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Fostering the advancement of medical research and the biological sciences.

Infectious Disease
Interfaces in Science
Medical Sciences
Science Education
Translational Research
Awardee Directory
BWF Related Links
Program Deadlines

Programs & Grant Guidelines

Biomedical Sciences

Career Awards for Medical Scientists (CAMS)

Program Information

Application Deadline: October 1, 2008
By electronic application only.

The program information, application information, and brochure on this site pertain to the 2007-2008 award series and are provided for your information only. Guidelines change from year to year. New program guidelines and application instructions for the 2008-2009 award series are being developed and will be available on this web site generally three months in advance of the application deadline. Check back then to access the current application instructions and guidelines.

Program Background

The physician scientist is critical to the success of the biomedical research enterprise and there has been a long documented history that the participation of the physician scientist within the research enterprise has been decreasing. In 1979, James Myngaarden, former head of the National Institutes of Health, coined the phrase "endangered species" when referring to physician scientists.

A report in 2000 by Zelmo et al in the *FASEB Journal* stated that in order to stabilize the early careers of a decreasing number of young physician scientists and keep them in the system, "NIH and other appropriate foundations should substantially expand the support for the training and mentoring of physician scientists." In 2005, Ley and Rosenberg in *JAMA* painted a somewhat encouraging picture after looking at a number of indicators, however, they cautioned that the NIH budget will only grow modestly in the coming years and this positive trend needs to be nurtured.

The Career Awards for Medical Scientists (CAMS) program is the result of the reformulation of the Career Awards in the Biomedical Sciences (CABS), which was instituted by the Burroughs Wellcome Fund (BWF) in 1995 and ran through the 2006 award year.

In response to the NIH's K99/R00 Pathway to Independence program, which was modeled after the CABS award, BWF has shifted the focus of the CABS program to address the on-going problem of increasing the number of physician scientists and keeping them in research. BWF believes that this bridging award, supporting the last year(s) of a mentored position in addition to supporting the beginning years of an independent position,

will facilitate the transition to a career in research and buy time from service commitments.

Program

The Career Awards for Medical Scientists (CAMS) program provides $700,000 over five years to bridge advanced postdoctoral/fellowship training and the early years of faculty service.

General requirements:

- Candidates must hold an M.D., D.D.S., D.V.M., Pharm.D., or equivalent clinical degree.
- Proposals must be in the area of basic biomedical, disease oriented, translational, or molecular, genetic, or pharmacological epidemiology research. Proposals that are in the area of epidemiology should contact BWF to determine the eligibility of the proposal. Proposals in health services research or involving large-scale clinical trials are ineligible.
- BWF encourages nominations from candidates who work in reproductive science.
- During the postdoctoral and faculty periods, grants must be made to degree-granting institutions in the U.S. or Canada on behalf of the award recipient.
- During the award period, at least 75 percent of the awardee's time must be devoted to research-related activities.
- Indirect costs may not be charged against BWF grants.

Postdoctoral/fellowship portion of the award:

- Lasts a minimum of one and a maximum of two years.
- Allows the awardee to use up to $95,000 per year.
- Allows maximum salary support of $65,000 per year.

Faculty portion of the award:

- Will be $700,000 minus the portion used during the postdoctoral year(s).
- Allows the awardee maximum salary support of $150,000. The balance is to be used for research expenses.
- Normally lasts three years plus the unused postdoctoral portion of the award.
- Allows awardees demonstrating adequate progress to be granted no-cost extensions up to the time they are reviewed for tenure.

For example, support for five years with two years of postdoctoral training would be:

Postdoctoral/Fellowship Period	Salary and Research	Administrative Fee	Annual Total
Year 1	$85,500	$9,500	$95,000
Year 2	$85,500	$9,500	$95,000
Faculty Period			
Year 3	$153,000	$17,000	$170,000
Year 4	$153,000	$17,000	$170,000
Year 5	$153,000	$17,000	$170,000

Salary and Fringe Benefits

- If an institution's salary scale for the position is higher than the salary amounts provided by the award, then the institution must supplement the awardee's salary.
- Institutions are expected to make a contribution to the awardee's salary to maximize the amount that can be used for research.
- BWF will pay an administrative fee of 10 percent to the institution to cover the awardee's fringe benefits, such as health insurance and retirement.
- Institutions that pay for fringe benefits from their own funds may keep the fee as reimbursement for administering the grant or reallocate the fee to the investigator's research expenses.

Faculty Appointments

- If an awardee moves to a faculty position within two years, the balance of the postdoctoral/fellowship portion of the award will be transferred to the faculty institution and added to the faculty portion of the award.
- BWF requires institutions to make a monetary commitment to an awardee's career before the awardee

begins the faculty portion of the award.
- BWF strongly prefers tenure-track appointments, accompanied by salary support or support for starting a laboratory, or both.
- BWF reserves the right to terminate the faculty portion of the award if the institutional commitment is deemed inadequate.
- Positions accepted at a research institute must be closely affiliated with a degree-granting institution, which must offer the awardee a joint tenure-track faculty position with some financial or similar commitment to the awardee.
- All faculty appointments must be approved by BWF.

Guidelines

Candidate Eligibility Guidelines

- Candidates must be a clinical fellow, resident, instructor (non-tenure track), or a postdoctoral researcher and have at least two years of research experience at the time of application. As a general guideline, candidates must not be more than 120 months past their most recent doctorate.
- Candidates with a clinical degree not awarded in the U.S. or Canada must be licensed to practice in the U.S. or Canada.
- Researchers who hold or have accepted a tenure-track faculty appointment as an assistant professor or the equivalent are not eligible.
- Candidates must be committed to a full-time career in research as an independent investigator at a North American degree-granting institution.
- Candidates must be nominated by accredited, degree-granting institutions in the U.S. or Canada.
- Candidates must be citizens or permanent residents of the U.S. or Canada at the time of application.
- If a permanent resident, candidates must provide documentation of permanent resident status with the application.
- Permanent residents of the U.S. must provide a copy of their Permanent Resident Card.
- Permanent residents of Canada must provide a copy of their Landed Immigrant Status form.
- Persons who have applied for permanent resident status but have not received their government documentation by the time of application are not eligible.

Institutional Nomination Guidelines

- U.S. or Canadian institutions-including affiliated medical schools, graduate schools, and all related hospitals and research institutes-**may nominate up to five candidates.**
- BWF encourages institutions to nominate women and underrepresented minorities. If a woman or underrepresented minority is nominated within the initial five candidates, a sixth candidate may be nominated provided that candidate is a woman or underrepresented minority (i.e. African American, Hispanic, or Native American).
- NIH may nominate candidates who intend to continue their postdoctoral/fellowship training at the NIH, but such awardees must move to a degree-granting institution to assume a faculty position. The NIH will support these awardees during the postdoctoral/fellowship years, and BWF will support them for the first three years of their faculty appointment. Their total award will be $510,000. Postdoctoral fellows at the NIH should contact its Office of Intramural Research for information about its nomination procedures.

Selection

The CAMS advisory committee will review applications, interview finalists, and make recommendations for approval to BWF's Board of Directors. Candidates not selected may be renominated in the next award cycle provided they still meet the eligibility requirements. BWF does not provide critiques of unfunded proposals.

Terms

Awards are made to institutions on behalf of the awardees. The institutions are responsible for disbursing the funds and for maintaining adequate supporting records and receipts of expenditures. Indirect costs may not be charged against the awards.

Awardees must provide BWF with an annual progress report detailing scientific progress. Institutions must provide an annual financial report. Both reports must be submitted (on forms that will be provided) by November 1 of each award year. Continued funding will depend on both the timely submission of these reports and their favorable review by BWF and its program advisory committee.

Award recipients may obtain funds from other sources for research in the same or similar areas as that conducted under these grants, so long as there is no conflict with meeting the terms of BWF's award. Award

recipients may not hold concurrent BWF awards or NIH K99/R00 awards.

The support allocated for research is under the control of the awardee and may be used flexibly for items such as equipment, consumable supplies, travel to scientific meetings, and laboratory personnel working with the awardee. Prior approval by BWF is required when, within an award year, purchases of equipment exceed $20,000 or travel costs exceed $8,000.

During the award period, unused research funds may be carried over to the succeeding year. Any unused funds held by institutions when awards expire or are terminated must be returned to BWF, unless the Fund has granted prior permission to retain the funds. Awardees may receive a no-cost extension up to the time they are reviewed for tenure; requests explaining why an extension is needed must be submitted in writing at least four months prior to the end of the award.

For grant recipients in the U.S., the administrative fee is intended to cover the cost of medical insurance and other benefits, such as retirement. For awardees in Canada, the administrative fee is to be used as a contribution to the employer's benefit plan.

BWF acknowledges that many postdoctoral/clinical fellows will move to new institutions to begin their independent research careers; therefore, this award is "portable." Awards may be transferred only with written approval of BWF. Requests must be received at least four months prior to any move, and approval will be based on whether the move will enhance the awardee's scientific growth and career development and whether the hiring institution demonstrates adequate commitment to the award recipient's career. Awardees who change institutions may take with them any equipment or supplies purchased under the award, as well as the balance of any unused award funds.

BWF prefers that awardees not move from one institution to another during their three years of faculty service. Special training opportunities that require faculty-level awardees to spend up to a year away from their base institution may be considered; awardees must submit to BWF a written request that explains why the training is needed.

Scientific publications or presentations that result from these awards must acknowledge the awardee's receipt of a Burroughs Wellcome Fund Career Award for Medical Scientists. Copies of journal articles and other publications should be sent to BWF along with the annual progress report.

Awardees should follow their institutions' patent, copyright, and intellectual property policies regarding discoveries that result from research conducted under these awards. Awardees must adhere to all federal, state, and local regulations regarding the participation of human subjects, and the use of animals, radioactive or hazardous materials, and recombinant DNA in their research projects. BWF expects the appropriate federal, state, and local guidelines with regard to scientific misconduct are in place and enforced at all institutions with which BWF awardees are affiliated.

Awardees should share scientific findings in a timely manner via the standard means of scientific communication, including publications and/or presentations in scientific forums. BWF will not retain any rights to published results or patents that result from the research.

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Fostering the **advancement** *of* **medical research** *and the* **biological sciences.**

Advisory Committee
Brochure
BWF Related Links
Grant Recipients
Insider Tips
Laboratory
Management Course
Previous Programs
Program Deadlines
Program Links
Program Publications
Progress Reporting
Special Reports

Programs & Grant Guidelines

Basic Biomedical Sciences

Previous Programs in the Basic Biomedical Sciences

Career Awards in the Biomedical Sciences

Grant Recipients

2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
1996
1995

2006

Derek W. Abbott, M.D., Ph.D.
Harvard Medical School
Regulation of innate immunity via non-traditional ubiquitin linkages

Karl Mark Ansel, Ph.D.
Harvard Medical School / CBR Institute for Biomedical Research
Endogenous RNA interference and gene silencing in T cell differentiation

Thomas G. Bernhardt, Ph.D.
Case Western Reserve University School of Medicine
Coordinating cell division and chromosome segregation in *Escherichia coli*

Michael D. Blower, Ph.D.
University of California-Berkeley
Analysis of the role of RNA in spindle assembly

Leah E. Cowen, Ph.D.
MIT / Whitehead Institute for Biomedical Research
Hsp90 and the evolution of pathogens and their hosts

Justin L. Gardner, Ph.D.
New York University Faculty of Arts and Science
Flexible sensory representations in human visual cortex

Levi A. Garraway, M.D., Ph.D.
Harvard Medical School
Linking genetic alterations to tumor dependencies in human melanoma

Matthew C. Gibson, Ph.D.
Harvard Medical School
Design principles in metazoan epithelia: the molecular control of growth and form

Ira M. Hall, Ph.D.
Cold Spring Harbor Laboratory
Investigation of DNA copy-number fluctuation and epigenetic inheritance using genomic microarrays

Mondira Kundu, M.D., Ph.D.
University of Pennsylvania School of Medicine
Role of Ulk1 and autophagy in erythroid maturation

Cheng-Yu Lee, Ph.D.
University of Oregon
Genetic regulation of neural stem cell self-renewal

Anthony Leonardo, Ph.D.
Harvard University
Neuronal population dynamics underlying the retinal code for motion

Stephen B. Long, Ph.D.
Rockefeller University
Atomic structures of open and closed voltage-dependent potassium channels and other eukaryotic membrane proteins

Aaron W. McGee, Ph.D.
Yale University School of Medicine
Inhibition of plasticity in the adult central nervous system by Nogo-66 receptor signaling

Kakoli Mitra, Ph.D.
State University of New York-Albany
Probing the dynamics of protein integration into and translocation across membranes using fluorescence spectroscopy and cryo-electron microscopy

Lev Z. Osherovich, Ph.D.
University of California-San Francisco School of Medicine
Insulin signaling in neurodegenerative protein misfolding diseases

Stephanie A. Pangas, Ph.D.
Baylor College of Medicine
Defining the role of TGFb superfamily in ovarian cancer through mouse models

Margot E. Quinlan, Ph.D.
University of California-San Francisco School of Medicine
Collaboration between two actin nucleators - Spir and Capu

Oliver J. Rando, M.D., Ph.D.
Harvard University
Time scales of epigenetic inheritance: how and why

Antonina I. Roll-Mecak, Ph.D.
University of California-San Francisco
Molecular anatomy and physiology of a microtubule severing enzyme defective in hereditary spastic paraplegia

Pardis C. Sabeti, M.D., D.Phil.

Broad Institute of MIT and Harvard
Evolutionary genomics and its applications to human disease

Sara L. Sawyer, Ph.D.
University of Washington / Fred Hutchinson Cancer Research Center
Using rapid evolution to identify intracellular proteins interacting with retrotransposons in yeast

Benjamin P. Tu, Ph.D.
University of Texas Southwestern Medical Center-Dallas
Logic of the yeast metabolic cycle

David M. Weinstock, M.D.
Memorial Sloan-Kettering Cancer Center
Defining individual DNA double-strand break repair capacity using zinc-finger nucleases

2005

Diana M. Bautista, Ph.D.
University of California-San Francisco
Molecular and cellular mechanisms of mechanotransduction in mammalian sensory neurons

Ben E. Black, Ph.D.
University of California-San Diego School of Medicine
Epigenetic mechanisms for centromere specification

David L. Brody, M.D., Ph.D.
Washington University School of Medicine
Amyloid-beta and apolipoprotein E in traumatic brain injury

Mark M. Churchland, Ph.D.
Stanford University
Experimental study of settling neural processes in the primate brain

William M. Clemons, Ph.D.
Harvard Medical School
Structural studies of complexes involved in protein translocation and synthesis

Daniela M. Dinulescu, Ph.D.
Massachusetts Institute of Technology
Role of endometriosis in fertility and ovarian cancer pathogenesis

Alla Y. Karpova, Ph.D.
Cold Spring Harbor Laboratory
Using molecular inactivators of synaptic transmission to study cortical function and its modulation by subcortical systems in health and disease

Leslie S. Kean, M.D., Ph.D.
Emory University School of Medicine
Innate immunity and transplantation tolerance: Defining the role of natural killer (NK) cells in allograft rejection

Tobias R. Kollmann, M.D., Ph.D.
University of Washington School of Medicine
Induction of protective immunity to listeria in neonates

Steven T. Kosak, Ph.D.
Fred Hutchinson Cancer Research Center
The genomic organization of hematopoietic differentiation

Yaping J. Liao, M.D., Ph.D.
Stanford University
Neurophysiological dysfunction in calcium channelopathies

Feroz R. Papa, M.D., Ph.D.
University of California-San Francisco School of Medicine
The connection between endoplasmic reticulum stress and type 2 diabetes

Michael G. Poirier, Ph.D.
Northwestern University
A study of DNA accessibility within nucleosome arrays

Jeremy F. Reiter, M.D., Ph.D.
University of California-San Francisco
Tectonic: discovery of novel signal directing mammalian development

Kyu Y. Rhee, M.D., Ph.D.
Weill Medical College of Cornell University
Enzymes of intermediary metabolism in *Mycobacterium tuberculosis*: Anti-mycobacterial targets of nitric oxide

Alan Saghatelian, Ph.D.
Scripps Research Institute
Identifying functional connections between the proteome and metabolome by global metabolite profiling

Annette E. Salmeen, D.Phil.
Stanford University School of Medicine
Reactive oxygen species as temporal coordinators of cell signaling pathways

Michael D. Shapiro, Ph.D.
Stanford University School of Medicine
Genetic and developmental basis of skeletal diversity in ninespine sticklebacks

Helen C. Su, M.D., Ph.D.
National Institute of Allergy and Infectious Diseases (NIAID)
Molecular function of caspase-8 for lymphocyte activation

Sinisa Urban, Ph.D.
Harvard Medical School
Exploring the role of rhomboid signalling in development and disease

Loren D. Walensky, M.D., Ph.D.
Harvard Medical School
Targeting protein interactions *in vivo* using chemically reinforced helical peptides

Hong Zhang, Ph.D.
Harvard Medical School
Role of RNA and nuclear bodies in PcG-mediated epigenetic gene silencing

2004

Geoffrey K. Aguirre, M.D., Ph.D.
Postdoctoral Institution: University of Pennsylvania School of Medicine
Discipline: Neuroscience
Title of research plan: fMRI studies of the process architecture of face perception

Bradley E. Bernstein, M.D., Ph.D.
Postdoctoral Institution: Harvard University Faculty of Arts and Sciences
Discipline: Cell biology & regulation
Title of research plan: Proteomic studies of post-translational histone modifications

Nika N. Danial, Ph.D.
Postdoctoral Institution: Harvard Medical School
Discipline: Cell biology & regulation
Title of research plan: Integration of glycosis and apoptosis by the pro-apoptotic protein BAD

Jeremy S. Dasen, Ph.D.
Postdoctoral Institution: Columbia University
Discipline: Neuroscience
Title of research plan: The role of Hox proteins in sensory-motor neuronal connectivity and identity

Seth J. Field, M.D., Ph.D.
Postdoctoral Institution: Harvard Medical School
Discipline: Cell biology & regulation
Title of research plan: Comprehensive analysis of phosphoinositide function

Ruben L. Gonzalez, Ph.D.
Postdoctoral Institution: Stanford University School of Medicine
Discipline: Biophysics
Title of research plan: Single-molecule fluorescence studies of eukaryotic translational initiation and regulation

Chyi-Song Hsieh, M.D., Ph.D.
Postdoctoral Institution: University of Washington
Discipline: Immunology
Title of research plan: Determining the antigen specificity of CD25+CD4+ regulatory T cells

Eric C. Lai, Ph.D.
Postdoctoral Institution: University of California-Berkeley
Discipline: Developmental biology
Title of research plan: A genomewide analysis of microRNA function in Drosophila

George Y. Liu, M.D., Ph.D.
Postdoctoral Institution: University of California-San Diego School of Medicine
Discipline: Infectious diseases
Title of research plan: Role of Group B Streptococcal hemolysin/cytolysin and pigment in the pathogenesis of invasive neonatal infections

Marc D. Meneghini, Ph.D.
Postdoctoral Institution: University of California-San Francisco
Discipline: Genetics
Title of research plan: Regulating chromatin domains in yeast and during animal development

Vamsi K. Mootha, M.D.
Postdoctoral Institution: Massachusetts Institute of Technology
Discipline: Genomics
Title of research plan: Genomic approaches to mitochondrial biogenesis

Suzanne M. Noble, M.D., Ph.D.
Postdoctoral Institution: University of California-San Francisco School of Medicine
Discipline: Infectious diseases
Title of research plan: Identification of virulence in Candida albicans, a diploid, commensal human fungal pathogen

Bijan Pesaran, Ph.D.
Postdoctoral Institution: California Institute of Technology
Discipline: Neuroscience
Title of research plan: Cortical mechanisms for hand-eye coordination

Noah A. Rosenberg, Ph.D.
Postdoctoral Institution: University of Southern California
Discipline: Genetics
Title of research plan: Efficient genome-based inference of ancestry for use in genetic association studies

Alvaro Sagasti, Ph.D.
Postdoctoral Institution: New York University School of Medicine
Discipline: Developmental biology
Title of research plan: The development of morphological diversity in trigeminal sensory neurons

Michele M. Solis, Ph.D.
Postdoctoral Institution: University of Washington School of Medicine
Discipline: Neuroscience
Title of research plan: A telencephalic pattern generator for song

2003

Kaveh Ashrafi, Ph.D.
Postdoctoral Institution: Harvard Medical School
Faculty Institution: University of California-San Francisco
Comprehensive analysis of regulatory mechanisms of fat biology

Aaron P. Batista, Ph.D.
Postdoctoral Institution: Stanford University School of Medicine
Neural gating within the cerebral cortex during sensory-motor behavior

Or P. Gozani, M.D., Ph.D.
Postdoctoral Institution: Harvard Medical School
Regulation of chromatin remodeling events by nuclear phosphoinositides

Christina M. Hull, Ph.D.
Postdoctoral Institution: Duke University Medical Center
Cell identity, sexual development, and virulence in the human fungal pathogen *Cryptococcus neoformans*

Susan M. Kaech, Ph.D.
Postdoctoral Institution: Emory University School of Medicine
Faculty Institution: Yale University
Investigation of the mechanisms that regulate memory CD8 T cell development

Dennis H. Kim, M.D., Ph.D.
Postdoctoral Institution: Harvard Medical School
Genetic analysis of innate immunity in *C. elegans*

Anna K. Majewska, Ph.D.
Postdoctoral Institution: Massachusetts Institute of Technology
Imaging rapid plasticity in the visual cortex

David E. Reich, Ph.D.
Postdoctoral Institution: Whitehead Institute for Biomedical Research
Faculty Institution: Harvard University
Applying population genetics to find genes in common disease

Erica O. Saphire, Ph.D.
Postdoctoral Institution: Scripps Research Institute
Faculty Institution: Scripps Research Institute
Structural studies of Ebola virus pathogenesis

Shu-ou Shan, Ph.D.
Postdoctoral Institution: University of California-San Francisco School of Medicine
Mechanism of signal recognition particle-mediated protein targeting

Collin M. Stultz, M.D., Ph.D.
Postdoctoral Institution: Harvard Medical School
The conformational free energy landscape of collagen and its relationship to atherosclerotic plaque rupture

Kevin B. Urdahl, M.D., Ph.D.
Postdoctoral Institution: University of Washington
The role of MHC class I molecules in immunity against tuberculosis

Amy J. Wagers, Ph.D.
Postdoctoral Institution: Stanford University School of Medicine
Dynamic circulation of hematopoietic stem cells: implication for stem cell function

2002

Suzanne J. Admiraal, Ph.D.
Postdoctoral Institution: Harvard Medical School
Biosynthesis of hybrid natural products