T lymphocytes on colon cancer stem cells
University of Washington

William Weiss, M.D., Ph.D.

Combination therapy against EGFR and PI3-kinase in glioma
University of California-San Francisco

Cassian Yee, M.D.

Adoptive therapy of cancer: strategies to augment the antigen-specific T cell response
University of Washington

Kang Zhang, M.D., Ph.D.

Define novel genes for diabetic microvascular complications
University of California-San Diego

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Sciences and Technology
MIT-Harvard Division of Health Science and Technology
Massachusetts Institute of Technology
Professor of Anaesthesia
Harvard Medical School

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Department of Biochemistry and Biophysics
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Group Leader
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Erin O'Shea, Ph.D.

Investigator, Howard Hughes Medical Institute
Professor, Departments of Molecular and Cellular
Biology and Chemistry and Chemical Biology
Director, FAS Center for Systems Biology
Harvard University

Suzanne R. Pfeffer, Ph.D.

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Department of Biochemistry
Stanford University

Stephen R. Quake, Ph.D.

Professor and Co-chair
Department of Bioengineering
Stanford University

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Rockefeller University

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Professor, Department of Biomedical Engineering
Johns Hopkins University

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Center for Teaching Quality

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Dave Smith

Director
Center for Inquiry Based Learning

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Henry J. Knott Professor and Director
McKusick-Nathans Institute of Genetic Medicine
Department of Medicine, Pediatrics, Molecular Biology
and Genetics
Johns Hopkins University School of Medicine

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Professor of Biochemistry and Molecular Biophysics
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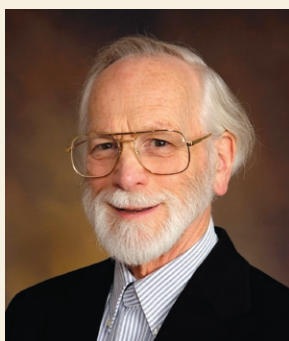
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In Remembrance

Catherine L. Voron joined the Wellcome family in 1988 working in the legal department of Burroughs Wellcome Co. She received meeting planner certification in 1998 and has served BWF as meeting professional since that time.

We will miss her.

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- Join virtual groups on specific subjects or for specific organizations.
- Read articles and find specific information on navigating a career in clinical or translational research and on career development.
- Access information and resources from our partner organizations.

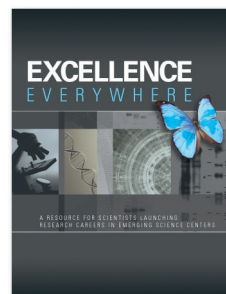
<http://community.sciencecareers.org/ctscinet/>



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