

# Fueling Curiosity-Driven Research

2014 ANNUAL REPORT



# 2014 Annual Report

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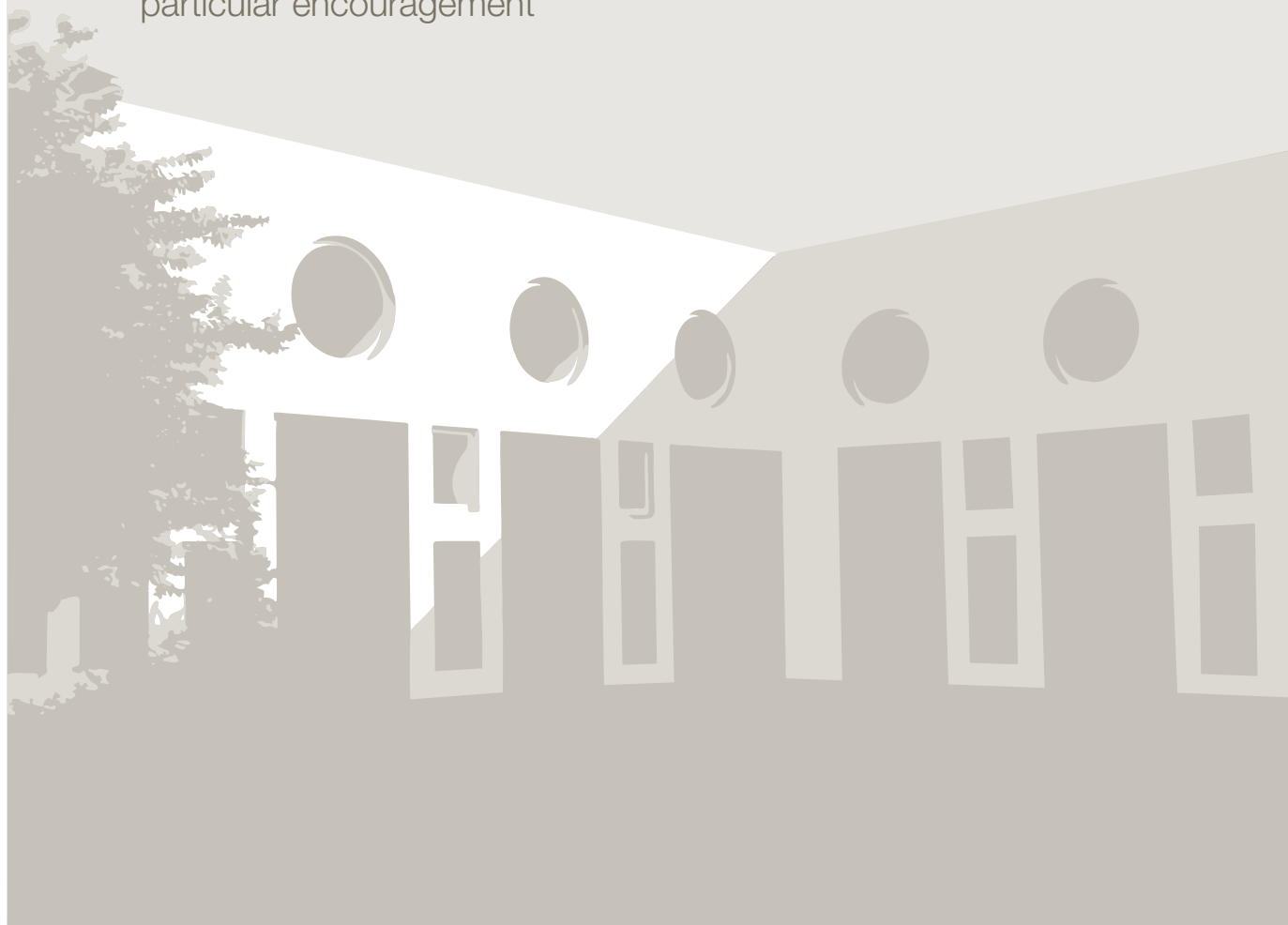
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## Burroughs Wellcome Fund

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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 biomedical sciences that are undervalued or in need of particular encouragement



*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. Grants are made primarily to degree-granting institutions on behalf of individual researchers. 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 established 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

John Burris reviews the greatest challenge to biomedical science, funding. He encourages collaborative discussion and investment across a variety of constituents to enable the national potential in biomedical research to be realized.



**John E. Burris, Ph.D.**  
President  
Burroughs Wellcome Fund



Economic news, in general, is brighter than just a few years ago. The housing market is on the upswing, jobless rates are dropping, and commentators say we are no longer in “the Great Recession.”

But the news from one very significant sector of the economy—biomedical research—is bleak. Funding from the National Institutes of Health, the backbone of biomedical research funding in America, has steadily decreased in real dollars since 2004. In 2013, the National Institutes of Science received \$29.3 billion, when adjusted for inflation is almost 12 percent less than in 2004. NIH-funded research supports an estimated 402,000 jobs across America, yet investment in the NIH has been flat for more than a decade. Postdoctoral researchers, the workhorse of biomedical research, are forced out of science when their mentor’s funding ends, or they find themselves in a series of postdoc positions without the prospect of running their own labs.

There are other challenges eroding America’s biomedical research enterprise. In a March 2014 article in the Proceedings of the National Academy of Sciences, several well-respected scientists, including Harold Varmus, director of the National Cancer Institute and former director of the NIH, highlighted “systemic flaws” in U.S. biomedical research. During the last decades of the 20th century the NIH budget doubled, then doubled again. Then, it dropped. This inconsistent and unreliable investment goes hand-in-glove with methods for choosing who receives grant funding, and for what. A recent shift in focus toward “translational research” risks compromising the science of fundamental questions that open doors yet unknown.

Over time, the current system has created a great imbalance in the workforce. The number of postdoctoral positions, originally intended to provide several years of additional training before a scientist advances to a faculty or other position, far outweighs the number of available faculty positions, as well as other satisfying career options. The result is a highly educated, highly skilled workforce who may not have the career options. Many decide to leave science, which is never a good return on an investment. Others move from one postdoc position to another, biding their time as long as possible.

The Burroughs Wellcome Fund is an independent private foundation with 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.* We identify the most talented, motivated scientists doing the most promising work in research that is underserved by NIH or corporate funding.

In 2014, the Burroughs Wellcome Fund distributed \$28.4 million in grants to scientists around the country, including \$3 million to K-12 teachers in our home state of North Carolina. Our investment in scientists affords them the opportunity to take risks and the chance to make critical, incremental and, sometimes, major insights in understanding.

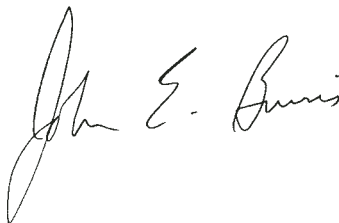
*Our investment in scientists affords them the opportunity to take risks and the chance to make critical, incremental and, sometimes, major insights in understanding.*

By investing in science education, we are looking to the future for the next generation of scientific leaders. Our funding enables the best science and mathematics teachers to flourish through career development opportunities. Our program in informal science and mathematics education helps develop the joy of curiosity and discovery so crucial to the research enterprise.

Our investments are primarily directed at the long-term health of fundamental academic research. We are hopeful that our awardees can leverage our funding into fruitful careers. However, without significant investments in time, energy and finances to improve the biomedical research landscape, our scientists' careers, and those of many other

American scientists, are in jeopardy. With their careers go a significant number of jobs directly and indirectly related to biomedical research, as well as the scientific knowledge that would have been produced.

The Burroughs Wellcome Fund is committed to supporting biomedical researchers long into the future. We encourage substantial, in-depth and urgent discussions from a variety of constituents that will set U.S. biomedical research on a course that enables our national potential to be realized.



## Fiscal Year 2014 Major Competitive Grant Awardees

### Career Awards at the Scientific Interface

**Ariana E. Anderson, Ph.D.**  
University of California-Los Angeles

**Amit Choudhary, Ph.D.**  
Harvard University  
Broad Institute

**Matthew C. Good, Ph.D.**  
University of California-Berkeley

**Prashant Mali, Ph.D.**  
Harvard Medical School  
University of California-San Diego

**Nikhil S. Malvankar, Ph.D.**  
University of Massachusetts-Amherst

**Elizabeth A. Nance, Ph.D.**  
Johns Hopkins University

**Elizabeth Hesper Rego, Ph.D.**  
Harvard School of Public Health

**Ramkumar Sabesan, Ph.D.**  
University of California-Berkeley  
School of Optometry

**Kimberly Murley Stroka, Ph.D.**  
Johns Hopkins University School of Medicine

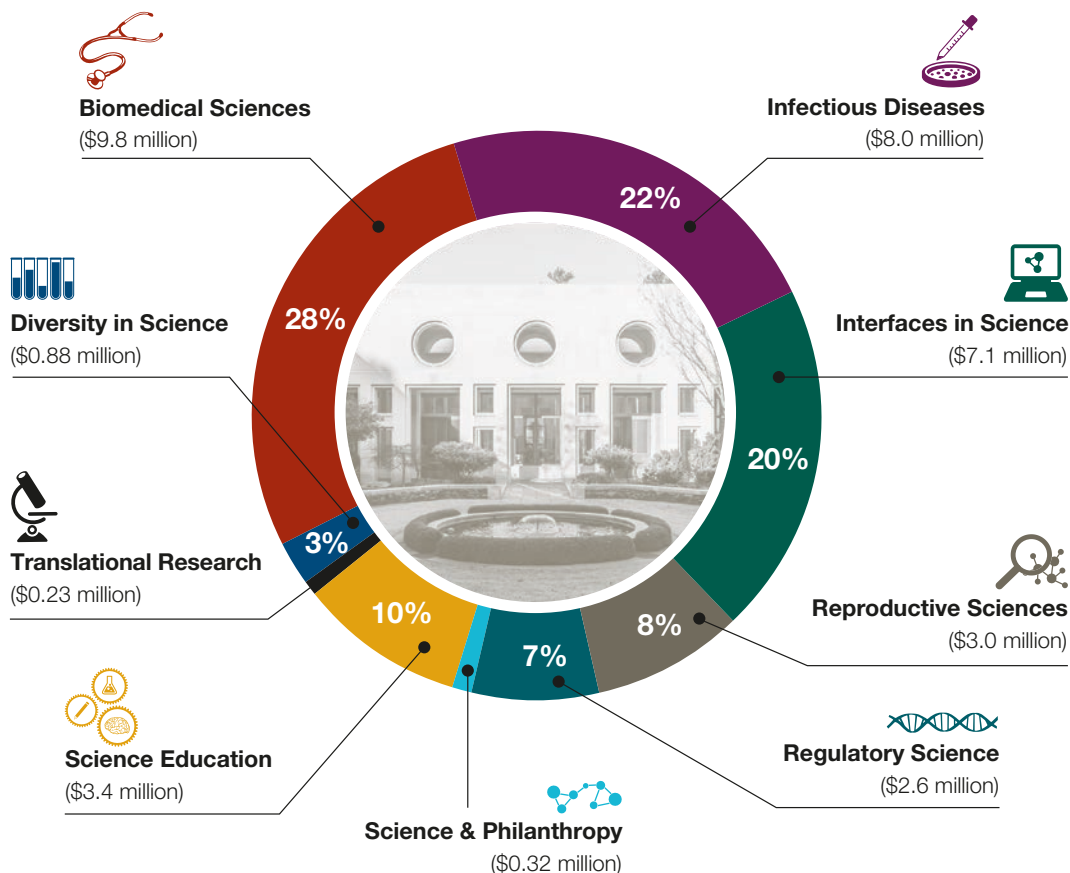
**Michael D. Vahey, Ph.D.**  
University of California-Berkeley  
School of Public Health

**Heng Xu, Ph.D.**  
Baylor College of Medicine

**Xin Zhang, Ph.D.**  
Scripps Research Institute



BWF awarded \$35.3 million in grants during fiscal year 2014.



For audited financial statements and evaluations of our grant programs, visit [www.bwffund.org/annualreport](http://www.bwffund.org/annualreport) or scan the QR code.



### Career Awards for Medical Scientists

**Theresa Alenghat, D.V.M., Ph.D.**  
University of Pennsylvania

**Christina Eleanor Barkauskas, M.D.**  
Duke University

**James Edward Cassat, M.D., Ph.D.**  
Vanderbilt University School of Medicine

**Kevin Jon Cheung, M.D.**  
Johns Hopkins University

**Ethan Michael Goldberg, M.D., Ph.D.**  
University of Pennsylvania  
Perelman School of Medicine

**Malay Halder, M.D., Ph.D.**  
Washington University School of Medicine

**Marcin Imielinski, M.D., Ph.D.**  
Harvard Medical School

**Jeffery M. Kico, M.D., Ph.D.**  
Washington University School of Medicine

**Jason Knight, M.D., Ph.D.**  
University of Michigan-Ann Arbor

**Anita Katherine McElroy, M.D., Ph.D.**  
Emory University School of Medicine

**Sudarshan Rajagopal, M.D., Ph.D.**  
Duke University Medical Center

**Sean Robinson Stowell, M.D., Ph.D.**  
Emory University School of Medicine

## 2014 Major Grant Awardees *continued*

### Innovation in Regulatory Science

**Brian Alexander, M.D.**

Dana Farber Cancer Institute

**Randolph Ashton, Ph.D.**

University of Wisconsin-Madison

**J. Matthew Brennan, M.D.**

Duke University Medical Center

**Mark Burkard, M.D., Ph.D.**

University of Wisconsin

**Mary L'Abbe, Ph.D.**

University of Toronto

### Institutional Program Unifying Population and Laboratory Based Sciences

**Dartmouth College**

Carmen J. Marsit, Ph.D.

Scott M. Williams, Ph.D.

**University of Michigan-Ann Arbor**

Betsy Foxman, Ph.D.

Tom Schmidt, Ph.D.

**University of Rochester**

Nancy M. Bennett, M.D.

Stephen Dewhurst, Ph.D.

**Washington University St. Louis**

Graham A. Colditz, M.D.

Susan K. Dutcher, Ph.D.

### Investigators in the Pathogenesis of Infectious Disease

**Robert A. Cramer, Ph.D.**

Dartmouth College

**Michael A. Fischbach, Ph.D.**

University of California-San Francisco

**De'Broski R. Herbert, Ph.D.**

University of California-San Francisco

**Tobias M. Hohl, M.D., Ph.D.**

Memorial Sloan-Kettering Cancer Center

**Alexei V. Korennykh, Ph.D.**

Princeton University

**Matthias Marti, Ph.D.**

Harvard University

**Erika L. Pearce, D.Phil., Ph.D.**

Washington University

**Manuela Raffatellu, M.D.**

University of California-Irvine

**Daniel B. Stetson, Ph.D.**

University of Washington

**Niraj H. Tolia, Ph.D.**

Washington University School of Medicine

**Victor J. Torres, Ph.D.**

New York University School of Medicine

**Robert T. Wheeler, Ph.D.**

University of Maine

### Postdoctoral Enrichment Program

**Jonathan Abraham, M.D., Ph.D.**

Boston Children's Hospital

Harvard Medical School

**Albert Ernesto Almada, Ph.D.**

Harvard University

**Sara Conard, Ph.D.**

University of North Carolina-Chapel Hill

**Oliver Isauro Fregoso, Ph.D.**

Fred Hutchinson Cancer Research Center

University of Washington

**Galo Garcia III, Ph.D.**

University of California-San Francisco

**Courtney Rory Goodwin, M.D., Ph.D.**

Johns Hopkins University School of Medicine

**Dennis Jones, Ph.D.**

Harvard Medical School

Massachusetts General Hospital

**Markita Patricia Landry, Ph.D.**

Massachusetts Institute of Technology

**Sonya Elina Neal, Ph.D.**

University of California-San Diego

**Adrianne Marie Rosales, Ph.D.**

University of Colorado-Boulder

**Joshua Charles Saldivar, Ph.D.**

Stanford University

**Rosa Anna Uribe, Ph.D.**

California Institute of Technology

### Preterm Birth Initiative

**Trevor D. Burt, M.D.**

University of California-San Francisco

**Kang Chen, Ph.D.**

Wayne State University

**David N. Cornfield, M.D.**

Stanford University School of Medicine

**Stephen Lye, Ph.D.**

University of Toronto

**Vincent Joseph Lynch, Ph.D.**

University of Chicago

### Student Science Enrichment Program

**Beaufort County Police Activities League**

Youth Career and STEM Enrichment Program

Using Aviation and Robotics

**Cape Fear Community College Foundation**

CT-RISE: Chem-Techathon: Renewing Interest in

Science Education

**Cherokee Middle School**

Cherokee Science Investigation – Medical Mania

**Discovery Place**

After-School STEM Enrichment Project at

Palisades Park

**East Carolina University**

Increasing participation and proficiency in science

at grade 5 through inquiry based learning

**Friends of the North Carolina State  
Museum of Natural Sciences**

Dragonfly Detectives: Introducing Children to

Citizen Science

**Guilford County Schools**

GCS: Building Robotics!

**North Carolina State University**

Project PLANTS: Planting Leaders in

Agriculture and Nature Through Science

**North Carolina State University**

Authentic learning as a means to promote

student enthusiasm for science careers by

establishing a model biotechnology company

in a rural Tier 1 high school

**North Carolina State University**

**PAMS Foundation**

Coastal Inquirers

**Pfeiffer University**

PROJECT GENES: Genetics Education for the

Next Era of Science

**Swain County High School**

Project Endeavor

**Wake County Public School System**

STEM Wise

**West Marion Elementary School**

Project Wild Thing

# 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 research 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.



## Career Awards for Medical Scientists

***Five-year awards for physician scientists provide \$700,000 to bridge advanced postdoctoral/fellowship training and the early years of faculty service. This award addresses the on-going problem of increasing the number of physician scientists and will help facilitate the transition to a career in academic research.***

### BACKGROUND

Since 1994, a major theme of BWF has been award programs that provide support in the advanced postdoctoral years and the initial years of a faculty appointment. This type of award is typically called a Bridging Award, however, this type of award is also known as a Hybrid Award, Transition Award, or Fellow to Faculty award.

BWF has made an investment of more than \$200 million in these types of awards namely:

**Career Awards in the Biomedical Sciences**  
(1995 – 2006)

**Career Awards at the Scientific Interface**  
(2001 – date)

**Career Awards for Medical Scientists**  
(2007 – date)

**The Hitchings-Elion Fellowship**  
(1992 – 2000) *Note: initially a fellows' program but became a bridging award for the last two cycles.*

BWF has arguably created the largest bridging award footprint among private funders. Since the inception of the Career Awards in the Biomedical Sciences program in 1995 there have been two major studies published by the NRC promoting career transition awards:

1. *Dimensions, Causes, and Implications in the Career of Life Sciences* (1998)

2. *Bridges to Independence* (2005).

The 2005 *Bridges to Independence* study provided the catalyst for the National Institutes of Health to create the K99/R00 (2006) mechanism that was patterned after BWF's Career Awards in the Biomedical Sciences. Following the introduction of the K99/R00 mechanism BWF replaced the CABS program with a physician scientist program, Career Awards for Medical Scientists.

Because of both clinical training and training in hypothesis-based research, the physician scientist provides a unique perspective for bridging the gap between basic research and clinical practice. Unfortunately, there has been declining participation of the physician scientist in biomedical research.

About half of physician scientists have dual degrees (M.D., Ph.D.) and about 80% of CAMS awardees have dual degrees. Approximately 2.9% of medical school enrollees are enrolled in joint M.D., Ph.D. programs and ~80% of these complete the M.D., Ph.D. In spite of this, data suggests that physicians are less likely to participate in biomedical research than in the past. For example, the number of applications for an NIH K08 award can be used as an indication of the career interest of the physician in biomedical research. Applications for a K08 have steadily dropped from a high of 676 in 2005 to 425 in 2011 (last reportable year), a 37% decrease. The number of physicians reporting research as their major professional activity reached a high in 1985 of 23,268 (4.6% of the work force) and the number had dropped to 13,557 (1.6% of the workforce) in 2011. This happened in spite of the NIH budget increasing from \$5,149,000,000 to \$30,916,000,000.

To keep the physician scientist within the research enterprise, BWF instituted the Career Awards for Medical Scientists program in 2007.

## AWARDEE DEMOGRAPHICS

The CAMS program attempts to attract physician scientists that are within 10 years of their last doctorate and are still in a mentored, non-faculty, position such as a residency, fellowship, or postdoc. The desired outcome is for the physician scientist to obtain a tenure-track academic appointment with 75% protected time for research.

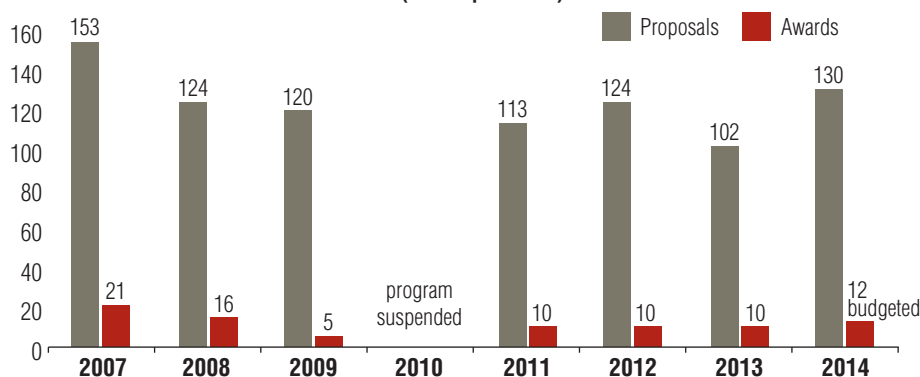
The program's track record has been remarkable. CAMS has gone through seven award cycles and 84 awards have been made. Seventy-six of the 84 are still active or have completed the program. The major professional activity for all active awardees is academic biomedical research. Three left the program early to enter clinical practice. Sixty-six (82%) of the 76 active awardees have tenure-track faculty appointments. Only 10 are still in mentored positions.

By being in a position to pick the best and the brightest candidates, the program is currently in a strong position to maximize the impact of the physician scientist workforce. In addition, CAMS awardees remain in research and many already have leadership positions at their institutions and within their research communities.

For the 2015 award cycle a new initiative has been introduced to identify and fund physician scientists who work at the interface between neuroscience and the practice of psychiatry. It is hoped that during the current award cycle we will receive enough proposals from psychiatrists to be able to make an additional two awards.

For the 2016 award cycle the program will begin an open nomination process which will involve a two-step process with the candidate submitting a pre-proposal and, if selected, the candidate will be asked to submit a full proposal.

**Career Award for Medical Scientists (2007-present)**



69 current active awardees | >\$48,000,000 commitment | 61 tenure-track appointments

## Collaborative Research Travel Grants

***Provides up to \$15,000 in support for researchers from degree-granting institutions to travel to a laboratory to acquire a new research technique or to facilitate a collaboration. Consideration is given to applicants who hold a Ph.D. in mathematics, physics, chemistry, computer science, statistics, or engineering who are interested in investigating research opportunities in the biological sciences or to biologists interested in working with physical scientists, mathematicians, engineers, chemists, statisticians, or computer scientists to incorporate their ideas and approaches to answering biological questions.***

From 1978 through 2000, BWF ran a travel grants program that enabled U.S. and Canadian scientists to participate in collaborative research projects for two weeks to six months in the United Kingdom or the Republic of Ireland. At the time, this was the longest running program at BWF. During that period nearly 700 grant applications were funded. Travel grants went to individuals at many institutions that normally would not have received a BWF grant and the grants provided support for a wide range of biomedical research activities. An outcomes survey was done on three years of grantees (1995-1997). At the time of the survey (1999), 77% of the respondents indicated an on-going collaboration with the host lab and 78% claimed they could not have made the trip without BWF support. One of the considerations that came from the survey was that the overall value and utility of the program could be enhanced by opening the program to travel worldwide rather than just to the United Kingdom.

A variation of the original Research Travel Grant program was run in 2009 that provided small travel grants of up to \$5,000 for trainees currently working in the laboratories of BWF Career Awardees. These awards could be used for travel to a laboratory to

begin collaboration or acquire new research techniques, travel to a national or international meeting to present a paper or poster, or organize and chair a panel at a national or international meeting. An advisory committee met in December 2009 and recommended funding for 86 of the trainees. The breadth and range of the proposals indicated a place for this type of award.

The travel grant program was revised again in 2011 to exploit what appeared to be an opportunity to provide relatively unrestricted travel funds to academic scientists and trainees and to provide a stimulus for those working or contemplating working at the interface of science, the BWF board approved a new program which provided travel grants which can be used both internationally and domestically to acquire new research techniques, to promote collaborations, and to attend courses. Special consideration would be given to candidates who hold a Ph.D. in mathematics, physics, chemistry, computer science, statistics, or engineering that are interested in investigating research opportunities in the biological sciences.

For the four CRTG cycles 164 travel awards have been made. The 2014 cycle resulted in 34 awards with an average award amount of \$10,171.

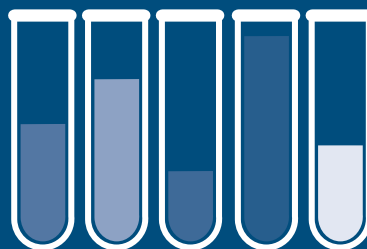
Over the next few months BWF staff will be surveying the first class of the Collaborative Research Travel Grant (CRTG) program. We will be requesting data on:

- Type of research activity supported: collaboration, learning a new technique, or other activity
- Awardees doctoral discipline; hosts doctoral discipline
- Whether the trip was made in conjunction with a sabbatical
- Whether the trip could have been made without BWF funding, and sources of alternate funding
- Whether the trip resulted in a publication
  - Where the research was published
  - Whether BWF was acknowledged



# Diversity in Science

The Burroughs Wellcome Fund launched the Diversity in Science program in 2012 to advance the careers of underrepresented minority postdoctoral fellows by enhancing the postdoctoral training and experience of these junior scientists.



## Postdoctoral Enrichment Program

***Provides \$60,000 over three years to support the development of underrepresented minority postdoctoral fellows in biomedical research.***

### BACKGROUND

BWF is known for serving as a catalyst for change in undervalued and underserved areas. Increasing the number of underrepresented minorities (URM) scientists within the biomedical and medical research and education communities align with the goals and objectives of the Burroughs Wellcome Fund. In May 2011, the Board of Directors discussed various ways to increase the number of URM scientists. This conversation resulted from the lack of applications from these scientists for BWF career development awards in Fiscal Year 2009, and the recognition of the need to diversify the pipeline of young people moving into the sciences. At the February 2011 meeting, the Board suggested BWF consider ways to reach out to URM postdocs by hosting workshops, investing in tools development, and partnering with others interested in URM postdocs, such as the National Postdoctoral Association (NPA).

After staff investigations, BWF elected to create the Postdoctoral Enrichment Program (PDEP) to address ways to identify quality URM scientists who are doing innovative research and provide resources to advance their work. PDEP provides \$60,000 over three years to support the career development activities for URM postdoctoral fellows in a degree-granting institution (including its affiliated graduate and medical schools, hospitals and research institutions) in the United States or Canada. PDEP does not provide salary support, but supports the enrichment activities to enhance research

productivity, e.g. workshops, courses, travel, collaborations, training in new techniques; activities for the postdoctoral mentor to increase the mentoring of URM fellows in university-based programs; and participation in a peer network system of URM postdoctoral scholars. These scientists' training and professional development must be guided by mentors committed to helping them advance to stellar careers in biomedical or medical research.

### INVESTMENT

In 2012, the BWF Board of Directors approved funding for three years for the PDEP totaling \$1.5 million. The Board approved 10 award recipients at \$50,000 each for a total of \$500,000 for the first award cycle in 2013. There were 12 award recipients approved at \$50,000 each for a total of \$600,000 for the second award cycle in 2014. In May 2014, the Board increased the grant amount from \$50,000 to \$60,000 for all PDEP recipients, bringing the total investment to \$1.3 million to date.

The deadline for applications for the second award cycle of the PDEP for URM scientists was January 15, 2014. BWF received 63 applications, of which 60 were eligible for review by the advisory committee. The committee met on May 7, 2014, to discuss 23 finalist candidates and made recommendations for 12 awards totaling \$600,000. In June, the Board approved an increase to the PDEP grant amount from \$50,000 to \$60,000 to help move recipients toward the professoriate. This increase was applied to all current PDEP grant recipients.

In 2014, BWF partnered with HHMI to conduct a Mentoring Workshop for mentors of PDEP award recipients. The feedback on content, networking, and engagement was positive.



## IMPACT

BWF has reached 159 URM scientists at top institutions across the country who are eligible for BWF career development awards. The Board has approved 22 of these individuals to receive BWF funding.

The PDEP award recipients are networked with other BWF career development award recipients and Board members providing opportunities for creative exchange and movement towards the professoriate.

The first PDEP award recipient has accepted a faculty appointment. Philip Romero, Ph.D., of the University of California-San Francisco accepted a start-up package from UCLA.

## Postdoctoral Enrichment Program

### Highlights 2014

- Awardee Meeting October 2013
- Mentor Workshop 2014
- 60 Eligible Applications  
Largest number of applications:  
UNC-Chapel Hill (8), Harvard (7), Stanford (5)
- 12 Awards made (\$60k each)
- \$720,000 Investment

Postdoctoral Enrichment Program	2013/2014 Award Cycle		
	Applicants	Finalists	Awardees
Total	99/60	34/32	10/12
Black/AA	47%/45%	38%/43%	50%/33%
Hispanic	47%/48%	56%/57%	40%/67%
American Indian/Native	5%/5%	6%/0	10%/0
Female	40%/57%	47%/52%	40%/42%
Male	60%/43%	53%/48%	60%/58%
Institutions	51/60	23/16	9/10
Applied for NIH K99	56/31	19/17	3/9

# Infectious Diseases

The Burroughs Wellcome Fund has supported research in infectious disease since 1981, when it began funding modern molecular approaches to understanding the parasitic diseases of poverty that primarily affect people in underdeveloped tropical countries. Later, support was expanded to include the fungal pathogens, which are similarly difficult to study. In 2000, the program was broadened to concentrate on how interactions between humans and microbes damage human health. In infectious diseases, the Burroughs Wellcome Fund focuses on big “Why?” questions that explain our interactions with the microbial world.



## Investigator in the Pathogenesis of Infectious Disease

***Five-year awards provide \$500,000 for opportunities for accomplished investigators at the assistant professor level to study infectious disease 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.***

We received 141 eligible applications for the 2013/2014 award cycle, up nearly 14% from 2012/2013's 124 and on par with the 142 applications received in 2011/2012 but down from highs of 165 in 2009/2010 and 2010/2011. With 12 awards, this year's funding rate was 8.5%.

The number of institutions that nominated applicants this year was up to 86 from the historical average of 83. Rutgers and Case Western Reserve nominated four candidates, while Duke University, Johns Hopkins University, Texas A&M University, University of California-Irvine, University of California-Los Angeles, University of Georgia, University of Texas Southwestern Medical Center, University of Toronto, and Yale University each nominated three.

This year we increased the number of possible nominations from five to seven. In previous years, institutions could nominate two candidates, plus "free" nominations for an underrepresented minority candidate, a veterinarian scientist, and a researcher working in parasitic helminthes, mycology, or reproductive science. This year, on advice from the advisory committee, we changed the *or* to an *and*.

Our plans for 2014/2015 focus on streamlining our application process to prepare for ending the use of institutional nominations. Toward this end, we have added some new elements to the application for 2014/2015. Per the committee's recommendation, we are explicitly asking applicants how the proposed work takes a step beyond the work they are supporting (or hope to support) with R01s, and replacing the currently unused "lay abstract" with a shorter précis communicating why the work is important. We are also testing using keywords and a new approach to letters of recommendation that may help us better manage the large numbers of applications anticipated in future rounds.

As we did last year, we have scheduled conference calls in August, September, and October to offer applicants information about the Pathogenesis awards. These calls cover the material available online, but their central message is that potential applicants have something to gain from talking directly with program officers. The August and September 2014 calls each attracted about 22 callers, down from 33 for each call in 2013.

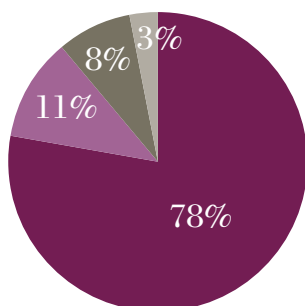
## AWARDEE DEMOGRAPHICS

This year, we funded 10 Ph.D.s, one M.D./Ph.D., and one M.D. Over time, clinician scientists have held 22% of the Pathogenesis awards and Ph.D.s, 78%. This year, we supported 10 men and two women. Two of the new awardees are underrepresented minorities.

We track several demographics: we get a few applications from Canadian institutions each year and have not seen this part of the pool deteriorate. We continue to see men and women applying at the long-established ratio of about 2:1. Minority applications to the program have always been low.

### Awardee Degrees

■ Ph.D. ■ M.D./Ph.D. ■ M.D.  
■ D.V.M./Ph.D.



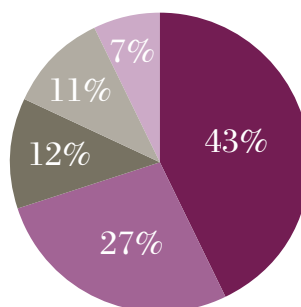
## AWARDEES' FIELDS

Between 2010 and 2012, we funded no mycologists. In some years, we have funded few people working in eukaryote pathogens at all. This year was a particularly good one for these systems, though: we funded three mycologists, two people working with protozoan parasites, and one researcher working with a parasitic worm.

The graph below shows the broad fields represented by awardees. This is not an accurate representation of their research interests, though: applicants and awardees are increasingly interested in problems that do not easily fit under a neat heading. We are seeing more polymicrobial projects, including both microbiome work and projects that are focused on an organ system, immunological settings (for example, viruses within the context of worms), or application of innovative techniques.

### Broad Topics of Awardees' Work

■ Bacteriology ■ Virology ■ Parasitology  
■ Immunology & Broader Topics ■ Mycology



## APPLICANT INSTITUTIONS

### Where are the PATH awardees?

Institution	Awardees
University of Texas Southwestern Medical Center-Dallas; University of Washington; Harvard University	7
Yale University; University of California-San Francisco; Washington University	5
New York University	4
Duke University; Mount Sinai School of Medicine; Northwestern University; Stanford University; University of California-Berkeley; University of Pennsylvania; University of Texas-Austin; University of Toronto; University of Wisconsin-Madison; Vanderbilt University	3
Columbia University; Emory University; Johns Hopkins University; Memorial Sloan-Kettering Cancer Center; The Scripps Research Institute (California); University of California-Los Angeles; University of Chicago; University of Colorado Health Sciences Center; University of Massachusetts; University of North Carolina-Chapel Hill	2
Brown University; California Institute of Technology; Case Western Reserve University; Cornell University; Dartmouth College; McGill University; Medical College of Wisconsin; Penn State; Princeton; Rockefeller University; Scripps Research Institute (Florida Campus); SUNY-Stony Brook; Texas A&M University; Tufts University; University of Alabama-Birmingham; University of Alberta; University of California-Irvine; University of California-San Diego; University of Cincinnati; University of Florida; University of Illinois-Chicago; University of Maine; University of Michigan; University of Minnesota-Twin Cities; University of Oregon; University of Pittsburgh	1
<b>TOTALS</b>	<b>116*</b>

## AD HOC ACTIVITIES

This year we have continued making small (\$1,000) grants that allow pathogenesis awardees to invite one another, advisory committee members, members of the Board, or others within “the BWF family” out for seminar visits. Twenty five pairs got together using this mechanism in 2013/2014.

We supported 12 small meetings this year including the International Conference on Cryptococcus and Cryptococcosis; the Cellular and Molecular Fungal Biology Gordon Conference; Anthelmintics from Discovery to Resistance; International Conference on Parasitology (ICOPA); the Biennial Congress of the Anaerobe Society of the Americas; the Midwest Microbial Pathogenesis Conference and the Mid-Atlantic Microbial Pathogenesis Conference; the ASM Conference on Candida and Candidiasis; the Genetic Epidemiology of Malaria meeting; the Microbial Pathogenesis: Mechanisms of Infectious Diseases Gordon Conference; the Biology of Host Parasite Interactions Gordon Conference; and a convening on Plasmodium falciparum in the Human Bone Marrow: the Malaria Headquarters? We also continued our support of the annual meeting of the American Society for Tropical Medicine and Hygiene (ASTMH) and for a pair of career development activities run each year by the American Society for Microbiology.

## BURROUGHS WELLCOME FUND/AMERICAN SOCIETY FOR TROPICAL MEDICINE AND HYGIENE (ASTMH) INFECTIOUS DISEASE FELLOWSHIP

Support for the BWF-ASTMH Fellowship, a fellow-to-faculty bridging award that helps newly trained physician scientists establish research careers with significant presence in the tropical developing world, was renewed for another three years with a grant of \$1.206M.

The advisory committee for the BWF/ASTMH Fellowship chose three new fellows for 2013: Soumya Chatterjee, National Institutes of Health, who works in India on tuberculosis in the context of helminth infections; Andrew DiNardo, Baylor College of Medicine, who has a similar focus in Swaziland; and Emily Wong, Massachusetts General Hospital, who works in South Africa on a new class of innate lymphocytes involved in the response to tuberculosis and HIV.

## VETERINARIAN SCIENTISTS

At Cornell University in August 2014, we ran the sixth round of a career development short course run in parallel with the Merit-NIH Veterinary Scholars Symposium and aimed at veterinarian scientists who are preparing for academic research careers. Participants included 12 veterinarians with and without Ph.D.s, including 3 assistant professors and several postdocs who are currently on the job market.

In 2015, the Symposium and course will be held at the University of California at Davis. Though the Fund will still be involved with the course, we have transferred ongoing coordination to John Parker, DVM, Ph.D., a PATH awardee at Cornell's College of Veterinary Medicine.

## CONVENING AWARDEES

We also held gatherings of the BWF family at the American Society for Microbiology meeting and at ASTMH. Both events were well attended.

# Interfaces in Science

The Burroughs Wellcome Fund has made a major investment in the training and support of young investigators with backgrounds in the physical, chemical, computational science, and engineering whose work addresses biological questions and who are dedicated to pursuing a career in academic research. Advances in genomics, bio-quantitation, modeling of complex systems, and nanotechnology have opened up new realms of research for ambitious investigators who want to explore the new frontier of biology.



## 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. BWF has moved to a self-nomination format for this award.***

### BACKGROUND

The Interfaces in Science Focus area has had four competitive programs: the Career Awards at the Scientific Interface (CASI; ongoing since 2001), the Institutional Awards at the Scientific Interface (IASI; not awarded since 2000), the Interfaces Short Course Awards (ISCA, offered in 2011-2012), and the Innovation Awards in Functional Genomics, which were offered once in 2000. Since the program began in 1997, a total of \$88,569,541 has been awarded through competitive programs and adhoc grants (Table 1).

In three IASI cycles (1996, 1998, 2000), a total of ten programs were funded for five years each, reaching a total of over four hundred individual trainees. Due to the time it took initially for programs to ramp up to steady state, as well as payment

deferrals and no-cost extension requests, BWF was still paying out and/or tracking progress for two of these grants until FY 2009. Trainees from these programs were convened four times.

The CASI program was modeled closely on BWF's Career Awards in the Biomedical Sciences (CABS) program, but is distinguished by the requirement that applicants have doctoral level training or evidence of significant expertise in a computational, theoretical, or physical science discipline outside of biology. The program began in 2001 but was suspended in 2003, and again in 2010. A total of 111 awards have been made to date, in 10 cycles. The applicant pool has grown stronger during the years, as more institutions have hired faculty who work at this interface. For the past three years, at the request of the program advisory committee, BWF opened the application process to allow self-nominations.

At the direction of the BWF Board, a new competitive program, the Interfaces Short Course Awards (ISCA), was implemented during FY 2012. Proposals were accepted by invitation only, reviewed by the six-member advisory committee, and two awards were made for a total of \$800,000.

The Innovation Awards in Functional Genomics were offered once in conjunction with BWF's building dedication in 2000. That program made 11 awards, which paid out until 2005.

**Table 1: BWF Investment to Date in Interfaces in Science: FY 2014 and Cumulative**

Program	FY 2014	Total Investment
Institutional Awards (IASI)	--	\$26,054,760
Career Awards (CASI)	\$6,000,000	\$54,699,471
Short Course Awards (ISCA)	\$200,000	\$1,000,000
Functional Genomics	--	\$3,010,149
Adhoc grants	\$471,091	\$3,835,161
<b>TOTALS</b>	<b>\$6,671,091</b>	<b>\$88,569,541</b>



Lastly, ad hoc efforts in this focus area have included support for training and other programs that bring biologists and physical scientists together, as well as support for career development and networking sessions at professional society meetings.

### 2015 APPLICANT POOL: INDIVIDUALS

The pre-proposal deadline for the 2015 award cycle was September 3, 2014. Table 3 provides data on the applicant pool, compared to the five previous years of the program. In the 2015 award cycle, close to 400 applicants expressed interest in the program by taking the eligibility quiz, and approximately 77% qualified. 245 submitted pre-proposals, compared to 308 in 2014 application cycle. Of note is the fact that the open process has not resulted in a greater proportion of women applying for the award. Among the 111 CASI awardees, 39 (35%) are women, as shown in Table 2.

### 2015 APPLICANT POOL: INSTITUTIONS

The number of institutions submitting candidates has almost doubled since the program's inception. In the past, applicants were nominated by degree-granting institutions (DGIs), and postdocs at independent research institutes could not apply unless they were offered a nomination slot from an associated DGI. Under the new self-nomination guidelines, postdocs based in non-DGI entities can apply, if the mentor has a faculty appointment at a DGI. Exceptions were made for applicants from NIH and HHMI's Janelia Farm Research Campus, as NIH and HHMI will cover costs of the postdoc portion of their awards.

**Table 2: Demographics of the 2014 Awardees Compared to All CASI Awardees**

	2014	All Awardees
<b>Women</b>	<b>4 (33%)</b>	<b>39 (35%)</b>
<b>Underrepresented Minorities (URM)<sup>†</sup></b>	<b>0</b>	<b>6 (5%)</b>
<b>Temporary Residents</b>	<b>6 (50%)</b>	<b>30 (27%)</b>
<b>Institutions</b>	<b>7 (58%)</b>	<b>40*</b>
<b>Canadian Institutions</b>	<b>0</b>	<b>0</b>
<b>TOTAL</b>	<b>12</b>	<b>111</b>

<sup>†</sup> URM refers to Black and Hispanic; \*40 awardee postdoc institutions and 38 awardee faculty institutions

**Table 3: Profile of CASI Applicant Pool Since 2009**

Applicants	2015 Cycle	2014 Cycle	2013 Cycle	2012 Cycle	2011 Cycle	2009 Cycle
<b>Took Eligibility Quiz</b>	<b>378</b>	<b>700</b>	<b>1524</b>	<b>1851</b>	<b>1713</b>	<b>n/a</b>
<b>Qualified</b>	<b>294</b>	<b>446</b>	<b>631</b>	<b>802</b>	<b>827</b>	<b>n/a</b>
(Pre) Proposals Received	245	308	296	376	446	148
Eligible for Review	241	284	296	374	445	142
Female Applicants	64 (26%)	79 (26%)	82 (28%)	93 (25%)	122 (27%)	41 (29%)
Temporary Visa Holders	93 (38%)	116 (38%)	114 (39%)	152 (41%)	155 (35%)	50 (35%)
Underrepresented Minorities	12 (4%)	17 (6%)	22 (7%)	21 (6%)	17 (4%)	17 (12%)

**Table 4: CASI Institution Submission Statistics**

Institutions	2015 Cycle	2014 Cycle	2013 Cycle	2012 Cycle	2011 Cycle	2009 Cycle
<b>Canadian Institutions</b>	<b>2</b>	<b>5</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>2</b>
<b>TOTAL</b>	<b>70</b>	<b>99</b>	<b>98</b>	<b>106</b>	<b>85</b>	<b>75</b>

**Table 5: Institutions Submitting 10 or More Pre-proposals to CASI, 2015**

# of Pre-proposals	%	Institution
<b>44</b>	<b>18%</b>	<b>Harvard U. (&amp; affiliates)</b>
<b>17</b>	<b>7%</b>	<b>Stanford U.</b>
<b>13</b>	<b>5%</b>	<b>MIT</b>
<b>13</b>	<b>5%</b>	<b>UC – Berkeley</b>
<b>9</b>	<b>4%</b>	<b>U. Chicago &amp; Yale U.</b>

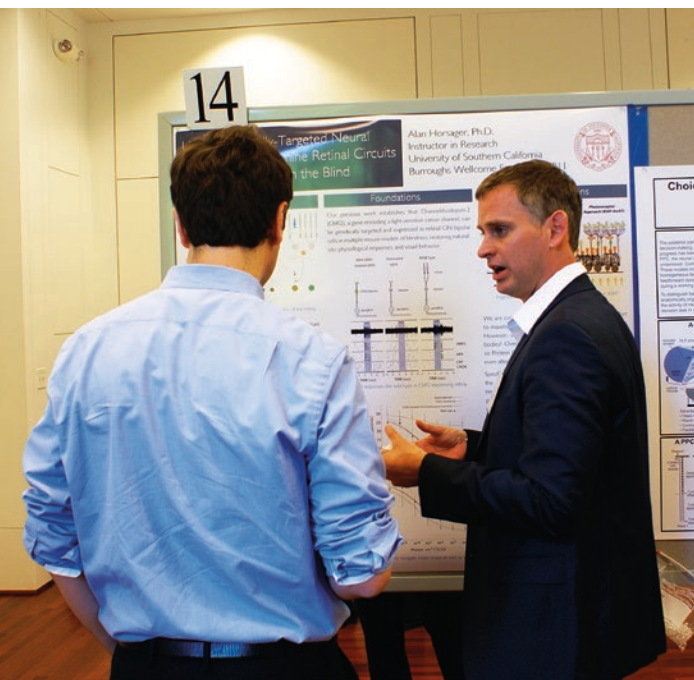
## AWARDEE TRANSITIONS

The 111 successful applicants to the program have come from 40 different institutions, and as of October 2013, 85 of the awardees (76%) have been appointed to tenure-track faculty positions at 38 institutions. Since the program's inception, four awardees (4%) have chosen careers outside of degree-granting institutions in North America.

## CONVENING AWARDEES

In February 2014, we convened BWF awardees who were attending the Biophysical Society meeting in San Francisco. In addition, the new CASI BWF awardees who received their awards in 2014 were invited to attend the BWF New Awardees Networking Meeting, held at BWF headquarters on October 8-9, 2014.

The Fund hosted a Scientific Interfaces Symposium in La Jolla, California on September 30th – October 2nd at the Estancia Hotel & Spa associated with UCSD. The agenda and program book for this symposium are included as supplementary material. There were 86 attendees, 60 of whom were CASI awardees. In addition to providing a venue for networking, BWF staff sought to gain an understanding of the big questions, methodology, the challenges our awardees are facing within their interdisciplinary research, and more broadly the grand challenges we face among the disciplines represented. This was a great opportunity to reflect on where we have been, what we have accomplished, and more importantly to survey the scientific landscape for where BWF might invest in the future.



*Alan Horsager, a 2011 Career Award at the Scientific Interfaces recipient, discusses his research. Dr. Horsager is currently the CEO of Episona.*

# Population and Laboratory Based Sciences

The Institutional Program Unifying Population and Laboratory Based Sciences (PUP), BWF's second institutional award program, launched Fall, 2007. The intention of the program has been to develop young researchers who will be equally at home with ideas, approaches, and insights generated at the molecular scale and at the population scale. Ambitious researchers trained this way will be in a powerful position to solve problems in areas including environmental health, infectious diseases, and chronic diseases where there is considerable promise in bringing together epidemiological, population genetic, geospatial, and other kinds of "larger world" data with mechanistic and molecular data gained at the bench.



## Program Unifying Population and Laboratory Based Sciences

*Though researchers in population sciences and bench sciences often have interests in common, those working from each perspective are often physically separated into different Schools within an institution, and their students are exposed to different curricula and cultures. Our vision has been that PUP trainees will bridge this gap, pulling together faculty who may have lacked good ways to come together. PUP has specifically emphasized connections between bench science and public health. Whether their training program incorporates epidemiology, ecology, or -omics, PUP students who would have otherwise taken a traditional laboratory-based PhD are thinking about problems through a public health lens and students who would have otherwise trained in traditional public health approaches are exposed to the power of asking questions at the molecular or organismal level.*

Though we were not looking for particular themes, that the 10 programs fall into three groups (listed below) will help us build stimulating meetings, networking opportunities, and career development resources to serve the PUP students. With the approval of four new awards in October 2014, selection of planned cadre of PUP institutions has concluded. It is still too early to tell what the outcome of the PUP investment has been.

### DATA SCIENCE

**Big data in the life sciences training program,** Dartmouth College (grant begins in 2015)

**MD-GEM:** The Maryland Genetic, Epidemiology, and Medicine Training Program, Johns Hopkins University Bloomberg School of Public Health, in partnership with the National Human Genome Research Institute (grant began in 2013, graduate program launched in 2014)

**The Houston laboratory and population sciences training program in gene-environment interaction** University of Texas-Houston Health Science Center, in partnership with Baylor College of Medicine and M.D. Anderson Cancer Center (grant began in 2009, graduate program launched in 2010)

### INFECTIOUS DISEASES AND HUMAN/MICROBE INTERACTIONS

**Integrated training in epidemiology and microbiome sciences (ITEMS),** University of Michigan-Ann Arbor (grant begins in 2015)

**Infection and immunity from molecules to populations,** University of Rochester (grant begins in 2015)

**Education Connecting Laboratory Investigation and Population Science at Einstein (eCLIPSE),** Albert Einstein College of Medicine of Yeshiva University (grant began in 2013, graduate program launched in 2014)

### CHRONIC DISEASES, WELLNESS, AND TRADITIONAL PUBLIC HEALTH

**Transdisciplinary training in laboratory and population sciences at Washington University,** Washington University St. Louis (grant begins in 2015)

**Boston University's Transformative Training Program in Addiction Science (TTPAS),** Boston University (grant began in 2013, graduate program launched in 2014)

**Human health: molecules to mankind (M2M),** Emory University (grant began in 2009, graduate program launched in 2010)

**Burroughs Wellcome Fund Inter-school Training Program in Chronic Diseases,** University of California-Los Angeles (grant began in 2009, graduate program launched in 2010)

# Regulatory Science

It has become clear that a critical area within translational research is regulatory science. Turning discoveries into innovative new approaches to therapies requires that the science of regulation keep up with the advances in biomedical science and technology. In recent years the FDA has become dramatically overburdened and underresourced, as outlined clearly in the 2007 FDA Science Board Report, *Science and Mission at Risk*.<sup>1</sup>





# Innovation in Regulatory Science

***The regulatory science initiative, Innovation in Regulatory Science Awards (IRSA), provides up to \$500,000 over five years to academic investigators who are addressing research questions that will lead to innovation in regulatory science that might improve the regulatory process.***

## BACKGROUND

Dr. Margaret Hamburg (Commissioner of FDA), and Dr. Janet Woodcock (Director, FDA Center for Drug Evaluation and Research) presented to the Board during the 2011 spring advisory Board Meetings, while Dr. Susan Desmond-Hellmann (then Chancellor of UCSF and now the President of the Gates Foundation) presented at the winter meeting in 2012. Their presentations outlined the role of regulatory science in the translation of discoveries into therapeutics, as well as the needs of the FDA in this area. BWF provided conceptual leadership and funding for an IOM workshop, “Strengthening a Workforce for Innovative Regulatory Science in Therapeutics Development”, which took place in September 2011. The Board approved the RFP for the Initiative in Innovation in Regulatory Science during the May 2012 Board Meeting.

During the inaugural IRSA Advisory Committee meeting, Dr. John Burris helped define Regulatory Science using the Institute of Medicine definition<sup>2</sup>—“science of developing new tools, standards, and approaches to assess the safety, efficacy, quality, and performance of FDA-regulated products”.

The intended purview of the BWF Regulatory Science initiative is to draw upon the talents of individuals trained in but not limited to mathematics, computer science, applied physics, medicine, engineering, toxicology, epidemiology, biostatistics, and systems pharmacology, the Regulatory Science initiative is intended to provide incentive to develop new methodologies or innovative approaches that will ultimately inform the regulatory decisions of health authorities in North America, especially the Food and Drug Administration (FDA).

Note that this initiative has implemented the least stringent criteria with regard to faculty position in that we require at a minimum that an applicant have an adjunct faculty appointment. The Fund and the IRSA Advisory Committee has given broad consideration to proposals outside of the basic academic sciences. These awards are open to U.S. and Canadian citizens or permanent residents who have faculty or adjunct faculty appointments at a North American degree-granting institution.

## 2014 APPLICANT POOL

For the 2014 IRSA award cycle, 98 pre-proposal applications were received in November 2013, all of which were eligible for review. From these pre-proposals, the committee selected a total of 40 semifinalists to invite to submit a full application. Of those invited, 37 submitted a full application.

<sup>1</sup> FDA Science Board. 2007. *FDA Science and Mission at Risk*. Rockville, MD Report of the Subcommittee on Science and Technology.

<sup>2</sup> IOM (Institute of Medicine). 2012 *Forum on Drug Discovery, Development, and Translation: Strengthening a Workforce for Innovation Regulatory Science in Therapeutics Development*. Washington, DC: The National Academies Press.

### Profile of the 2013-2014 IRSA Applicant Pool and Awardees

	2014 Proposals	2014 Full Proposals	2013 Proposals	2013 Full Proposals	Awardees
Total	98	39	56	32	11
Eligible for Review	98	37	56	32	NA
Female Applicants	27 (28%)	14 (38%)	12 (21%)	9 (28%)	5 (45%)
Minority Applicants	2 (2%)	2 (5%)	3 (5%)	1 (3%)	1 (9%)
Institutions	59	30	34	24	7
Canadian institutions	4	2	2	1	2

*Dr. Alison Harrill received an Innovation in Regulatory Science Award in 2013 for advancing regulatory science through translational pharmacogenomics.*





## PLANS FOR THE FISCAL YEAR 2015

### Program Management

Following our inaugural regulatory science committee meeting, and following the recommendation of our advisors, the 2014 class of IRSA candidates were required to make a clear connection to the Regulatory Sciences in their final proposals and during the interview process. Following the second committee meeting in June of 2014, the committee further determined that the candidates need to provide the reviewers a clear implementation strategy for bringing their research forward in a timely and effective manner. The following requirement was added to the 2015 full application stage of the process:

*“The purpose of the BWF Regulatory Science initiative is to fund investigators who are developing innovative and implementable solutions to regulatory problems. Therefore a very important part of the review of your application will be the committee’s understanding as to how your findings will change regulatory approval. Please provide a paragraph that explains your strategy and time line for moving your findings towards regulatory approval for their use in regulatory decision making. You should include any pitfalls and the major validation steps that you envision being required.”*

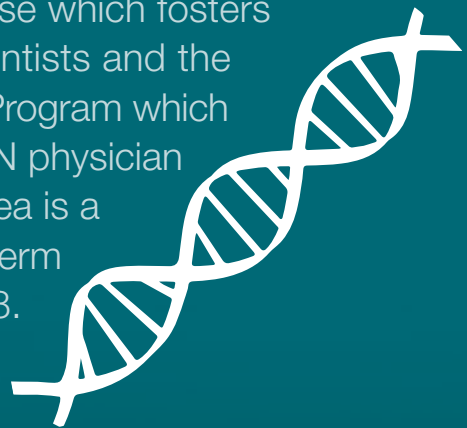
### Catalytic Grant Management

- With active participation from Rusty Kelley, BWF continues to Fund the IOM Forum on Drug Discovery, Development, and Translation, including sponsorship of an IOM study: Strategies for the Responsible Sharing of Clinical Trial Data.
- BWF is sponsoring the upcoming 2014 one-day Regulatory Session for the Tissue Engineering & Regenerative Medicine Conference in Washington, D.C. in November. This activity highlights the regulatory challenges surrounding the emerging stem cell-based and tissue engineering candidate products.
- BWF sponsored a regulatory-based “Bioengineering” session at the International Society for Stem Cell Research (ISSCR) in Vancouver, Canada in June of 2014.

*“The purpose of the BWF Regulatory Science initiative is to fund investigators who are developing innovative and implementable solutions to regulatory problems.”*

# Reproductive Sciences

An undervalued and underfunded area that BWF has had an interest in is reproductive science. Over the past 10 years major support for reproductive science has been provided by BWF through ad hoc grants in support of the MBL's Frontiers in Reproduction course which fosters the early careers of reproductive scientists and the Reproductive Scientist Development Program which serves as a major pipeline for OB/GYN physician scientists. The newest entry to this area is a competitive grant program, BWF Preterm Birth Initiative that was started in 2008.



## BWF Preterm Birth Initiative

*In 2008 the BWF Preterm Birth Initiative competitive grant program was begun to look at the basic biology of preterm birth and parturition. We have gone through two full-grant cycles and ten \$600,000 awards have been made. The deadline for the last cycle was December 2, 2013, and we anticipate making five \$600,000 awards.*

### BACKGROUND

A major BWF breakthrough in reproductive science support came in 2008 with the board approval of the BWF Preterm Birth Initiative. This initiative followed closely on the heels of a report from the Committee on Understanding Premature Birth and Assuring Healthy Outcomes and published by the National Academies Press in 2007. This study was partially funded by BWF.

The BWF Preterm Birth Initiative involves:

1. Partnering with other funders who are committed to prematurity to hold biannual symposiums. This was funded by a one-time ad hoc grant made in 2008.
2. BWF board approval in 2008 of a competitive preterm birth award program aimed at a better understanding of parturition by fostering multidisciplinary collaborations, and to attracting new researchers to the field.

To stretch grant dollars BWF partnered with the March of Dimes to host the Biannual Symposium on Preventing Prematurity. Symposiums have been held in 2008, 2010, and 2012. The 4th symposium will be held December 7-9, 2014. About 125 attendees from around the globe are expected to attend. A draft agenda is included in the appendix.

The competitive preterm birth program has gone through three complete grant cycles. Fifteen \$600,000 grants have been. The deadline for the 4th full grant cycle is December 1, 2014, and it is anticipated that five awards will be made.

## MBL SUMMER COURSE: FRONTIERS IN REPRODUCTION (FIR)

The FIR course was a product of the Reproductive Sciences Network (RSANET) that was established in 1995 to provide career development opportunities for reproductive scientists. The mentored training component of RSANET became what is now known as MBL's Frontiers in Reproduction summer course. BWF had an interest in the course from the beginning because of the career development aspect of the course and its focus on reproductive science that was considered an undervalued and underfunded area. BWF currently provides about 35% of the annual cost. The other major funder is NICHD.

The FIR course has provided training to over 300 students since its inception in 1998. Over the years there have been three formal outcomes studies. The most recent outcomes study was presented at a poster session at the July 2014 Society for the Study of Reproduction annual meeting. A reproduction of the poster is included in the appendix.

## REPRODUCTIVE SCIENTIST DEVELOPMENT PROGRAM (RSDP)

A 1992 IOM report stated that there was great concern regarding the research capabilities and capacity of academic OB/GYN departments. Through the 90s few reproductive physician scientists received NIH support and private sector support of reproductive physician scientists was meager. RSDP was founded to address these issues and to create a pipeline for academic OB/GYN physician scientists. The latest data (2010) from AAMC shows that only 0.48% (195) of the 40,377 active OB/GYNs list research as their major professional activity.

Each year four to six new RSDP Scholars are selected for the five-year program and over the past 26 years 96 have been admitted to the program. BWF became an RSDP sponsor in 1998 and has provided partial funding for eight Scholars. Of the 80 who have completed the program, 82% are in academia or with the intramural program at NIH. This compares very favorably with the 68% of M.D., Ph.D. graduates who end up in academia.

# 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.



## Program Updates and FY 2014 Highlights

BWF Science Education Funding Quick Facts (1996-2014)		North Carolina Education Landscape Quick Facts (2014)	
<b>\$31.5 m</b>	SSEP – 188 awards/38,000 students	<b>9.5m</b>	Population
<b>\$ 3.0 m</b>	CASMT – 17 awards/11 counties	<b>100</b>	Counties
<b>\$ 1.2 m</b>	Singapore Math Pilot – 207 teachers/3,694 students	<b>115</b>	School Districts
<b>\$ 0.6 m</b>	PRISM –170 teachers/64 districts/1,051 students	<b>2,524</b>	Public and Charter Schools
<b>\$ 5.4 m</b>	UNC FastTrack –120 Scholars (38 teachers)	<b>95,377</b>	Teachers
<b>\$ 1.0 m</b>	Grassroots Museum Collaborative (34)	<b>1.5m</b>	Students-Charters Included
<b>\$ 1.3 m</b>	Project SEED (6 doctorates/20 in pipeline)	<b>17</b>	Public Universities/NCSSM
<b>\$ 1.2 m</b>	Visiting Professorships (discontinued)	<b>36+</b>	Private Universities/Colleges
<b>\$13.0 m</b>	Adhoc grants	<b>34+</b>	Science Museums
<b>\$58.2 m</b>	<b>TOTAL</b>		

## Student Science Enrichment Program

*Three-year awards provide up to \$180,000 to North Carolina nonprofit organizations, including public/private schools, universities, colleges, and museums. The program's goals are to nurture students' enthusiasm about science, expose them to the excitement of scientific discovery, and interest them in pursuing careers in research or a variety of other careers in science.*

### BACKGROUND

The Student Science Enrichment Program (SSEP) serves as the cornerstone of our work in inquiry-based STEM education for students. This program supports creative, engaging hands-on teaching and learning for K-12 students across North Carolina. Nonprofit organizations, including universities, colleges, public/private schools, museums, and community organizations are eligible to apply. Activities must take place outside of the school day including after school programs, year-round experiences, Saturday academies, clubs or summer camps. A peer review advisory committee serves as the reviewer of applications and nominator of

awards. The committee also reviews annual progress reports to determine if award recipients are on track with their program strategies. They meet annually, generally in August, to discuss finalists applications. BWF has offered 17 series of SSEP award cycles.

### INVESTMENT

BWF has invested \$31.5 million since 1996 through 188 SSEP awards to nearly 85 different nonprofit organizations across North Carolina. For FY 2014, the BWF Board of Directors approved \$2.2 million to support SSEP grants that provide up to \$180,000 each payable over three years.

### HIGHLIGHTS FY 2014

The deadline for SSEP applications was April 10, 2014. BWF received 87 eligible applications out of a total of 91. The SSEP Advisory Committee was convened at the Burroughs Wellcome Fund facility on August 14, 2014, to review and discuss 23 finalist applications and to make recommendations for the 2014 award cycle. The committee recommended and the Board approved 14 organizations to receive the 2014 Student Science Enrichment Program awards totaling \$2,226,441.



The award recipients include universities (36%), one community college (7%), museums (14%), public/private schools (36%), and one community organization (7%). High schools (36%) received the majority SSEP awards, followed by middle schools (21%), elementary schools (21%), and blended grade schools. The Piedmont (36%) and Coastal (36%) regions competed for top awards followed by the Mountains (21%) and one statewide program.

### IMPACT

There are 1.5 million children in North Carolina's public and charter schools. SSEP has reached around 38,000 students, along with parents, teachers, school administrators, and scientists. Although our reach is around 3 percent of the state's K-12 student population to date, BWF's giving spans all 100 counties in North Carolina through out-of-school time, inquiry-based STEM programs. We will continue to broaden our scope of work in reaching children, particularly in the eastern part of the state.

BWF has conducted an annual evaluation of SSEP beginning in 1997. The most recent outcome data from student surveys show that of 505 students more than two-thirds of males (69%) and almost

three-quarters of females (72%) were interested in taking more science classes as a result of participation in an SSEP project. When it comes to their interest in taking more science classes, as opposed to simply learning more science, more than three-quarters of the students who were already interested or very interested in science (79%) responded that they were thinking about taking more science classes. Almost two-thirds of those who were only somewhat interested in science before SSEP (65%) also expressed interest in taking more science classes. More than two-thirds of all 2012-13 participants (70%) indicated that SSEP activities had encouraged them to think about taking more science classes in the future. This is a sampling of the change in behavior that occurs when students are exposed to quality STEM learning.

BWF convenes SSEP award recipients annually in August to network with potential partners and to keep them abreast of advances in the informal and formal STEM education areas. This year, 24 SSEP award recipients attended the annual August 2014 conference with 12 presenting posters.

*Glenn Murphy, author of Science Jam, chats with the crowd at the North Carolina Science Festival in Chapel Hill.*



## Career Award for Science and Mathematics Teachers

***Five-year awards provide \$175,000 to eligible 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. The award is a partnership between the North Carolina State Board of Education and BWF.***

### BACKGROUND

The Career Award for Science and Mathematics Teachers (CASMT) is a five-year award available to outstanding science and/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 and/or mathematics content and have outstanding performance records in educating children. CASMT is a partnership with the State Board of Education and the North Carolina Department of Public Instruction that provide award winning teaching professionals with a 12-month contract to ensure their availability to the state when a cohort of science and mathematics teacher advisors are needed. Annual progress reports are reviewed by a peer review advisory committee that conducts interviews of the teacher, principal, and superintendent in selecting nominees for the award. These reports are also shared with DPI as requested and with the program evaluators to inform them of continued progress towards strategic goals.

The CASMT program has been offered for the following four cycles, and will be offered every other year going forward, again in 2015. BWF has granted 17 total awards since the program's inception.

2010 (5 awards)—59 applications received  
*(first year excitement)*

2011 (6 awards)—26 applications received  
*(~313 teachers started the app process)*

2013 (6 awards)—31 applications received  
*(~100 teachers started the app process)*

2015 (6 TBD)—35 applications received  
*(~100 teachers started the app process)*

### INVESTMENT

BWF has invested \$2,975,000 in the CASMT program since 2009. The award provides \$175,000 over a period of five years (\$35,000 per year) to eligible teachers in the North Carolina public school system. BWF retains annuity funds of \$5,000 per year per award until the duration of the five-year award to encourage teachers to remain in the classroom.

### HIGHLIGHTS FY 2014-15

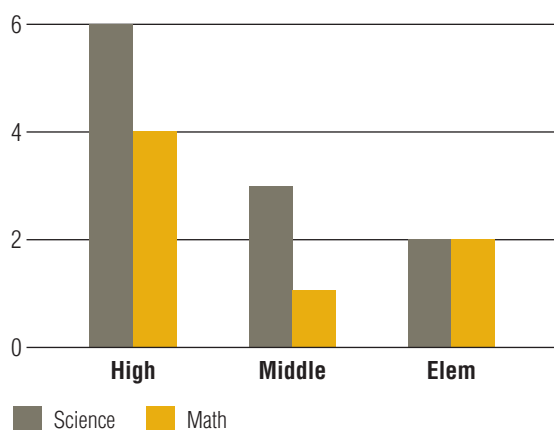
The CASMT program was not offered in BWF Fiscal Year 2014. This program alternates with the PRISM teacher awards offered this year (details below). The BWF Board has approved \$1,050,000 to support six new recipients for the Fiscal Year 2015 award cycle. The application deadline was September 15, 2014.

BWF received 35 eligible applications from teachers at high schools (57%), elementary schools (26%), and middle schools (17%). The majority applications came from the Piedmont area (40%) followed by the Mountains (31%), Coast (26%), and one statewide high school. The majority of applicants are female (66%) compared to males (34%), and Caucasian (91%) or African American (9%). Clearly more work must be done to better diversify the teacher pool. The CASMT Advisory Committee will meet February 11-12, 2015, to conduct interviews of finalist applicants, and their principals and superintendents.

### IMPACT

BWF currently has 14 active CASMT award recipients—females (71%), males (29%), Caucasian (79%), African American (14%), and Hispanic (7%). BWF has given 17 awards since the program's inception primarily to high school teachers and have spread these grants across the state, representing 12 different North Carolina counties—Allegany, Buncombe (3), Charlotte/Mecklenburg (3), Cumberland, Durham, Gaston, Guilford, Haywood, Transylvania, Wake, Warren, and Winston-Salem/Forsythe (2).

### A Snapshot of 2014 CASMT Awardees



CASMT recipients are convened annually with other BWF Science Education award recipients during the August STEM Education conference. They participate in poster sessions, group discussions, and network with colleagues to establish partnerships that move beyond the BWF meeting.

Two award recipients, Wendy Bartlett and Gregory Fisher of Winston Salem Forsythe County, have collaborated to advance mathematics in the school district. Claudia Walker will serve a second term on the National Academy of Sciences Teacher Advisory Council. The CASMT program evaluation team will continue work on helping teachers develop logic models and plans for the academic year.

## Promoting Innovations in Science and Mathematics Program

***Awards up to \$4,500 provide teachers with funding for materials, equipment, and training to conduct hands-on, inquiry-based science and mathematics projects in North Carolina public schools***

### BACKGROUND

BWF supports teaching professionals in their efforts to provide quality hands-on, inquiry-based activities for their students. We recognize the important role that K-12 teachers play in the lives of students by stimulating a passion for science and mathematics innovations in the classroom and beyond. The primary goal of Promoting Innovations in Science and Mathematics Program (PRISM) is to support teaching professionals in their efforts to provide quality hands-on, inquiry-based activities for their students. Awards are made to teaching professionals that hold a professional educator's license to teach in a North Carolina K-12 public school. This is a popular program with teachers who are building the confidence and learning the skill of grant writing.



## INVESTMENT

BWF has invested \$548,126 in PRISM awards to 170 science and mathematics teachers. This award provides up to \$3,000 for one year to cover the cost of equipment, materials, and supplies. An additional \$1,500 may be requested for professional development related to the implementation of new equipment or use of materials in the classroom.

## HIGHLIGHTS FY 2014

The deadline for PRISM applications was December 5, 2013. BWF received 85 eligible applications for the 2014 award cycle, the largest pool of applicants for PRISM. Of the 85 applications, 32 were from elementary school teachers, 21 from middle school teachers, 26 from high school teachers, four from elementary/middle school teachers, and one each from a middle/high school combination and an all grades school. We are reaching 53 female and 10 male K-12 teachers in the three North Carolina regions, Piedmont (49%), Coast (32%), and Mountains (19%). Teacher ethnicity include Caucasian (86%), African American (10%), Asian (1%), and other (3%). The average grant request was \$3,166. The PRISM Advisory Committee met on February 3, 2014, and nominated 63 North Carolina K-12 teachers to receive PRISM grants totaling \$203,252.

## IMPACT

BWF has made 170 PRISM grants to K-12 science, technology, engineering, and mathematics teachers in each of the three regions across North Carolina. This program has reached 64 of the 115 school districts, and as of 2013 reached 1,051 students.

## Singapore Math Pilot for North Carolina

### BACKGROUND

Mathematics in Singapore is taught in an innovative way emphasizing problem solving. Other elements that contribute to the success of mathematics taught in Singapore include focus on skill building, concepts, processes, attention to students' metacognition, and positive attitudes towards numbers and how they are used. The Singapore Mathematics Pilot (SMP) is a partnership between the North Carolina State Board of Education, Department of Public Instruction (DPI), and the Burroughs Wellcome Fund. The goal of the SMP is to demonstrate how high quality mathematics teaching and learning in the most challenged academic schools in North Carolina can produce academically successful students. SMP provides funding for teacher training, curriculum materials for students, and networking opportunities for teachers, parents, local school boards, and other community stakeholders.

DPI gave BWF a listing of 19 elementary schools that fit the criteria of need. Four schools and one district were selected to participate in the pilot. The Staff Development of Educators (SDE) (<http://www.sde.com/>) serves as consultants to train all SMP teachers by working with each school to develop training schedules and plans during the year. We began the training process with kindergarten teachers. Each school designates a SMP coach who agrees to serve as the central point person in coordinating activities. Principals at the SMP schools are very engaged in the process, some taking the lead role. District offices for all schools are supportive and monitoring student outcomes for scaling. BWF worked with DPI to determine the curriculum to use. Math in Focus published by Houghton Mifflin Harcourt was selected because of its rigor and alignment with the North Carolina standards in mathematics.

## INVESTMENT

In March 2011, the BWF Board of Directors approved a grant of \$1.2 million to fund the SMP. \$200,700 per year is committed for six years to support the elementary schools and one district located in urban and rural areas across North Carolina. We are in the fourth year of the pilot. After site visits to SMP schools, the leadership of a partnering company, SAS, joined BWF by providing support for one additional elementary school, Y.E. Smith Elementary in Durham, to participate in year two of the pilot. Bladen County added another elementary school to bring their total to three. The Bladen County School District is funding the third school.

## IMPACT

BWF staff has conducted site visits of seven of the eight elementary schools part of the Singapore Mathematics Pilot—Booker T. Washington Elementary in Bladen County has not yet been visited. The following describe what is happening with teachers and students.

**Teachers:** A total of 207 elementary teachers have been trained in SMP strategies. Training began during the summer of 2011 with the first cohort of SMP teachers. Each year a new grade level of teachers is added until we reach year six of the grant. At that time all teachers in the SMP elementary school should be trained. The first academic year of SMP teaching began in 2011/12 with kindergarten and first grade students.

**Students:** Kindergarten and first grade students begin learning with mathematics stories to engage them in the process. Teachers use manipulatives including number bonds, model drawings, number sense-whole/part numbers, and number language-concepts of numbers throughout the year. Number Bonds are used to help students become more flexible in their use of numbers, therefore improving their mental-math skills and computational fluency, an area of importance with the Common Core State Standards in mathematics. Math talks are emphasized to get students “talking” about mathematics. Such discourse improves

mathematical reasoning as students learn to evaluate the ideas of peers and justify their own mathematical thinking.

Second grade students learn concrete, pictorial, and abstract concepts to give meaning and connection to their life. Students develop an understanding of place values and what three-digit numbers represent hundreds, tens, and ones. Students can read and write numbers to 1000. Word problems are used with manipulatives to show adding to, taking from, putting together, taking apart, and comparing with, unknowns in all positions. Students use drawings and equations with symbols for the unknown number to represent the problem, preparing students for algebra. Students also develop linear measurement skills by measuring the length of objects by selecting and using appropriate tools such as cubes, rulers, yardsticks, meter sticks, and measuring tape. Pre-multiplication skills are introduced to students by determining whether a group of objects has an odd or even number of members by pairing objects or counting them by twos. Students write equations to express an even number as a sum of two equal parts.

Third grade SMP students took the End-of-Grade (EOG) exams in spring 2014. DPI selected a group of control schools that are being used by external program evaluator Metametrics to gauge student performances. Reading scores for SMP students were comparable to that of the control students. Mathematics scores were lower than the control students. There are a number of factors to contribute to this outcome, data were in aggregate and did not show that some SMP schools are outperforming others, this was the first year of training for third grade SMP teachers who were novelists in preparing students for the EOG, and it is agreed that student assessments are important to follow over time. We are in year four of the six-year Singapore Mathematics Pilot. Each of the SMP schools has provided demonstrable evidence in the improved learning cultures at their schools, which is a major achievement.

District/School 2012-13	Principals	Teachers	Students
<b>Bladen County*:</b> <ul style="list-style-type: none"> <li>■ Elizabethtown Primary (480 students)</li> <li>■ East Arcadia School (200 students)</li> <li>■ Booker T. Washington Primary v(225 students)</li> </ul>	3	31	482
<b>Eastfield Global Magnet School</b> <i>McDowell County School District</i>	1	21	332
<b>Gallberry Elementary School</b> <i>Cumberland County School District</i>	1	63	1,707
<b>Murphey Traditional Academy</b> <i>Guilford County School District</i>	1	36	406
<b>North Wilkesboro Elementary School</b> <i>Wilkes County School District</i>	1	39	386
<b>Y. E. Smith Elementary School</b> <i>Durham Public School District</i>	1	17	381
<b>TOTALS</b>	<b>8</b>	<b>207</b>	<b>3,694</b>

\*2013 figures

## FastTrack-University Program to Prepare Science and Mathematics Teachers

### BACKGROUND

BWF partnered with the University of North Carolina system to develop a “fast track” to teacher certification for science and mathematics majors aimed at preparing these individuals for careers in teaching in North Carolina K-12 classrooms. UNC General Administration selected North Carolina Central University, North Carolina State University, UNC Asheville, and UNC Chapel Hill as campus sites for FastTrack. In implementing this project, campus partners committed to preparing 120 science/mathematics scholars.

### INVESTMENT

The BWF Board of Directors approved a grant for \$5.4 million to support the Burroughs Wellcome Fund Scholars program. The grant provides \$6,500

scholarships to qualifying juniors and seniors, and an additional benefit of a \$5,000 annual salary supplement for up to five years for Scholars that graduate and obtain employment in a North Carolina public school as a licensed science teacher.

### IMPACT

There are 38 FastTrack teachers employed in North Carolina public schools teaching in the areas of science and mathematics. A common set of program guidelines have been developed with input from four UNC campuses. The guidelines include information about academic major requirements, criteria for accepting students into the program, application process, service commitment, annual salary supplement, amount of scholarship, campus sub-agreements, international experience, learning community, and program evaluation. All partnering campuses have agreed to these guidelines in developing the next generation of STEM teachers.

## Other Activities

The BWF staff continues to work with the STEM Funders Network (SFN) in drafting a template or framework for what is a STEM Ecosystem Logic Model and Work plan. The cooperative commitment to the implementation of the Next Generation Science Standards (NGSS), the Framework for K-12 Science Education, and Common Core State Standards in Mathematics served as the basis for this work. The Ecosystem draws together previous SFN efforts either coordinated by SFN and/or led by an SFN member.

## Program Plans for FY 2015

The BWF Board has approved funding for six CASMT grants for Fiscal Year 2015. The deadline for applications was September 14, 2014. The CASMT Advisory Committee will meet February 11-12, 2015, to conduct interviews of finalist applicants, and their principals and superintendents.

The BWF Board has approved funding for 12 SSEP grants for Fiscal Year 2015. The deadline for applications is mid April 2015.

*Dr. Danielle Lee provided the keynote address at the Fund's annual STEM conference.*



# 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 \$763.0 million at August 31, 2014, 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 six voting members, including four representatives from outside BWF and two 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 \$173.5 million. The sector's target allocation was 25 percent, and actual holdings stood at 22.7 percent.
- U.S. small capitalization equity assets had a market value of \$130.3 million. The sector's target allocation was 18 percent, and actual holdings stood at 17.1 percent.
- International equity assets had a market value of \$190.6 million. The sector's target allocation was 32 percent, and actual holdings stood at 25.0 percent.
- Fixed income assets had a market value of \$129.0 million. The sector's target allocation was 22 percent, and actual holdings stood at 16.9 percent.
- Cash equivalent assets had a market value of \$11.0 million. The sector's target allocation was 3 percent, and actual holdings stood at 1.4 percent.
- Alternative assets had a market value of \$128.6 million. The sector did not have a target allocation, and actual holdings stood at 16.9 percent. The maximum permitted allocation to alternative assets stood at 20.0 percent at cost.

The total market value of BWF's investments increased by \$60.9 million, or 8.7 percent, from the end of the previous fiscal year. This increase in assets was due mainly to strong returns for global equities during the year. BWF's total investment return before investment management fees for the fiscal year was +14.5 percent. The U.S. large capitalization equity sector returned +23.3 percent, the U.S. small capitalization equity sector had a +19.6 percent result, the international equity sector gained +13.7 percent for the fiscal year, and fixed income produced a +6.4 percent result.

As of August 31, 2014, BWF employed 13 marketable securities investment managers. In the U.S. large capitalization equity sector, the managers were Brown Advisory; LSV Asset Management; and Martingale Asset Management. WCM Investment Management; Numeric Investors; and Nichols Asset Management managed U.S. small capitalization equities. Pacific Investment Management Company; Rimrock Capital Management; and Smith Breeden Associates were the fixed income managers. Capital Guardian Trust Company; Northern Cross; Johnston Asset Management; and Hansberger Growth 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 managed a fund of absolute return strategies. Pacific Investment Management Company managed an absolute return strategy. Hamilton Lane Advisors managed two funds of private equity strategies. Finally, the Fund internally managed a diversified portfolio of mainly passive investments which was named the Tactical Portfolio. The Tactical Portfolio included investments in U.S. equities, international equities and global bonds.

## Statements of Financial Position

August 31, 2014 and 2013

(All dollar amounts presented in thousands)

	2014	2013
<b>Assets</b>		
Cash and cash equivalents	\$ 13,652	\$ 17,175
Investments	758,950	692,087
Accrued interest and dividends receivable	1,754	1,576
Other assets	145	129
Property and equipment, net	8,681	8,968
Total assets	\$ 783,182	\$ 719,935
<b>Liabilities and Net Assets</b>		
Transactions payable, net	\$ 9,216	\$ 8,236
Accounts payable and other liabilities	774	928
Federal excise tax payable	758	1,370
Deferred federal excise taxes	2,359	1,642
Unpaid awards	86,042	81,551
Total liabilities	99,149	93,727
Unrestricted net assets	684,033	626,208
Total liabilities and net assets	\$ 783,182	\$ 719,935



# Statements of Activities

August 31, 2014 and 2013

(All dollar amounts presented in thousands)

	2014	2013
<b>Revenues</b>		
Interest and dividends, less investment expenses of \$3,472 and \$3,423 in 2014 and 2013, respectively	\$ 8,686	\$ 9,139
Net realized gain on sale of marketable securities	51,698	40,754
Total revenues and realized gains	60,384	49,893
<b>Expenses</b>		
Program services	33,193	35,589
Management and general	5,668	6,890
Total expenses before net unrealized appreciation and deferred federal excise tax	38,861	42,479
Net unrealized appreciation of investments, net of provision for deferred federal excise tax of \$717 and \$702 in 2014 and 2013, respectively	36,302	32,990
Change in net assets	57,825	40,404
Net assets at beginning of year	626,208	585,804
Net assets at end of year	\$ 684,033	\$ 626,208

For full audited financials visit [bwfund.org/annualreport](http://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.

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 Hoc—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](http://bwfund.org/annualreport)**

# Program Summary

August 31, 2014

	Awarded Net of Cancelled	Amount Paid	Percentage of Total Paid
<b>Biomedical Sciences</b>			
Career Awards in the Biomedical Sciences	\$ —	\$ 1,346,741	
Career Awards in the Medical Sciences	8,455,896	6,189,595	
Research Travel Grant	345,815	348,515	
Ad Hoc	606,500	782,500	
Total	\$ 9,335,287	\$ 8,667,352	28%
<b>Diversity in Science</b>			
Postdoctoral Enrichment Program	\$ 870,000	\$ 200,000	
Total	\$ 870,000	\$ 200,000	3%
<b>Infectious Diseases</b>			
Investigators in Pathogenesis of Infectious Disease	\$ 6,146,092	\$ 4,445,000	
Ad Hoc	1,686,110	888,110	
Total	\$ 7,832,202	\$ 5,333,110	22%
<b>Interfaces in Science</b>			
Career Award at the Scientific Interface	\$ 5,671,773	\$ 4,608,332	
Interfaces Short Courses	200,000	100,000	
Ad Hoc	471,091	271,091	
Total	\$ 6,342,864	\$ 4,979,423	20%
<b>Population Sciences</b>			
Institutional Program Unifying Population and Laboratory-Based Sciences	\$ —	\$ 1,657,098	
Ad Hoc	10,000	10,000	
Total	\$ 10,000	\$ 1,667,098	0%

## Program Summary *continued*

August 31, 2014

	Awarded Net of Cancelled	Amount Paid	Percentage of Total Paid
<b>Regulatory Science</b>			
Innovation in Regulatory Science Awards	\$ 2,500,000	\$ 550,000	
Ad Hoc	95,000	95,000	
Total	\$ 2,595,000	\$ 645,000	7%
<b>Reproductive Sciences</b>			
Preterm Birth Initiative	\$ 3,000,000	\$ 1,725,000	
Total	\$ 3,000,000	\$ 1,725,000	8%
<b>Science and Philanthropy</b>			
Science and Philanthropy	\$ 316,000	\$ 319,000	
Total	\$ 316,000	\$ 319,000	1%
<b>Science Education</b>			
Career Award for Science and Mathematics Teachers	\$ —	\$ 390,000	
PRISM	203,252	200,259	
Student Science Enrichment Program	2,226,441	1,196,546	
Ad Hoc	989,860	1,494,384	
Total	\$ 3,219,553	\$ 3,281,189	10%
<b>Translational Research</b>			
Clinical Scientist Award in Translational Research	\$ —	\$ 1,725,000	
Total	\$ —	\$ 1,725,000	1%
<b>Grand Total</b>	<b>\$ 33,520,905</b>	<b>\$ 28,542,172</b>	<b>100%</b>

# Biomedical Sciences

## 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

### Bradley E. Bernstein, M.D., Ph.D.

Proteomic studies of post-translational histone modifications  
Harvard Medical School

### Ben E. Black, Ph.D.

Epigenetic mechanisms for centromere specification  
University of Pennsylvania Perelman School of Medicine

### Mark M. Churchland, Ph.D.

Experimental study of settling neural processes in the primate brain  
Columbia University Medical Center

### Daniela M. Dinulescu, Ph.D.

Role of endometriosis in fertility and ovarian cancer pathogenesis  
Harvard Medical School

### Erin C. Gaynor, Ph.D.

Molecular basis of colonization and invasion in the foodborne enteric pathogen *Campylobacter jejuni*  
University of British Columbia

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

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

### 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

### 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

### Margot E. Quinlan, Ph.D.

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

### Jeremy F. Reiter, M.D., Ph.D.

Tectonic: discovery of novel signal directing mammalian development  
University of California-San Francisco

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

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

### Noah A. Rosenberg, Ph.D.

Efficient genome-based inference of ancestry for use in genetic association studies  
Stanford University

### Benjamin P. Tu, Ph.D.

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

### Jennifer A. Zallen, Ph.D.

Molecular analysis of dynamic cell rearrangements in *Drosophila*  
Memorial Sloan-Kettering Cancer Center

### Yanping Zhang, Ph.D.

ARF-MDM-p53 tumor suppression pathway  
University of North Carolina-Chapel Hill School of Medicine

## CAREER AWARDS IN THE MEDICAL SCIENCES

### Susanne Elizabeth Ahmari, M.D., Ph.D.

Testing the Role of Cortico-Striatal Circuits in Obsessive Compulsive Disorder Pathology and Treatment  
University of Pittsburgh School of Medicine

### Theresa Alenghat, D.V.M., Ph.D.

Epigenomic regulation of the host-commensal relationship  
University of Cincinnati

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

Mechanism of peripheral neuropathy from Mitofusin 2 mutations  
Cedars-Sinai Medical Center

### Christina Eleanor Barkauskas, M.D.

Epithelial-mesenchymal crosstalk in lung fibrosis and alveolar homeostasis  
Duke University

### Chetan Bettgowda, M.D., Ph.D.

Translational molecular profiling of oligodendrogliomas  
Johns Hopkins University

### Gautam Bhawe, M.D., Ph.D.

Role of Peroxidasin and Protein Halogenation in Diabetic Nephropathy  
Vanderbilt University Medical Center

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

Investigating the role of retrotransposons in hematopoietic neoplasias  
Johns Hopkins University School of Medicine

### James Edward Cassat, M.D., Ph.D.

Contribution of host and pathogen to altered bone homeostasis and bacterial survival during osteomyelitis  
Vanderbilt University School of Medicine

### Clark C. Chen, M.D., Ph.D.

Molecular basis and therapeutic implications of genome instability during brain tumor progression  
University of California-San Diego School of Medicine

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

Genomic approaches to frontotemporal dementia  
University of Pennsylvania Perelman School of Medicine

### Kevin Jon Cheung, M.D.

Elucidating the role of K14+ leader cells in breast cancer invasion and metastasis  
To Be Named North American Degree Granting Institution

### Ajai Arvind Dandekar, M.D., Ph.D.

Quorum sensing and mechanisms to ensure cooperation in the opportunistic pathogen *Pseudomonas aeruginosa*  
University of Washington

**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

**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

**Karin Elisabeth Finberg, M.D., Ph.D.**

Identification of Novel Genetic Regulators of  
Mammalian Iron Homeostasis  
Yale University School of Medicine

**Scott Richard Floyd, M.D., Ph.D.**

Insulating chromatin from DNA damage  
signaling: epigenetic modifications and  
connections to human cancer  
Massachusetts Institute of Technology

**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

**Karunesh Ganguly, M.D., Ph.D.**

Control of a Complex Neuroprosthetic Device  
using Electrocorticography  
University of California-San Francisco

**Pradipta Ghosh, M.D.**

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

**Ethan Michael Goldberg, M.D., Ph.D.**

Analysis of circuit function informs novel  
therapeutic interventions in an epilepsy model  
University of Pennsylvania Perelman School  
of Medicine

**Malay Halder, M.D., Ph.D.**

Transcription factor SPI-C at the interface of  
iron homeostasis and innate immunity.  
To Be Named North American Degree Granting  
Institution

**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

**Andrew Caleb Hsieh, M.D.**

Elucidating the role of aberrant translational  
control on prostate cancer invasion and  
metastasis  
University of California-San Francisco

**Marcin Imielinski, M.D., Ph.D.**

Reconstructing complex loci in lung  
adenocarcinoma with large-insert whole  
genome sequencing  
Harvard Medical School

**Jean-Sebastien Joyal, M.D., Ph.D.**

Neuronal Energy Metabolism Drives  
Angiogenesis  
University of Montreal Faculty of Medicine

**Alex Kentsis, M.D., Ph.D.**

Tumorigenesis by endogenous DNA  
transposons in human cancer.  
Memorial Sloan-Kettering Cancer Center

**Jeffery M Kico, M.D., Ph.D.**

Role of notch signaling in the bone marrow  
stroma  
University of Tennessee Health Science Center  
College of Medicine

**Jason Knight, M.D., Ph.D.**

Innate immunity in the pathogenesis of lupus  
and antiphospholipid vasculopathy  
University of Michigan-Ann Arbor

**Douglas Sun Kwon, M.D., Ph.D.**

New technologies for the study of HIV mucosal  
immunity and compartmentalization in the  
female genital tract  
Harvard Medical School

**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

**Michael Z. Lin, M.D., Ph.D.**

Elucidating mechanisms of synaptic plasticity  
and learning by visualizing and controlling  
local protein turnover  
Stanford University School of Medicine

**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

**Anita Katherine McElroy, M.D., Ph.D.**

Defining the roles of CD4+ T cells in  
generating a protective immune response  
against Rift Valley fever virus  
Emory University School of Medicine

**Heather Christy Mefford, M.D., Ph.D.**

Novel genomic rearrangements in  
developmental pediatric disorders  
University of Washington School of Medicine

**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

**Jeniel Emily Nett, M.D., Ph.D.**

Mechanisms of Candida Biofilm Immune Evasion  
University of Wisconsin-Madison

**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  
University of California-San Diego

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

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

**Sudarshan Rajagopal, M.D., Ph.D.**

Dissecting receptor Signaling pathways in pulmonary hypertension  
Duke University Medical Center

**Stacey Lynn Rentschler, M.D., Ph.D.**

Role of notch signaling in preexcitation and arrhythmias  
Washington University School of Medicine

**Miguel Nicolas Rivera, M.D.**

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

**Michael D. Rosenblum, M.D., Ph.D.**

Memory regulatory T cells in inflammatory and autoimmune disease  
University of California-San Francisco

**Joshua Marc Shulman, M.D., Ph.D.**

Exploring the Genetics of Parkinson's Disease in Humans and Drosophila  
Baylor College of Medicine

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

Role of the Fanconi Anemia and other DNA crosslink repair pathways in genome maintenance and cancer prevention  
Rockefeller University

**Eric Lee Snyder, M.D., Ph.D.**

Regulation of lung cancer progression by the cell fate determinant Nkx2.1  
University of California-San Francisco

**Michael Thomas Spiotto, M.D., Ph.D.**

Identification of chromosomal aberrations that cooperate with the human papillomavirus to cause cancer  
University of Chicago

**Sean Robinson Stowell, M.D., Ph.D.**

Elucidating mechanisms of innate immunity against molecular mimicry  
Emory University School of Medicine

**David Tsai Ting, M.D.**

Characterization of non-coding RNAs in pancreatic adenocarcinoma  
Harvard Medical School

**Christopher Ryan Vakoc, M.D., Ph.D.**

Identifying epigenetic vulnerabilities in chemotherapy-resistant leukemia  
Cold Spring Harbor Laboratory

**Richard Chih-Chien Wang, M.D., Ph.D.**

Akt-mediated regulation of autophagy & tumorigenesis through formation of a beclin 1/keratin intermediate filament complex  
University of Texas Southwestern Medical Center-Dallas

**Duane Robert Wesemann, M.D., Ph.D.**

Extramedullary B Cell Development in the Gut Lamina Propria  
Harvard Medical School

**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

**Kelley Yan, M.D., Ph.D.**

Regulation of active and quiescent intestinal stem cells  
Stanford University

**Ellen Yeh, M.D., Ph.D.**

Function of the plastid organelle in *P. falciparum*: beyond isoprenoid precursor biosynthesis and blood stage  
Stanford University School of Medicine

**Hao Zhu, M.D.**

Investigating the Lin28/let-7 pathway in mouse models of liver cancer and regeneration  
University of Texas Southwestern Medical Center-Dallas

**Ann C. Zovein, M.D.**

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

**RESEARCH TRAVEL GRANT****Julia C. Arciero, Ph.D.**

Combining theoretical and experimental techniques to study transplant rejection  
Indiana University-Purdue University at Indianapolis

**Wadie F. Bahou, M.D.**

Biliverdin IX Beta Reductase Function in Hematopoiesis  
State University of New York-Stony Brook

**Charles Lee Brooks, Ph.D.**

Collaborative Interactions with Weizmann Institute on Exploring Protein-protein Interactions  
University of Michigan-Ann Arbor

**Pietro-Luciano Buono, Ph.D.**

Mathematical analysis of nonlocal hyperbolic partial differential equations for cancer cell movements.  
University of Ontario Institute of Technology

**Tien-Min Chu, D.D.S., Ph.D.**

Load-bearing tissue scaffolds with controlled degradation time  
Indiana University

**Valerie Copie, D.Phil., Ph.D.**

Acquiring training in NMR and mass spectrometry-based metabolomics research  
Montana State University-Bozeman

**Lea Karatheodoris Davis, Ph.D.**

Computational Pharmacogenomics Of Neuropsychiatric Disorders  
University of Chicago

**Enrique M. De La Cruz, Ph.D.**

Design and characterization of *in vitro* cytoskeletal contractile systems inspired by cells  
Yale University

**Kristyn Elizabeth Feldman, Ph.D.**

Multi-Locus Sequence Typing Environmental Fungal Samples from Western Kenya  
University of California-San Francisco

**Alexis Frazier-Wood, Ph.D.**

Understanding the Ethnic Specific Aspects to Cardiovascular Disease Risk  
University of Texas Health Science Center-Houston

**Hiro Furukawa, Ph.D.**

Visualization of neuronal macromolecular complexes by Cryo-electron microscopy  
Cold Spring Harbor Laboratory

**Varan Govind, Ph.D.**

Collaborative Whole-brain MR Imaging Studies in HIV-1 Clades B and C Infection  
University of Miami Miller School of Medicine

**James Gumbart, Ph.D.**

Development of novel approaches and models for permeability calculations  
Georgia Institute of Technology

**Brendan Andrew Harley, Sc.D.**

Mapping poroelastic properties across spatially-inhomogeneous biomaterials  
University of Illinois-Urbana-Champaign

**Mark Hochstrasser, Ph.D.**

Induction of membrane curvature and lipid segregation by viral and cellular proteins  
Yale University School of Medicine

**Diane Krause, M.D., Ph.D.**

Collaborative studies for single cell epigenetic analyses  
Yale University

**Kenro Kusumi, Ph.D.**

Integrating Computational and Biomedical Approaches to Comparative Analysis of Vertebrate Genomes  
Arizona State University

**KiBum Lee, Ph.D.**

Developing nanoparticle-based synthetic transcription factors to generate induced pluripotent stem cells  
Rutgers, the State University of New Jersey-Piscataway

**Mark Joseph Mamula, Ph.D.**

Analysis of Chemical Modifications in Autoimmunity  
Yale University School of Medicine

**Samantha Ann Meenach, Ph.D.**

*In Vitro* Analysis of Dry Powder Aerosol Particles for Pulmonary Delivery  
University of Rhode Island

**Thomas James Melia, Ph.D.**

Control of autophagosome formation by LC3-dependent membrane bending  
Yale University School of Medicine

**Rafik Naccache, Ph.D.**

Implantable Nanothermometers and Pressure Transducers: Drawing a Thread Between Silk Photonics and Nanomedicine  
Institut national de la recherche scientifique

**Jack Adam Noah, Ph.D.**

Neurofeedback through Augmented Reality  
Yale University School of Medicine

**Aleksandr Noy, Ph.D.**

In-situ AFM study of the dynamics of the protein-lipid interactions on curved lipid templates  
University of California-Merced

**Ifedayo Victor Ogungbe, Ph.D.**

Investigating the chemodiversity and pharmacotherapeutic potential of the Lower Guinean forests  
Jackson State University

**Richard Christopher Page, Ph.D.**

Functional implications for restrained ubiquitin ligase interactions with Hsp70  
Miami University

**Leilei Peng, Ph.D.**

Investigate disease mechanisms in live animal with deep-tissue functional microscopy  
University of Arizona

**Andrzej Zbigniew Pietrzykowski, M.D., Ph.D.**

Alcohol regulation of microRNA monitored by SPION binding assay and in situ PCR  
Rutgers, the State University of New Jersey-New Brunswick

**Helen Pushkarskaya, Ph.D.**

Individual differences in human behaviors emerging from the interplay of cognitive and emotional systems – healthy and clinical populations.  
Yale University School of Medicine

**Gary Stephen Shaw, Ph.D.**

Mechanism of Parkin E3 ligase activity  
University of Western Ontario

**Paul Robert Van Tassel, Ph.D.**

Biological Characterization of Porous Nanofilm Biomaterials  
Yale University

**Yadong Wang, D.Phil., Ph.D.**

Increase cell migration in vascular grafts  
University of Pittsburgh

**Michal Wesolowski, Ph.D.**

International Collaboration on the translation of quantitative 2D coded aperture phase contrast imaging from the synchrotron to the preclinical laboratory  
University of Saskatchewan

**Diane Marie Wiener, Ph.D.**

Transcriptional repression by phage 186 Cl at the single-molecule level  
Emory University

**Simone Angela Winkler, Ph.D.**

Combined RF-Shim coil Development for Ultra High-Field Magnetic Resonance Imaging  
Stanford University

**Anne D Yoder, Ph.D.**

Developing statistical expertise for estimating the temporal origins of Primates  
Duke University



# Diversity in Science

## POSTDOCTORAL ENRICHMENT PROGRAM

### **Jonathan Abraham, M.D., Ph.D.**

Structural and Molecular Basis for Passive Immunotherapy Against a Human Viral Hemorrhagic fever  
Harvard Medical School

### **Albert Ernesto Almada, Ph.D.**

Programming the muscle progenitor state  
Harvard University

### **Irene Catherine Blat, Ph.D.**

*In vivo* systems analysis of metaflammation in colorectal cancer  
Massachusetts Institute of Technology

### **Sara Elisabeth Conard, Ph.D.**

Role of IKKalpha in Maintaining Prostate Tumor Initiating Cells Through Regulation of Androgen Receptor  
University of North Carolina-Chapel Hill

### **Mehabaw Derebe, Ph.D.**

Retinoid Binding Function of Serum Amyloid A Proteins  
University of Texas Southwestern Medical Center-Dallas

### **Oliver Isauro Fregoso, Ph.D.**

Elucidating the role of the DNA damage response in lentiviral biology  
Fred Hutchinson Cancer Research Center

### **Galo Garcia, III, Ph.D.**

Elucidating the Role of the Transition Zone in Ciliary Diseases  
University of California-San Francisco

### **Courtney Rory Goodwin, M.D., Ph.D.**

Phospho-proteomic profiling of metastatic breast cancer  
Johns Hopkins University School of Medicine

### **Dennis Jones, Ph.D.**

Functional Analysis of Lymph Node Metastases  
Harvard Medical School

### **Kimberly A. Kempadoo, Ph.D.**

The role of dopamine in mediating hippocampal place cell stability and spatial learning  
Columbia University College of Physicians and Surgeons

### **Daniel C. Koch, D.Phil., Ph.D.**

Unique Cancer Stem Cell Signature in MYC Addicted Progenitor cells.  
Stanford University

### **Markita Patricia Landry, Ph.D.**

Detection of Unlabeled Proteins from a Live Single Cell Using Synthetic Antibodies  
Massachusetts Institute of Technology

### **Sonya Elina Neal, Ph.D.**

Discovering the machinery and mechanism of ERAD-M retrotranslocation  
University of California-San Diego

### **Carlos Ramon Ponce, M.D., Ph.D.**

Functional roles of V2 and V4 parallel input pathways in object recognition  
Harvard Medical School

### **Francisco Eduardo Robles, Ph.D.**

Novel molecular contrast mechanisms for biomedical applications using pump-probe nonlinear phase dispersion spectroscopy  
Duke University

### **Philip Romero, Ph.D.**

Engineering therapeutic proteins via large-scale sequence-function mapping  
University of California-San Francisco

### **Adrianne Marie Rosales, Ph.D.**

Role of Matrix Elasticity in Regulating Myofibroblast Activation of Valvular Interstitial Cells  
University of Colorado-Boulder

### **Joshua Charles Saldivar, Ph.D.**

DNA replication stress-induced primary cilia dysfunction in the formation of malignant breast cancer  
Stanford University

### **Felipe H. Santiago-Tirado, Ph.D.**

Mechanisms of Brain Infection by *Cryptococcus neoformans*  
Washington University School of Medicine

### **Racquel Kim Sherwood, Ph.D.**

Identification of *Legionella pneumophila* Autophagy Regulators  
Yale University

### **Sade Monique Spencer, D.Phil., Ph.D.**

Investigating the role of astrocyte-secreted synaptogenic molecules in cocaine-induced synaptic plasticity and reinstatement behavior.  
Medical University of South Carolina

### **Nikki Georgina Traylor-Knowles, Ph.D.**

Some Like It Hot: The Mechanisms of TNFR Signaling In Corals  
Stanford University

### **Rosa Anna Uribe, Ph.D.**

Functional analysis of enteric neural crest cell migration and development  
California Institute of Technology

# Infectious Diseases

## INVESTIGATORS IN PATHOGENESIS OF INFECTIOUS DISEASE

### Neal M Alto, Ph.D.

Systems architecture of bacterial effector/host membrane interactions  
University of Texas Southwestern Medical Center-Dallas

### David M. Aronoff, M.D., FIDSA

Prostaglandin E2 synthesis and signaling in the pathogenesis of puerperal Group A Streptococcus infections  
Vanderbilt University School of Medicine

### David Artis, Ph.D.

Tracking helminth-specific immune responses *in vivo*  
Weill Cornell Medical College

### Anna I Bakardjiev, M.D.

Pregnancy-related pathogenicity determinants of *Listeria monocytogenes*  
University of California-San Francisco School of Medicine

### Richard J. Bennett, Ph.D.

Phenotypic variation and host adaptation by the human fungal pathogen *Candida albicans*  
Brown University

### Helen E. Blackwell, Ph.D.

Interception of bacterial quorum sensing with synthetic ligands  
University of Wisconsin-Madison

### Abraham L. Brass, M.D., Ph.D.

Defining dengue virus's dependencies: discovery and characterization of host factors required for viral replication  
University of Massachusetts Medical School

### 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

### Dustin Brisson, D.Phil., Ph.D.

Evolution of original antigenic sin in Lyme disease  
University of Pennsylvania

### Juliane Bubeck-Wardenburg, M.D., Ph.D.

Tuning of the host-bacterial interaction by a pore-forming toxin  
University of Chicago

### James R. Carlyle, Ph.D.

MHC-independent recognition of infected cells by natural killer cells of the innate immune system  
University of Toronto

### Jen-Tsan Ashley Chi, M.D., Ph.D.

Sequence determinant of the *Plasmodium falciparum* gene regulation by human microRNAs  
Duke University Medical Center

### Carolyn B. Coyne, Ph.D.

Actin cytoskeleton and antiviral innate immune signaling  
University of Pittsburgh School of Medicine

### Robert A. Cramer, Ph.D.

Bioenergetics and microbial pathogenesis sufficiency  
Dartmouth College

### Blossom Damania, Ph.D.

Role of viral signaling proteins in the pathogenesis of Kaposi's sarcoma-associated herpes virus (KSHV)  
University of North Carolina-Chapel Hill

### K. Heran Darwin, Ph.D.

Ubiquitin-like proteins in bacterial pathogens  
New York University School of Medicine

### Michael R. Farzan, Ph.D.

Parallel identification of obligate viral receptors  
Harvard Medical School

### Michael J. Federle, Ph.D.

Interspecies communication among commensal and pathogenic bacteria  
University of Illinois-Chicago

### Michael A. Fischbach, Ph.D.

Novel microbiota-derived molecules that modulate the host immune response  
University of California-San Francisco

### Sarah M. Fortune, M.D.

Quick change: polarity, diversity and virulence in *Mycobacterium tuberculosis*  
Harvard University

### Stephen Girardin, Ph.D.

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

### Chuan He, Ph.D.

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

### De'Broski R. Herbert, Ph.D.

Trefoil factor proteins modulate host immunity against hookworms  
University of California-San Francisco

### Kent L. Hill, Ph.D.

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

### Tobias M. Hohl, M.D., Ph.D.

Tracing innate control over respiratory and systemic fungal infection  
Memorial Sloan-Kettering Cancer Center

### Lora V. Hooper, Ph.D.

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

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

Host discrimination between pathogenic and commensal bacteria in the colon  
Washington University School of Medicine

### Jonathan C. Kagan, Ph.D.

Novel approaches to study RIG-I like receptor mediated antiviral immunity  
Harvard Medical School

### Alexei V. Korennykh, Ph.D.

Systems analysis of pathogen defense mediated by 2',5'-linked isoRNA  
Princeton University

### D. Borden Lacy, Ph.D.

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

**Xiaorong Lin, Ph.D.**

Fungal communication and pathogenicity  
Texas A&M University

**Manuel Llinas, Ph.D.**

Global analysis of the *Plasmodium falciparum*  
metabolome  
Pennsylvania State University

**John D. MacMicking, Ph.D.**

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

**Matthias Marti, Ph.D.**

Cellular communication in malaria parasites  
Harvard University

**Denise M. Monack, Ph.D.**

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

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

Discovery of a cell type switch that drives  
fungal-mammalian commensalism  
University of California-San Francisco

**Erika L. Pearce, D.Phil., Ph.D.**

Cellular metabolism in immunity to infection  
Washington University

**Julie K. Pfeiffer, Ph.D.**

How gut microbes enhance enteric virus  
infectivity  
University of Texas Southwestern Medical  
Center-Dallas

**Manuela Raffatellu, M.D.**

Characterization of novel populations of  
neutrophils during bacterial infection  
University of California-Irvine

**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

**Sara L. Sawyer, Ph.D.**

Genetics of viral species tropism  
University of Texas-Austin

**Daniel B. Stetson, Ph.D.**

Why do DNA viruses cause cancer?  
University of Washington

**Adrie J.C. Steyn, Ph.D.**

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

**Christopher S. Sullivan, Ph.D.**

Herpesvirus immune evasion via non-coding  
RNA regulatory elements  
University of Texas-Austin

**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

**Niraj H. Tolia, Ph.D.**

Molecular basis for and inhibition of red blood  
cell invasion by plasmodium parasites  
Washington University School of Medicine

**Victor J. Torres, Ph.D.**

*Staphylococcus aureus* pore-forming toxins:  
leukocyte killing and beyond  
New York University School of Medicine

**Emily R. Troemel, Ph.D.**

Microsporidia virulence factors exploit host  
cell physiology  
University of California-San Diego

**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

**Sing Sing Way, M.D., Ph.D.**

Maternal regulatory T cells control the immune  
pathogenesis of prenatal infection  
University of Cincinnati Children's Hospital  
Medical Center

**David S. Weiss, Ph.D.**

A novel RNAi-like system controls bacterial  
innate immune evasion and virulence.  
Emory University

**Robert T. Wheeler, Ph.D.**

Phagocytes block fungal dimorphism to defend  
the epithelial barrier  
University of Maine

**Felix Yarovinsky, M.D.**

TLR-independent host resistance to protozoan  
parasites  
University of Texas Southwestern Medical  
Center-Dallas

**Liang Zhou, M.D., Ph.D.**

Environmental impact on host-pathogen  
interaction  
Northwestern University

## Interfaces in Science

### CAREER AWARD AT THE SCIENTIFIC INTERFACE

**Dirk R. Albrecht, Ph.D.**

Investigating neural circuits governing chemotaxis using microtechnology  
Worcester Polytechnic Institute

**Ariana E. Anderson, Ph.D.**

It's All in Your Head: Isolating the Placebo Effect in the Brain to Reduce Drug Development Costs  
University of California-Los Angeles

**Buz M. Barstow, Ph.D.**

Evolving the limits of metabolism and *in vivo* catalysis  
Harvard Medical School

**Julie S. Biteen, Ph.D.**

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

**Paul C. Blainey, Ph.D.**

From single cells to populations: using microfluidics, genomics, and culture to better understand infectious disease in the post-genomic era  
Massachusetts Institute of Technology

**Gregory R. Bowman, Ph.D.**

Decrypting cryptic allosteric sites resulting from protein flexibility  
University of California-Berkeley

**ShiNung Ching, Ph.D.**

Towards treatments in disorders of consciousness and new models of general anesthesia  
Washington University

**Amit Choudhary, Ph.D.**

Snakes, antioxidants, and diabetes  
Broad Institute

**Kwanghun Chung, Ph.D.**

Clear, Lipid-exchanged, Anatomically Rigid, Imaging/immunostaining-compatible, Tissue hYdrogel (CLARITY) technology for high-throughput and high-content whole tissue analysis  
Massachusetts Institute of Technology

**L. Stirling Churchman, Ph.D.**

Regulation of the RNA polymerase motor mechanism *in vivo*  
Harvard Medical School

**Eva-Maria S. Collins, Ph.D.**

Biophysical approaches to study stem cell dynamics during regeneration in planarians  
University of California-San Diego

**Rhiju Das, Ph.D.**

High resolution prediction of new RNA folds  
Stanford University

**Shawn Michael Douglas, Ph.D.**

Self-assembled DNA devices for nanoscale manipulation of immune signal transduction  
University of California-San Francisco

**Alexander R Dunn, Ph.D.**

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

**Yaniv Erlich, Ph.D.**

Dissecting complex phenotypes using web 2.0 social networks  
Whitehead Institute for Biomedical Research

**Stephanie I. Fraley, Ph.D.**

Digitizing microRNA: integrated profiling and discovery for rapid, quantitative, and broad-scale detection in infectious disease  
Johns Hopkins University School of Medicine

**Surya Ganguli, Ph.D.**

Expression and acquisition of sequence memory in neuronal networks  
Stanford University

**Hernan G. Garcia, Ph.D.**

Wiring up the synthetic fly  
Princeton University

**Margaret L. Gardel, Ph.D.**

Dynamic force generation in cell migration  
University of Chicago

**Maria Neimark Geffen, Ph.D.**

Perception and neural encoding of textured sounds  
University of Pennsylvania Perelman School of Medicine

**Keisuke Goda, Ph.D.**

Development of high-throughput blood screening technology for real-time noninvasive cancer diagnostics and therapy  
University of California-Los Angeles

**Matthew C. Good, Ph.D.**

Cell size and shape dependence of intracellular assembly and signaling  
University of California-Berkeley

**Robert De Moss Gregg, IV, Ph.D.**

From machine to biomimetic control in robot-assisted walking  
University of Texas-Dallas

**Ming Hammond, Ph.D.**

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

**Christopher D. Harvey, Ph.D.**

Neural circuit mechanisms underlying decision-making in mice  
Harvard Medical School

**Maureen E. Hillenmeyer, Ph.D.**

*In vivo* synthetic evolution of bioactive natural products  
Stanford University

**Karen E. Kasza, Ph.D.**

Mechanical cues coordinating cell behaviors during morphogenesis  
Memorial Sloan-Kettering Cancer Center

**Harold D. Kim, Ph.D.**

Understanding the mechanisms of sensitivity in gene expression  
Georgia Institute of Technology

**Gavin M. King, Ph.D.**

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

**Allon Moshe Klein, Ph.D.**

Defining patterns and mechanisms of stem cell fate choice  
Harvard Medical School

**Mark A. Kramer, Ph.D.**

Population rhythms of epilepsy  
Boston University

**Sergey A. Kryazhimskiy, Ph.D.**

Predicting evolution in microbial populations  
Harvard University

**Heather J. Kulik, Ph.D.**

Deciphering the role of the protein scaffold in enzyme catalysis with fast and accurate computation  
Massachusetts Institute of Technology

**Gabriel A. Kwong, Ph.D.**

Nanoparticles that amplify biomarkers *in vivo* for ultrasensitive metastasis monitoring  
Massachusetts Institute of Technology

**Prashant Mali, Ph.D.**

Engineering normal and diseased liver organogenesis  
Harvard Medical School

**Nikhil S. Malvankar, Ph.D.**

Direct visualization of charge flow in individual native biomolecules  
University of Massachusetts-Amherst

**Elizabeth A. Nance, Ph.D.**

Nanoparticle-mediated targeted therapies for pediatric brain disorders  
Johns Hopkins University

**Lulu Qian, Ph.D.**

Exploring and re-realizing the principles of information processing in biology using artificial nucleic-acid systems  
California Institute of Technology

**Arjun Raj, Ph.D.**

Stochastic gene expression in development: from phenomena to function  
University of Pennsylvania

**Elizabeth Hesper Rego, Ph.D.**

Drug use on the single cell level: differential antibiotic susceptibility of mycobacterial cells using fluorescent reporters.  
Harvard School of Public Health

**Erin C. Rericha, Ph.D.**

Fluid flows in cell mechanosensitivity and cell motion  
Vanderbilt University

**Jason T. Ritt, Ph.D.**

Active sensing in natural and robotic organisms  
Boston University

**Michael J. Rust, Ph.D.**

Nonlinear dynamics underlying the cyanobacterial circadian clock  
University of Chicago

**Ramkumar Sabesan, Ph.D.**

Studying visual function on a cellular scale  
University of California-Berkeley

**Sridevi Vedula Sarma, Ph.D.**

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

**Mikhail G. Shapiro, Ph.D.**

Genetically encoded reporters for sensitive non-invasive imaging of biological function  
California Institute of Technology

**Paul A. Sigala, Ph.D.**

Mechanistic probes of heme metabolism in malaria parasites  
Washington University

**Jonathan Rodolfo Silva, Ph.D.**

Applying molecular spectroscopy to derive multi-scale cardiac bioelectricity models  
Washington University

**Jan M. Skotheim, Ph.D.**

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

**Kimberly Murley Stroka, Ph.D.**

Engineering blood-brain barrier mechanobiology in tumor metastasis  
Johns Hopkins University School of Medicine

**Michael D. Vahey, Ph.D.**

Uncovering the dynamics of enveloped virus assembly  
University of California-Berkeley School of Public Health

**Joshua Vaughan, Ph.D.**

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

**Daniel A. Wagenaar, Ph.D.**

Neural circuitry and mechanisms of multisensory integration in a predatory invertebrate  
University of Cincinnati

**Bo Wang, Ph.D.**

*In vivo* imaging and functional genomic analysis of stem cells in human parasitic worm schistosoma  
University of Illinois-Urbana-Champaign

**Heng Xu, Ph.D.**

Deciphering stochastic transcriptional regulation at the single-event level  
Baylor College of Medicine

**Ahmet Yildiz, Ph.D.**

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

**Jesse G. Zalatan, Ph.D.**

Entropic contributions to efficiency in biochemical networks  
University of California-San Francisco

**Xin Zhang, Ph.D.**

Scrutinizing the cellular and molecular mechanisms that create and maintain the functional proteome using chemical probes  
Scripps Research Institute

## INTERFACES SHORT COURSES

**David W. Tank, Ph.D.**

Neurotechnologies for Analysis of Neural Dynamics  
Princeton University

## Population and Laboratory Based Sciences

### INSTITUTIONAL PROGRAM UNIFYING POPULATION AND LABORATORY-BASED SCIENCES

**Eric Boerwinkle, Ph.D.**

Houston laboratory and population sciences training program in gene-environment interaction  
University of Texas-Houston Health Science Center

**Priya Duggal, Ph.D.**

MD-GEM: The Maryland Genetic, Epidemiology, and Medicine Training Program  
Johns Hopkins University Bloomberg School of Public Health

**Lindsay A. Farrer, Ph.D.**

Boston University's Transformative Training Program in Addiction Science (TTPAS)  
Boston University

**Paul R. Marantz, M.D., M.P.H.**

Education Connecting Laboratory Investigation and Population Science at Einstein (eCLIPSE)  
Albert Einstein College of Medicine of Yeshiva University

**Beate R. Ritz, M.D., Ph.D.**

Burroughs Wellcome Fund Chronic Diseases Inter-school Training Program (BWF-CHIP)  
University of California-Los Angeles

# Regulatory Science

## INNOVATION IN REGULATORY SCIENCE AWARDS

**Brian M. Alexander, M.D.**

Development of a Biomarker Enriched Adaptive Trial for Patients with Glioblastoma  
Dana Farber Cancer Institute

**Randolph S. Ashton, Ph.D.**

Organoid Microarrays for pan-Hindbrain and Spinal Cord Screening  
University of Wisconsin-Madison

**James Matthew Brennan, M.D.**

Administrative Claims-based Efficiencies for the Advancement of Regulatory Sciences  
Duke University Medical Center

**Mark E. Burkard, M.D., Ph.D.**

A chemical-genetic library of human cell lines for evaluating pharmacologic inhibition of protein kinases  
University of Wisconsin

**Dana V. Devine, Ph.D.**

Refreshing the regulatory approach to ensuring the safety and efficacy of blood transfusion products  
Canadian Blood Services

**Kathleen M. Giacomini, Ph.D.**

Systems pharmacology approaches to understanding drug-induced weight gain  
University of California-San Francisco

**Alison Hege Harrill, Ph.D.**

Advancing regulatory science through translational pharmacogenomics  
University of Arkansas for Medical Sciences

**Mary R. L'Abbe, Ph.D.**

Evaluation of nutrient profiling methods for nutrition regulation  
University of Toronto

**Calum Archibald MacRae, M.B. Ch.B., Ph.D.**

Building structure-related prediction algorithms for organ-specific drug toxicity through iterative modeling in novel zebrafish reporter lines  
Brigham and Women's Hospital, Inc.

**Vishal S. Vaidya, Ph.D.**

Mapping the biology of a damaged kidney cell  
Brigham and Women's Hospital

**Susan Webb Yackee, Ph.D.**

When politics intrudes on science: regulatory policymaking at the FDA  
University of Wisconsin-Madison

## Reproductive Science

### PRETERM BIRTH INITIATIVE

**Kjersti M. Aagaard-Tillery, M.D., Ph.D.**

Contributions of maternal-fetal mitochondrial genome and microbiome interactions to preterm birth  
Baylor College of Medicine

**Julie Baker, Ph.D.**

Genomic networks that guide trophoblast invasion and disease  
Stanford University

**Trevor D. Burt, M.D.**

Fetal immune activation and lineage switching in preterm labor  
University of California-San Francisco

**Kang Chen, Ph.D.**

The functions of B cells in pregnancy and the pathogenesis of preterm birth  
Wayne State University

**Claire Chougnnet, Ph.D.**

Host-microbe cross-talk and pregnancy outcomes  
University of Cincinnati

**David N. Cornfield, M.D.**

Myometrial smooth muscle cell TRPV channel activity modulates contractility  
Stanford University School of Medicine

**Francesco J. DeMayo, Ph.D.**

Progesterone receptor regulation of gravid myometrium  
Baylor College of Medicine

**Amanda L. Lewis, Ph.D.**

Mucus barrier degradation in bacterial vaginosis-associated preterm birth  
Washington University

**Stephen Lye, Ph.D.**

Targeting leukocyte activation to prevent preterm labor  
University of Toronto

**Vincent Joseph Lynch, Ph.D.**

Evolutionary forward genomic insights into the casual mechanisms of preterm birth  
University of Chicago

**Mala S. Mahendroo, Ph.D.**

Assessment of cervical ripening by sodium magnetic resonance imaging  
University of Texas Southwestern Medical Center-Dallas

**Jeffrey C. Murray, M.D.**

Genomic signatures of gene expression and alternative splicing in preterm birth  
University of Iowa

**Indira Mysorekar, Ph.D.**

Occult infections in the etiology of preterm birth  
Washington University School of Medicine

**Katharina Ribbeck, D.Phil., Ph.D.**

Properties and functions of cervical mucus associated with preterm birth  
Massachusetts Institute of Technology

**George Scott Worthen, M.D.**

Genetics of preterm birth  
University of Pennsylvania



# Science Education

## CAREER AWARD FOR SCIENCE AND MATHEMATICS TEACHERS

### Wendy Elizabeth Bartlett

Winston-Salem Forsyth County Schools

### Michelle Wendy Beard

Alleghany County Schools

### Michael J. Bowman, Ed.D.

Buncombe County Schools

### Kimberly Clark

Buncombe County Schools

### Michelle Ellis

Gaston County Public Schools

### Gregory Scott Fisher

Winston-Salem Forsyth County Schools

### Christopher Shannon Fisher

Charlotte/Mecklenburg Schools

### William Hendrickson

Pitt County Schools

### Heather M. Kaiser

Cumberland County Schools

### Sonja Celene Fischer McKay

Exploris Middle School

### Stuart Thomas Miles

Evergreen Community Charter School

### Amanda Northrup

Haywood County Schools

### Tamica Stubbs

Charlotte/Mecklenburg Schools

### David Christopher Taylor

Charlotte/Mecklenburg Schools

### Claudia Isabel Walker

Guilford County Schools

### Jennifer Williams

Transylvania County Schools

## PRISM AWARD

### Aebeyo K. Abraha

From Hands on to Minds on

Ben L. Smith High School

### Nicholas Anders

Aquaculture

Southern Alamance High School

### Margaret M. Atuk

Weather Wonder and Research

South Toe Elementary School

### Evelyn Baldwin

Wake North Carolina State University Science

Technology Engineering and Math Early

College High

### Carla M. Billups

Bringing STEM to the Valley

Jonathan Valley Elementary

### Katheryn A. Cooper

Investigations of Human Impacts on

Environmental Conditions in North Carolina

Biomes

Early College at Guilford

### Karen B. Curry

Aquatic biodiversity indicators

East Wake Middle

### Michael F. Czysz, III

Developing Electronics Proficiency in

High School Students

Roxboro Community School

### Lora M. DeWalt

Changing Matter and Changing Science

Forest View Elementary School

### Mary A. Ferguson

Operation STEM lab

Patriots STEM Elementary School

### Jill B. Francis

Visualizing Biotech Applications

Chase High School

### Debra B. Gallagher

Comparative Anatomy

Harold Winkler Middle School

### Carol Renee Gilpin

Common Core and Robots for Fourth Grade

Students

Morehead City Elementary

### Whitney H. Godfrey

iPad Microscopes Bring Engineering to Life

River Gate Elementary

### Steven Grindstaff

Illuminating Light

Burnsville Elementary School

### NC Haischer

Investigating Environmental Health and

Concerns

Durham School of the Arts

### Katie Hartsell

Angier Elementary Gets Bitten by The WeatherBug

Angier Elementary School

### Ellen N. Hefner

Teaching Chemistry with probware

Robert B. Glenn High School

### Margaret Mary Hershey-Mason

Learning K-2 Math Skills Through Whole-Body

Movement

Davidson Elementary School

### Michael Wayne Holleman

Schools Going Solar

North Wilkes Middle School

### Leslie Guyer Hooper

Who Did It?

Surry Central High School

### Lauren N. Houchins

Watching Future Leaders Blossom ... One

STEM at a Time

Loyd Auman Elementary School

**Denise K. Humphries**

Project SMILE (Science & Math Investigations for Learning Everyday)  
Chinquapin Elementary School

**Kelly R. Johnson**

BHT's LEGO League  
BH Tharrington Primary

**Ruth Kiser**

Move and Measure in Science  
Mountain View Elementary School

**Frank J. Kowalczyk**

Real World Water Quality Data Gathering and Analysis of Leeper Creek with Wireless Digital Vernier Technology  
East Lincoln Middle School

**Jeffrey P. LaCrosse, Ph.D.**

Rocketry and Electronics in the Classroom  
Charles E. Jordan High School

**Jacquelyn M. Lane**

We Do STEM: Science, Technology, Engineering, and Math  
Jackson Park Elementary

**Korey L. Lawlis**

Scientist Explorer Packs  
Gatesville Elementary School

**Jamie L. Mabry, II**

Concord Weather Alert Team  
Concord Middle School

**Susette S. McConnell**

Hands on Fun With Weather and Ecosystems!  
Crosscreek Charter School

**Juliette A. McCoy**

Attention Grabbing Math  
Lewis Chapel Middle School

**Lindsay P. McEntire**

Number Sense Science  
Oakley Elementary School

**Mason N. Midkiff**

Anatomy in Action  
Surry Central High School

**Tracy Miller**

From The Ground Up  
Metrolina Regional Scholars Academy

**Rebecca Morford**

Building a Foundation  
Viewmont Elementary School

**Nicolette J. Morgan**

Strategies That Engage Minds Robotics Project  
Contentnea-Savannah STEM School

**Tracy Neal**

Enhancing Biotechnology at Toisnot  
Toisnot Middle School

**Amanda C. Parfitt**

Our Mission Githens Starfish Helping Hands  
Sherwood Githens Middle School

**Danielle A. Parker**

Catching the Connection: Trout In An Earth Science Classroom  
Madison High School

**Misty L. Parris**

Taking Science to a New Level: Enhancing Instruction with Inquiry Kits  
Elm City Elementary School

**Pamela S. Pate**

Pate, Pamela, E.B. Frink Middle School  
E.B. Frink Middle School

**Jean M. Pelezo**

STEM Iron Scientist  
New Century International Middle School

**Mark A. Petersen**

Bringing the SSHS Physics Lab into the 21st Century  
Smithfield-Selma High School

**Justyn F. Phelps**

Biotechnology Lab Equipment, Supplies and Training  
JF Webb High School of Health and Life Sciences

**Tinika T. Pierce**

Pender County Water Pollution Assessment  
Pender Early College High School

**Jared A. Pinkston**

Student Focused Inquiry with Probeware  
Pender High School

**Kelly N. Pipes**

Who Says? Scientific Inquiry Made Real  
West Wilkes Middle School

**Sarah C. Reid**

Malaria Curriculum  
Research Triangle High School

**Morina F. Ricablanca**

STEM for 6th Graders and Science Olympiad Varsity Team  
East Hoke Middle School

**Jodi S. Riedel**

High Hopes with High Tunnel Horticulture  
Wakefield High School

**Kelly Jason Ruff**

East Burke High School

**Shana M. Runge**

NC 6th Essential Standards Energy Kit  
Shelby Intermediate School

**Elizabeth Anne Schriver**

DISCOVER Lab  
Knollwood Elementary

**Aaron Sebens**

Wind Powered Classroom, Making Our Classroom Run On Alternative Energy  
Central Park School for Children

**Emily M. Sobul**

Spy Living Organisms  
Banks Elementary

**Janet B. Spinks**

Motivating & Engaging Students during Investigations with Data-Collection Technology  
Bunker Hill High School

**Chantal Vinson**

Campus Waste Management  
Mountain Island Charter School

**Claudia Isabel Walker**

Fitness Counts at Murphey  
Murphey Traditional Academy

**Jennifer L. Walmsley**

Project GREEN  
Contentnea-Savannah STEM School

**Peggy D. Weinhoeft Renfro**

Sun Stewards Outreach Program  
Douglas Byrd High School

**Kristie Wikane**

Project Based Learning Unit: School Yard  
Habitat  
Rockingham Middle School

**Caroline B. Wilson**

Literacy and Science and Exploration, Oh My  
Wayne Avenue Elementary School

**Christy L. Wilson**

Wilson, Christy, Ben D. Quinn Elementary,  
Club STEM  
Ben D. Quinn Elementary School

## STUDENT SCIENCE ENRICHMENT PROGRAM

**Joan Barber**

Step Up to STEM  
North Carolina School of Science and  
Mathematics Foundation

**Ronny Bell, Ph.D.**

Cherokee MedCaT Academy Medical Career  
and Technology: Enriched Student Experiences  
in Health Careers  
Wake Forest University

**Laura J. Bottomley, Ph.D.**

The Engineering Place  
North Carolina State University

**Carol Bumgarner**

Aventuras de Ciencia (Adventures in Science)  
Webb A. Murray Elementary School

**JoAnn M. Burkholder, Ph.D.**

The North Carolina Floating Classroom  
North Carolina State University

**Linda Cagley**

Summer Science Experience - Sixth Grade  
Science Sleuths and Ten80 PLUS  
Foundation of the Carolinas

**Robert Corbin, Ph.D.**

After-School STEM Enrichment Program  
Discovery Place Inc.

**Renata Sabine Crawley**

Project Wild Thing  
West Marion Elementary School

**Paul R. Domenico**

STEM Extensions  
Wake County Public School System

**Elizabeth Ann Driscoll**

Project PLANTS: Planting Leaders in  
Agriculture and Nature Through Science  
North Carolina State University

**Hardin Engelhardt**

Marbles STEM Play Corps  
Marbles Kids Museum

**Dane Fisher, Ph.D.**

PROJECT GENES: Genetics Education for the  
Next Era of Science  
Pfeiffer University

**Bette P. Fitzgerald**

Cherokee Middle School - Cherokee Science  
Investigation - Medical Mania  
Cherokee Boys Club, Inc.

**Patricia Gray**

UBEATS: A BioMusic STEM Intervention for  
ESL Students in Guilford County  
University of North Carolina-Greensboro

**Dana Brown Haine**

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

**Shannon Harrison**

Collaborative STEM Initiative (CSI)  
Boys & Girls Clubs of Wake County

**Tracy Lonzie Lee Holbrook**

CT-RISE: Chem-Techathon: Renewing Interest  
in Science Education  
Cape Fear Community College Foundation, Inc.

**Anthony Kennedy, Ph.D.**

Increasing participation and proficiency in  
science at grade 5 through inquiry based learning  
East Carolina University

**Matthew Damon Koci**

Authentic learning as a means to promote  
student enthusiasm for science careers by  
establishing a model biotechnology company  
in a rural Tier 1 high school  
North Carolina State University

**Stephanie Luster-Teasley, Ph.D.**

Case Studies in the Sciences and Engineering  
Enrichment Laboratories Program  
North Carolina A&T State University

**Holly Minnear**

Sensational STEM Project  
Burke County Public Schools

**Jason Lawrence Painter**

Coastal Inquirers  
North Carolina State University College of  
Sciences Foundation

**Robert M. Panoff, Ph.D.**

Computing MATTERS: Nurturing the Seedlings  
of SUCCEED  
Shodor Education Foundation Inc.

**Norma Pattillo**

Project Endeavor  
Swain County High School

**LuAnne Pendergraff**

Dragonfly Detectives: Introducing Children to  
Citizen Science  
Friends of the North Carolina State Museum of  
Natural Sciences

**Kate Pett**

Bug Campers and Stargazers: Expanding the  
Science Capacity of In Real Life  
Asheville City Schools Foundation

**Alvin D. Powell**

Youth Career and STEM Enrichment Program  
Using Aviation and Robotics  
Beaufort County Police Activities League, Inc.

**Dorothea K. Shuman, Ph.D.**

Hiking MYLES of Science  
Montreat College

**Jeanne Erickson Smith**

B-3 Summer Research and Science  
Saturday Program  
Charlotte/Mecklenburg Schools

**Liz Stabenow**

iWalk the Eno II and Outdoor Science Labs:  
Year-round Science, Engineering, and  
Nature Inquiries  
Eno River Association

**Adrienne D. Stiff-Roberts, Ph.D.**

Student Engineers Network: Strengthening  
Opportunities in Research (SENSOR)  
Saturday Academy  
Duke University

**Katie Stoudemire**

Healing and Hope Through Science  
University of North Carolina-Chapel Hill

**Terry M. Tomasek**

Let's Move! Elon Academy  
Elon University

**Christi Jo Whitworth**

3D Planets  
Pisgah Astronomical Research Institute

**Avis Williams**

GCS: Building Robotics!  
Guilford County Schools

**Linda Mayo Willis, Ph.D.**

STEM 4 ME! Academy  
Hyde County Schools

# Translational Research

## CLINICAL SCIENTIST AWARD IN TRANSLATIONAL RESEARCH

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

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

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

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

### **Laurence J. 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

### **Michael R. DeBaun, M.D.**

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

### **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  
University of Pennsylvania Perelman School of Medicine

### **S. Ananth Karumanchi, M.D.**

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

### **Francis Lee, M.D., Ph.D.**

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

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

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

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

Maternal nutrition and fetal metabolic programming  
Oregon Health and Science University

### **Ari M. Melnick, M.D.**

Differentiation therapy for B-cell lymphomas  
Weill Cornell Medical College

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

Pathogenesis and diagnosis of clinically-indolent prostate cancer  
Stanford University

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

Abnormal HIP1 and cancer biology  
University of Texas Southwestern Medical Center-Dallas

### **Pradeep Singh, M.D.**

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

### **Jeffrey A. Toretsky, M.D.**

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

### **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

### **Kang Zhang, M.D., Ph.D.**

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

# Ad Hoc

## BIOMEDICAL SCIENCES

### *Career Development of Postdoctoral Scientists*

#### **American Society for Cell Biology**

Support for the Minorities Affairs Committee (MAC) activities at the annual meeting

#### **American Society for Cell Biology**

Support for the Women in Cell Biology (WICB) career discussion and mentoring roundtables at the annual meeting

#### **Association for Clinical and Translational Science**

Support for the 2014 annual meeting

#### **Carnegie Mellon University**

Support for the Statistical Analysis of Neural Data (SAND7) conference

#### **Cold Spring Harbor Laboratory**

Support for faculty travel support to the summer course: Imaging structure & function in the nervous system

#### **Federation of American Societies for Experimental Biology**

Support for summer conference: Machine on Genes

#### **Marine Biological Laboratory**

Support for the Embryology: Concepts & Techniques in Modern Developmental Biology course

#### **Research!America**

Support for the Internship Program 2012-2017

#### **Society for Neuroscience**

Support for the professional development committee postdoctoral travel awards to the annual meeting

#### **University of Colorado-Boulder**

Support for the 2015 Single Molecule Biophysics Workshop

#### **University of North Carolina-Chapel Hill School of Medicine**

Support for a first annual one-day regional symposium focused on providing women Ph.D./M.D. students with career development skills and networking opportunities

## Medical Sciences

#### **American Physician Scientists**

Support for the annual meeting and unrestricted funds

#### **American Society for Clinical Investigation/Association of American Physicians**

Support for the 2014 joint meeting

#### **Baylor College of Medicine**

Support for the Alexander R. Matzuk 2014-2015 speaker series in lieu of honorarium for CAMS advisory member Martin M. Matzuk, M.D., Ph.D.

#### **Clinician Investigator Trainee Association of Canada**

Support for the annual meeting

#### **Stanford University**

Support for a symposium in honor of Professor W. James Nelson

#### **University of North Carolina-Chapel Hill**

Lineberger Comprehensive Cancer Center Support for the annual symposium

## Reproductive Science

#### **Gordon Research Conferences**

Support for the 2014 Gordon Research Conference on mammalian reproduction

#### **Marine Biological Laboratory**

Support for the 2013-2015 sessions of the Frontiers in Reproduction course

#### **Marine Biological Laboratory**

Support for the annual FIR symposium

#### **Marine Biological Laboratory**

Support for the FIR course evaluation

#### **Society for Gynecologic Investigation**

Support for the annual meeting

#### **Society for the Study of Reproduction**

Support for diversity committee activities at the annual meeting

#### **The Endocrine Society**

Support of FIR travel awards to joint ICE/ENDO meeting

#### **Washington University**

Support for the 2013 RSDP scholar's annual research conference/retreat and SGI symposium

#### **Washington University**

Support to establish a seed grant program for current RSDP scholars

#### **Washington University School of Medicine**

Support for the final year of Phase II for RSDP junior faculty scholar Natak Douglas, M.D., Ph.D.

#### **Washington University School of Medicine**

Support for years one and two of Phase II for RSDP junior faculty scholar Mark Santillan, M.D.

## INFECTIOUS DISEASES

### *Infectious Diseases - General*

#### **American Society for Microbiology**

Support for the Kadner Institute for Graduate Students and Postdoctoral Scientists in Preparation for Careers in Microbiology and the ASM Scientific Writing and Publishing Institute

#### **American Society for Microbiology**

Support for the 12th Conference on Candida and Candidiasis

#### **American Society for Microbiology**

Support for the 2014 Beneficial Microbes meeting

#### **American Society for Microbiology**

Support for conference on Polymicrobial Infections

#### **American Society of Tropical Medicine and Hygiene**

Support for the annual meeting

#### **American Society of Tropical Medicine and Hygiene**

Support for the Burroughs Wellcome Fund/ American Society of Tropical Medicine and Hygiene Fellowship for three years 2014-2017

#### **American Society of Tropical Medicine and Hygiene**

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

**Anaerobe Society of the Americas**

Support for the 12th Biennial Congress of the Anaerobe Society of the Americas (ASA)  
ANAEROBE

**Association for Women in Science**

Support for renewal of Burroughs Wellcome Fund's Association for Women in Science partnership dues

**Baylor College of Medicine**

Support for PATH awardee, Neal Alto, to present a seminar at Baylor College of Medicine

**Cornell University College of Veterinary Medicine**

Support for the annual Merial-NIH Veterinary Scholars Symposium

**Cornell University College of Veterinary Medicine**

Support for the 'Becoming Faculty: a short course on launching a scientific career' held in conjunction of the annual Merial-NIH Veterinary Scholars Symposium

**Emory University School of Medicine**

Support for PATH awardee, Miriam Braunstein, to present a seminar at Emory University

**Emory University School of Medicine**

Support for PATH awardee, David Weiss, to present a seminar at the National Institutes of Health

**Gordon Research Conferences**

Support for the 2014 Cellular and Molecular Fungal Biology Gordon Research Conference

**Gordon Research Conferences**

Support for the Gordon Research Conference "Microbial Pathogenesis: Mechanisms of Infectious Disease" and its companion Gordon Research Seminar "New Approaches to Understand the Host-Pathogen Dynamic"

**Gordon Research Conferences**

Support for the Gordon Research Conference "Biology of Host Parasite Interactions"

**Grants Managers Network**

Support for Grants Managers Network dues

**Harvard School of Public Health**

Support for the convening of "Plasmodium falciparum in the Human Bone Marrow: The Malaria Headquarters"

**International Conference on Cryptococcus and Cryptococcosis**

Support for the conference

**Laval University**

Support for a workshop "RNA Regulatory Pathways in Protozoa Parasites" during the annual meeting of the RNA Society

**Northwestern University Feinberg School of Medicine**

Support for PATH awardee, Neal Alto, to present a seminar

**Scripps Research Institute**

Support for PATH awardee, Julie Pfeiffer, to present a seminar

**Sociedad Mexicana de Parasitologia A.C.**

Support for the International Congress of Parasitology meeting

**Stanford University School of Medicine**

Support for PATH awardee, Benjamin tenOever, to present a seminar

**Stanford University School of Medicine**

Support for PATH awardee, Carolyn Coyne, to present a seminar

**Texas A&M University**

Support for PATH awardee, Richard Bennett of Brown University, to present a seminar

**Tufts University School of Medicine**

Support for PATH awardee, Felix Yarovinsky, to present a seminar

**Tufts University School of Medicine**

Support for PATH awardee, Liang Zhou, to present a

**Tufts University School of Medicine**

Support for PATH awardee, Erica Saphire, Ph.D., to present a seminar

**University of California-San Diego**

Support for Jason Stajich to present a seminar

**University of California-San Diego**

Support for the Burroughs Wellcome Travel Award for postdoc exchange involving research across the spectrum of roundworm and flatworm biology and pathology

**University of Georgia**

Support for a symposium "Anthelmintics: from discovery to resistance

**University of Georgia**

Support for the development of a 'kinetoplastid visiting scholars program to encourage exchange interactions with laboratories in other fields

**University of Illinois-Chicago**

Support for the annual Midwest Microbial Pathogenesis

**University of Minnesota College of Veterinary Medicine**

Support for the BWF/HHMI partnership veterinary student training program fellow Katie Anderson

**University of Nebraska Medical Center**

Support for the annual conference on Gram-Positive Pathogens

**University of North Carolina-Chapel Hill**

Support for the BWF/HHMI partnership veterinary student training program, Fellow Lauren Griggs

**University of North Carolina-Chapel Hill**

Support for PATH awardee, Sean Whelan, to present a seminar

**University of North Carolina-Chapel Hill**

Support for PATH awardee, Ekaterina Heldwein, to present a seminar

**University of North Carolina-Chapel Hill**

Support for PATH awardee, Jonathan Kagan, to present a seminar

**University of North Carolina-Chapel Hill**

Support for PATH awardee, Michael Federle, to present a seminar

**University of Notre Dame**

Support for PATH awardee, Michael Federle, to present a seminar



**University of Notre Dame**

Support for the Midwest Neglected Infectious Diseases meeting

**University of Pennsylvania**

Support for the 2014 EuPathDB workshop

**University of Texas Health Science Center-Houston**

Support for PATH awardee, David Aronoff, to present a seminar Health Science

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH awardee, Karla Satchell, to present a seminar

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH awardee, Raphael Valdivia, to present a seminar

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH awardee, Borden Lacy, to present a seminar

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH awardee, Sean Whelan, to present a seminar

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH awardee, Barbara Kazmierczak, to present a seminar

**University of Texas Southwestern Medical Center-Dallas**

Support for PATH Advisory Committee member, David Russell, to present a seminar

**University of Waterloo**

Support for the annual Canadian Association of Postdoctoral Administrators meeting

**Vanderbilt University School of Medicine**

Support for the 16th International Congress of Virology

**Wake Forest University School of Medicine**

Support for the Mid-Atlantic Microbial Pathogenesis Meeting

**Washington University School of Medicine**

Support for the 2014 Molecular and Cellular Biology of Helminth Parasites conference

**Washington University School of Medicine**

Support for the Helminth Genomics and Bioinformatics Workshop

**Wellcome Trust Sanger Institute**

Support for the Genomic Epidemiology of Malaria (GEM)

**Yale University School of Medicine**

Support for a BWF-related individual to present a seminar

**INTERFACES IN SCIENCE**

**American Society for Cell Biology**

Support for an Interdisciplinary Session

**Biophysical Society**

Support for the "Future of Biophysics Burroughs Wellcome Fund Symposium", the Postdoctoral Breakfast Meeting, the Graduate Student Breakfast Meeting and Postdoc Travel Awards

**Clinical Pharmacology and Therapeutic**

Support for a one-day introductory course in Pharmacoeconomics

**Computational and Systems Neuroscience**

Support for the annual meeting, including a workshop highlighting the work of young scientists conducting interface research, and travel awards to the meeting

**Georgia Institute of Technology**

Support for speakers for Dynamics Days 2014

**Georgia Tech Research Corporation**

Support for Dynamic Days

**Gordon Research Conferences**

Support for Single Molecule Approaches to Biology Conference

**International Society for Cellular Therapy**

Support for the annual meeting

**International Society for Stem Cell Research**

Support for the Plenary session, Bioengineering at the annual meeting

**Marine Biological Laboratory**

Support for students to continue collaborating with the course faculty at their home institutions and following the physiology course

**Marine Biological Laboratory**

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

**New York Stem Cell Foundation**

Support for an internship

**Society for Biomaterials**

Support for the annual meeting

**POPULATION AND LABORATORY BASED SCIENCES**

**Gordon Research Conferences**

Support for the 2014 Gordon Research Conference on DNA damage, mutation, and cancer: Choices and crosstalk between alternative pathways

**Society of Toxicology**

Support for the annual meeting

**REGULATORY SCIENCE**

**National Academy of Sciences/Institute of**

Support for Strategies for Responsible Sharing of Clinical Trial Data: Guiding Principles and a Framework for Implementation.

**National Academy of Sciences/Institute of Medicine**

General Support

**Termis-Americas**

Support for the 2014 TERMIS-AM IC's one-day event

**University of California-San Diego**

Support of Clinical Trial Site Leadership for establishment of the Partnership to Accelerate Clinical Trials

## SCIENCE EDUCATION

### *General Education Grant*

#### **Grantmakers for Education**

Support for 2014

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

General support for 2014-15

#### **North Carolina Department of Public Instruction**

Support for the Teacher of the Year program

#### **Public School Forum of North Carolina**

Support for the Institute for Educational  
Policymakers

#### **Public School Forum of North Carolina**

Support for leadership event to acknowledge  
50 Years of education excellence

#### **Southern Illinois University Foundation**

Support for the Dr. Willie Pearson, Jr.  
Academic Excellence Fund, in lieu of  
honoraryarium

### *Science Education*

#### **Bladen County Schools**

Singapore Math Pilot

#### **Cumberland County Schools**

Cumberland County Schools' Singapore  
Math Pilot Project at Gallberry Farm  
Elementary School

#### **Envision Excellence In Stem Education**

Support for the STEM Funders Network 2013

#### **Envision Excellence In Stem Education**

Support for a convocation with the California  
Teachers Advisory Council

#### **Foundation Center**

Support for 2013

#### **Friends of the North Carolina State Museum of Natural Sciences**

Support for the Association of Science  
Technology Centers conference

#### **Guilford County Schools**

Singapore Math Pilot at Murphey Traditional  
Academy

#### **McDowell County Schools**

Building a Strong Math Foundation Through  
Constructing, Drawing, and Solving, a  
proposal by Eastfield Global Magnet School

#### **Morehead Planetarium and Science Center**

Support for the 2014 Science Festival

#### **Morehead Planetarium and Science Center**

Support for the #ScienceFail event

#### **Morehead Planetarium and Science Center**

Support for events for the 2015 Science  
Festival

#### **National Association of Academies of Science**

Support for the American Junior Academy of  
Science Breakfast with Scientists

#### **North Carolina Association for Biomedical Research**

Bridging the Gap: Uniting North Carolina K-16  
STEM Education

#### **North Carolina New Schools Project**

Support for Economically Themed Schools

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

Support for the Student Academy of Science  
students to participate in the American Junior  
Academy of Science/AAAS meetings

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

Singapore International Mathematics Challenge  
2014

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

Summer Leadership and Research Experience  
2014

#### **North Carolina Science Teachers Association**

Support for the National Science Teachers  
Association regional meeting and a session of  
Next Generation Science  
Standards

#### **North Carolina Society of Hispanic Professionals**

Support for the 2014 Celebrate Education event  
commemorating the 15th anniversary of the  
organization

#### **Public School Forum of North Carolina**

Support for the Institute for Educational  
Policymakers and the International Studies  
program

#### **Research Triangle Park High School**

Support for the US2020 Coalition at Research  
Triangle Park

#### **University of North Carolina General Administration**

Support Science Education "Fast Track"  
Initiative

#### **University of North Carolina-Chapel Hill**

Support for the Chancellor's Science Scholars  
Program and the STEM Summer Bridge  
program

#### **University of North Carolina-Chapel Hill**

Support for North Carolina DNA Day 2014

#### **University of North Carolina-Chapel Hill School of Education**

Continued support for the CASMT Evaluation

#### **Wilkes County Schools**

Singapore Math Project - North Wilkesboro  
Elementary School

### *Science, Math, and Technology Science Champion*

#### **Cabarrus County Schools**

Support for the i3 INSPIRE (Infusing Innovative  
STEM Practices Into Rigorous Education)  
initiative

#### **Contentnea-Savannah STEM School**

Lenoir County Project with Contentnea-  
Savannah K-8 School and STEM East

#### **Development Foundation of the North Carolina Center for the Advancement of Teaching**

Support for the Western North Carolina P-16  
Education Consortium

**James B. Hunt Jr. Institute for Educational Leadership and Policy**

Support for efforts to support the Common Core Math Standards and the Next Generation Science Standards

**North Carolina Association of School Administrators**

Support for the Next Generation Superintendents' Development Program

**North Carolina Chamber**

Support for the annual Education Summit

**North Carolina Chamber Foundation**

Support for the North Carolina Conference on Education

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

Support for the North Carolina Student Academy of Science for 2015 meeting

**North Carolina Science Fair Foundation**

Support for the 2014 Science and Engineering

**North Carolina Science Leadership Association**

Continued support for the Science Leadership Fellows Program

**North Carolina State University**

Support for the STEM Scorecard

**North Carolina State University**

Support for the Distinguished Leadership in Practice-Digital Learning program, as well as for the workshop titled "Addressing Today's Challenges within the Context of Emerging Trends"

**Professional Engineers of North Carolina Education Foundation**

Support for the Future City Competition

**Public School Forum of North Carolina**

Support for the travel of North Carolina students to the Beijing Youth Science Creation Competition

**SCIENCE AND PHILANTHROPY**

*Communications/Science Writing*

**American Association for the Advancement of Science**

2014 AAAS Mass Media Science & Engineering Fellows Program

**American Institute of Biological Sciences**

Support for the COPUS network

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

Support for the collaborative communications training program

**Open Notebook**

Support for the TON Fellows

**ScienceOnline**

Support for the development of a collaborative effort with the Science Communicators of North Carolina

**ScienceOnline**

Support for ScienceOnline Together2014

**Tides Center**

Scaling Up Communications Training for STEM Graduate Students

*General Philanthropy*

**Council on Foundations**

General support

**Health Research Alliance**

General support

**Marine Biological Laboratory**

Support for educational activities

**McGill University**

Support for the Distinguished Lecture Series, directed by BWF Board Member, Roderick R. McInnes, CM, M.D., Ph.D., FRSC

**National Academies**

Support for the Roundtable on Public Interfaces of the Life Sciences

**Society for the Advancement of Chicanos and Native Americans in Science**

General support for 2014-2015, in lieu of honorarium for Clifton Poodry, Ph.D.

**Triangle Community Foundation**

Support for the Founder's Day Celebration

**University of Iowa Foundation**

Support for medical research activities at the University of Iowa, directed by BWF Board Member, Michael Welsh, M.D.

*Science Policy*

**Aspen Cancer Conference, Inc.**

Support for the annual Aspen Cancer Conference

**Reinvestment Partners**

Support for the RTP Global Innovation Leaders Series and the visit of Dr. Kongkiat Kespechara, in collaboration with the Eisenhower Fellowships NC Alumni Network

*Special Award*

**Eisenhower Exchange Fellowships**

Support for the Eisenhower Exchange Fellowships to provide support for the 2014 USA Fellow, David W. Callaway, M.D.

**Massachusetts General Hospital**

Support for the research of Patrick L. Purdon and his research on the neuroscience of sleep and general anesthesia

**National Academies**

Support for a National Research Council Study on Genetically-Engineered Crops: Past Experience and Future Prospects

**Universidad Peruana Cayetano Heredia**

Continued support for the laboratory of Dr. Giraldez

**Washington University**

Support for the David M. Kipnis and Paula L. Kipnis Endowed Professorship

# Advisory Committees

*The Burroughs Wellcome Fund uses advisory committees for each competitive award program to review grant applications and make recommendations to BWF's Board of Directors, which makes the final decisions. We select members of these committees for their scientific and educational expertise in the program areas. In addition, BWF uses a financial advisory committee to help in developing and reviewing the BWF's investment policies. This committee is appointed by and reports to the Board of Directors.*

## Biomedical Sciences

### CAREER AWARDS FOR MEDICAL SCIENTISTS

**Derek Abbott, M.D., Ph.D.**

Associate Professor, Department of Pathology  
Case Western Reserve University  
*BWF Career Awardee in the Biomedical Sciences - 2006*

**Jack Antel, M.D.**

Professor of Neurology and Neurosurgery  
McGill University

**Leslie J. Berg, Ph.D.**

Professor, Department of Pathology  
University of Massachusetts Medical School

**Paul Buckmaster, D.V.M., Ph.D.**

Professor  
Dept. of Comparative Medicine  
Stanford University

**Kathleen Caron, Ph.D.**

Professor of Cell Biology & Physiology and Genetics  
Chair, Dept. of Cell Biology & Physiology  
University of North Carolina-Chapel Hill  
*BWF Career Awardee in the Biomedical Sciences - 2001*

**Aravinda Chakravarti, Ph.D.**

Director, Center for Complex Disease Genomics  
McKusick - Nathans Institute of Genetic Medicine  
Johns Hopkins University School of Medicine

**Tamara L. Doering, M.D., Ph.D.**

Professor, Dept. of Molecular Microbiology  
Washington University School of Medicine  
*BWF Career Awardee in the Biomedical Sciences - 1996*

**H. Shelton Earp, III, M.D.**

Professor and Director, Lineberger Comprehensive Cancer Center  
University of North Carolina-Chapel Hill School of Medicine

**Sarah Hollingsworth Lisanby, M.D.**

Lawrence C. Katz Professor and Chair, Dept. of Psychiatry and Behavioral Sciences  
Professor, Dept. of Psychology & Neuroscience  
Duke University

**Kelsey C. Martin, M.D., Ph.D.**

Chair and Professor  
Dept. of Biological and Chemistry and Dept. of Psychiatry and Biobehavioral Sciences  
University of California-Los Angeles  
*BWF Career Awardee in the Biomedical Sciences - 1997*

**Martin M. Matzuk, M.D., Ph.D.**

Stuart A. Wallace Chair and Professor  
Dept. of Pathology and Molecular & Cellular Biology  
Baylor College of Medicine

**Elizabeth McNally, M.D., Ph.D.**

(Co-Chair)  
Elizabeth J Ward Chair and Director, Center for Genetic Medicine  
Northwestern University Feinberg School of Medicine  
*BWF Clinical Scientist Awardee in Translational Research - 2001*

**Louis J. Muglia, M.D., Ph.D.**

Co-Director, Perinatal Institute, Division of Neonatology  
University of Cincinnati Children's Hospital Medical Center  
Director, Center for Preterm Birth Research  
Professor, UC Dept. of Pediatrics  
*BWF Career Awardee in the Biomedical Sciences - 1995*

**Jeffrey A. Whitsett, M.D. (Co-Chair)**

Chief, Section of Neonatology, Perinatal and Pulmonary Biology  
University of Cincinnati Children's Hospital

**John York, Ph.D.**

Natalie Overall Warren Professor and Chair  
Dept. of Biochemistry  
Vanderbilt University Medical Center  
*BWF Career Awardee in the Biomedical Sciences - 1995*

### COLLABORATIVE RESEARCH TRAVEL GRANTS

**Matthew Redinbo, Ph.D.**

Professor and Chair, Department of Chemistry  
The University of North Carolina at Chapel Hill  
*BWF Career Awardee in the Biomedical Sciences - 1999*

**Keith Weninger, Ph.D.**

Associate Professor, Department of Physics  
North Carolina State University  
*BWF Career Awardee at the Scientific Interface - 2001*

**John York, Ph.D.**

Natalie Overall Warren Professor of Biochemistry  
Chair, Department of Biochemistry  
Vanderbilt University School of Medicine  
*BWF Career Awardee in Biomedical Sciences - 1995*

## Diversity in Science

### POSTDOCTORAL ENRICHMENT PROGRAM

**Jerry L. Bryant, Ph.D.**

Former Director, Science Education Initiatives  
United Negro College Fund

**Kami Kim, M.D.**

Professor  
Albert Einstein College of Medicine

**Lee Limbird, Ph.D.**

Professor of Biochemistry, Department of Life  
and Physical Sciences  
Dean, School of Natural Sciences, Mathematics,  
and Business  
Fisk University

**Clifton A. Poodry, Ph.D.**

Senior Fellow, Science Education  
Howard Hughes Medical Institute

**Charmaine Royal, Ph.D.**

Associate Professor, Institute for Genome  
Sciences and Policy  
Department of African and African American  
Studies  
Duke University

**Michael Summers, Ph.D. (Chair)**

HHMI Investigator Professor of Chemistry and  
Biochemistry  
University of Maryland, Baltimore County

## Infectious Diseases

### INVESTIGATORS IN THE PATHOGENESIS OF INFECTIOUS DISEASE

**John C. Boothroyd, Ph.D. (Chair)**

Professor of Microbiology and Immunology  
Stanford University

**Robert W. Doms, M.D., Ph.D.**

Chair of Microbiology  
University of Pennsylvania School of Medicine

**JoAnne L. Flynn, Ph.D.**

Professor of Microbiology and Molecular Genetics  
University of Pittsburgh School of Medicine

**Daniel E. Goldberg,  
M.D., Ph.D.**

Professor of Medicine and Co-chief, Division  
of Infectious Diseases  
Washington University School of Medicine

**Brigitte T. Huber, Ph.D.**

Professor of Pathology-Medical  
Tufts University School of Medicine

**Margaret Kielian, Ph.D.**

Professor of Cell Biology  
Albert Einstein College of Medicine of  
Yeshiva University

**Aron Lukacher, M.D., Ph.D.**

Professor of Microbiology and Immunology  
Penn State College of Medicine

**Aaron P. Mitchell, Ph.D.**

Professor of Biological Sciences

## Interfaces in Science

### CAREER AWARDS AT THE SCIENTIFIC INTERFACE

**Russ Altman, M.D., Ph.D.**

Professor of Bioengineering, Genetics and  
Medicine  
Director, Program in Biomedical Informatics  
Stanford University

**William Bialek, Ph.D.**

John Archibald Wheeler/Battelle Professor,  
Department of Physics  
Associate Director, Lewis-Sigler Institute for  
Integrative Genomics  
Princeton University

**Adrienne L. Fairhall, Ph.D.**

Associate Professor  
University of Washington  
Dept. of Physiology and Biophysics

**John Kuriyan, Ph.D.**

Investigator, Howard Hughes Medical Institute  
Chancellor's Professor  
Department of Molecular and Cell Biology  
Department of Chemistry  
University of California-Berkeley

**Cato T. Laurencin, M.D., Ph.D.**

University Professor  
Director, Institute for Regenerative Engineering  
& the Raymond and Beverly Sackler Center for  
Biomedical, Biological,  
Physical and Engineering Science  
University of Connecticut Health Center

**Alan S. Perelson, Ph.D. (Co-chair)**

Senior Fellow  
Los Alamos National Laboratory

**Rob Phillips, Ph.D. (Co-chair)**

Professor of Applied Physics and Bioengineering  
California Institute of Technology

**Bernardo L. Sabatini, M.D., Ph.D.**

Assistant Professor  
Harvard Medical School  
Dept. of Neurobiology

**Brent R. Stockwell, Ph.D.**

Associate Professor Biological Sciences and  
Chemistry  
Early Career Scientist of the Howard Hughes  
Medical Institute  
Columbia University

**Shankar Subramaniam, Ph.D.**

Joan and Irwin Jacobs Endowed Chair in  
Bioengineering and Systems Biology  
University of California-San Diego

**Julie A. Theriot, Ph.D.**

Associate Professor  
Department of Biochemistry  
Department of Microbiology and Immunology  
Stanford University School of Medicine

**Michelle D. Wang, Ph.D.**

Investigator, Howard Hughes Medical Institute  
Professor of Physics  
Cornell University

## Population and Laboratory Based Sciences

### INSTITUTIONAL PROGRAM UNIFYING POPULATION AND LABORATORY BASED SCIENCES

#### **Mark Boguski, M.D., Ph.D.**

Professor  
Beth Israel Deaconess Medical Center  
Harvard Medical School

#### **Pamela B. Davis, M.D., Ph.D.**

Dean  
Case Western Reserve University School of  
Medicine

#### **Timothy Hughes, Ph.D.**

Professor  
University of Toronto

#### **Mark Lathrop, Ph.D.**

Scientific Director  
McGill University and Genome Quebec  
Innovation Centre

#### **H. Steven Wiley, Ph.D.**

Director, Biomolecular Systems  
Pacific Northwest National Laboratories

#### **Lynn Zechiedrich, Ph.D.**

Associate Professor  
Baylor College of Medicine

## Regulatory Science

### INNOVATION IN REGULATORY SCIENCE

#### **Darrell Abernethy, M.D., Ph.D.**

Associate Director for Drug Safety  
Official of Clinical Pharmacology  
Food and Drug Administration  
Professor of Medicine and Pharmacology and  
Molecular Science  
Johns Hopkins University School of Medicine

#### **Sandy Allerheiligen, Ph.D.**

Vice President and Global Head  
Modeling and Simulation  
Merck Research Labs

#### **David Acheson, M.D.**

President and CEO  
The Acheson Group, LLC

#### **Jerome Avorn, M.D.**

Chief, Division of Pharmacoepidemiology  
and Pharmacoeconomics  
Brigham and Women's Hospital  
Professor of Medicine  
Harvard Medical School

#### **David William Feigal, Jr., M.D., MPH**

Partner, NDA Partners, LLC

#### **Garret FitzGerald, M.D. (Chair)**

Chair, Dept. of Pharmacology  
Director, Institute for Translational Medicine  
and Therapeutics (ITMAT)  
University of Pennsylvania Perelman School  
of Medicine

#### **Dan Roden, M.D.**

Professor of Medicine and Pharmacology  
Assistant Vice Chancellor for Personalized  
Medicine  
Vanderbilt University Medical Center

#### **Paul Watkins, M.D.**

Verne S. Caviness  
Distinguished Professor of Medicine  
University of North Carolina-Chapel Hill  
Director, Hamner-UNC Institute for Drug Safety  
Sciences

#### **Alastair J.J. Wood, M.D.**

Professor of Medicine and Pharmacology  
Weill Medical College of Cornell University  
Partner, Symphony Capital, LLC

## Reproductive Sciences

### PRETERM BIRTH INITIATIVE

#### **Susan Fisher, Ph.D.**

Professor  
Director, Translational Research in Perinatal  
Biology and Medicine  
University of California-San Francisco

#### **Jay D. Iams, M.D.**

Frederick P. Zuspan Professor and Endowed  
Chair, Division of Maternal Fetal Medicine  
Vice Chair, Department of Obstetrics and  
Gynecology  
Ohio State University Medical Center

#### **Louis J. Muglia, M.D., Ph.D. (Chair)**

Co-Director, Perinatal Institute  
Director, Center for the Prevention of Preterm Birth  
University of Cincinnati Children's Hospital  
Medical Center  
Director, Center for Preterm Birth Research  
Professor, UC Dept. of Pediatrics  
*BWF Career Awardee in the Biomedical  
Sciences – 1995*

#### **D. Michael Nelson, M.D., Ph.D.**

Virginia S. Lang Professor and Vice Chair  
Dept. of Obstetrics and Gynecology  
Washington University School of Medicine

#### **Jerome F. Strauss, III, M.D., Ph.D.**

Dean, School of Medicine  
Executive Vice President for Medical Affairs  
Virginia Commonwealth University

#### **Jenny Ting, Ph.D.**

Alumni Distinguished Professor of  
Microbiology and Immunology  
Lineberger Comprehensive Cancer Center  
University of North Carolina at Chapel Hill

#### **Jeffrey A. Whitsett, M.D.**

Co-Director, Perinatal Institute  
Chief, Section of Neonatology, Perinatal and  
Pulmonary Biology  
University of Cincinnati Children's Hospital

## Science Education

### STUDENT SCIENCE ENRICHMENT PROGRAM

**Honorable Hugh A. Blackwell**

Attorney  
Member, North Carolina House of Representatives

**Yolanda S. George**

Deputy Director, Education and Human  
Resources Programs  
American Association for the Advancement  
of Science

**Douglas Harris, Ph.D.**

Executive Director  
The Vermont Institutes

**Sylvia M. James, Ed.D.**

Division Director  
Division of Human Resources Development  
National Science Foundation

**Connie Locklear**

Division of Indian Education  
Public Schools of Robeson County

**Steve Saucier**

Executive Director  
Grassroots Science Museum Collaborative

**Brenda Wojnowski, Ed.D.**

President  
Wojnowski and Associates

**Marco Zarate**

President and Co-founder  
North Carolina Society of Hispanic Professionals

### CAREER AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS

**Hon. Larry Bell**

North Carolina General Assembly  
House of Representatives

**Enriqueta C. Bond, Ph.D.**

Past President  
Burroughs Wellcome Fund

**David Marsland**

Science Content Specialist  
Discovery Education

**Angela Quick, Ed. S.**

Senior Vice President, Talent Development  
North Carolina New Schools

**Pat Shane, Ph.D.** (Chair)

Executive Director  
North Carolina Science Leadership Association

**Dave Smith**

Director  
Center for Inquiry Based Learning



# Board of Directors and Staff

## Board of Directors

**Bruce Alberts, Ph.D.**  
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**Roderick R. McInnes, M.D., Ph.D.**  
**Carla Shatz, Ph.D.**  
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Vice President, Finance

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Senior Manager,  
Facilities and Administration

**Betsy Stewart**  
Administrative Assistant

**Brent Epps**  
Facilities and  
Administrative Assistant

## Finance and Information Technology

**Ken Browndorf**  
Senior Asset and  
Accounting Manager

**Jennifer Caraballo**  
Accountant

**Sammy Caraballo**  
Systems and Web Engineer

**Wendell Jones**  
Technology Coordinator

## Meetings

**Lori Hedrick**  
Meeting Professional

**Barbara Evans**  
Administrative Meeting  
Assistant

## Programs

**Debra J. Holmes**  
Senior Program Associate

**Rusty Kelley, Ph.D.**  
Program Officer

**Jean A. Kramarik**  
Senior Program Associate

**Alfred M. Mays**  
Program Officer

**Victoria McGovern, Ph.D.**  
Senior Program Officer

**Ruth Reynolds**  
Programs Assistant

**Melanie Scott**  
Senior Program Associate  
and Database Specialist

**Rolly L. Simpson Jr.**  
Senior Program Officer

**Tiffanie Taylor**  
Program Associate

**D. Carr Thompson**  
Senior Program Officer  
(Retired Nov. 2014)

**Kendra Tucker**  
Senior Programs Assistant  
and Data Specialist

# Program Contact Information

## Biomedical Sciences; Reproductive Sciences

**Rolly Simpson**  
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**Debra Holmes**  
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## Career Guidance; Infectious Diseases; Population and Laboratory Based Sciences

**Victoria P. McGovern, Ph.D.**  
Senior Program Officer  
vmcgovern@bwfund.org

**Jean A. Kramarik**  
Senior Program Associate  
jkramarik@bwfund.org

## Interfaces in Science; Regulatory Science

**Rusty Kelley, Ph.D.**  
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rustykelly@bwfund.org

**Tiffanie Taylor**  
Program Associate  
ttaylor@bwfund.org

## Science Education

**Alfred M. Mays**  
Program Officer  
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**Melanie B. Scott**  
Senior Program Associate and  
Database Specialist  
msscott@bwfund.org

## Communications/Media

**Russ Campbell**  
Communications Officer  
news@bwfund.org

## Program Information

The most up-to-date information about our programs, including complete application information, can be found on our website at [www.bwfund.org](http://www.bwfund.org).



**Burroughs Wellcome Fund**

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