

# Women in Biomedical Careers



## **NIH Updates on Women in Science** **News for You to Use!**

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*NIH Updates on Women in Science is brought to you by the [NIH Working Group on Women in Biomedical Careers](#). We encourage you to forward this e-newsletter to colleagues who may find it of interest.*

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## ***Second NIH Regional Meeting Addresses Women's Careers in Science***

On May 27-29, 2009 the University of California, San Francisco (UCSF) hosted the Office of Research on Women's Health and the NIH for the second of four scientific workshops and town hall meetings to update the research agenda in women's health for the NIH for the next ten years. In addition to working groups on various scientific topics, each meeting features a working group on women in biomedical careers. At the San Francisco meeting, the working group had two extramural co-chairs, Joan Y. Reede, M.D., M.P.H., M.S., Dean for Diversity and Community Partnership at Harvard Medical School, and Elena Fuentes-Afflick M.D., M.P.H., Professor of Pediatrics and Epidemiology, UCSF, as well as two NIH co-chairs, Joan Schwartz, Ph.D., Assistant Director, Office of Intramural Research, NIH, and J Taylor Harden, Ph.D., Assistant to the Director for Special Populations at the National Institute on Aging.

The working group produced several recommendations for expanding research on topics such as race and gender schemas, work/life factors that impact women's careers, and best practices from a variety of fields that foster organizational change and determine their applicability, synthesis, and translation to the biomedical community. Overarching themes included developing new and enhancing existing communication strategies to inform constituencies about opportunities and research findings and ensuring that women of color are represented in all deliberations regarding training, career development, research and leadership.

The meeting also featured a keynote address by Virginia Valian, Ph.D., Distinguished Professor, Psychology and Linguistics, Hunter College and CUNY Graduate Center, and author of "*Why So Slow: The Advancement of Women in Science and Medicine.*" Dr. Valian's talk focused on gender schemas – the commonly shared implicit hypotheses about gender differences that affect our expectations and evaluations of men and women, and the accumulation of disadvantage – the idea that small, seemingly insignificant differences between how men and women are perceived and treated can add up to large differences in outcome when added together over the course of a career. She noted that research into and education about these concepts can help society better understand and overcome the unintentional biases that hinder the careers of women. She called upon leaders both at the NIH and throughout the research community to articulate the benefits of diversity and to continuously monitor grant reviews, search committees, and symposia to be sure women are being included appropriately and not being held back, intentionally or unintentionally.

[\*Moving Into the Future – New Dimensions and Strategies for Women's Health Research for the National Institutes of Health\*](#)

[Overview of Conference from UCSF website](#)

## ***The National Academies Held a Briefing on a Companion Report to Beyond Bias and Barriers***

On June 2, the National Academies *Committee on Women in Science, Engineering, and Medicine (CWSEM)* held a public briefing on a new Congressionally mandated report on career differences

between male and female faculty in six disciplines – biology, chemistry, civil engineering, electrical engineering, mathematics, and physics. The report, *Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty*, which was sponsored by the National Science Foundation, examines issues such as faculty hiring, promotion, tenure, and allocation of institutional resources including laboratory space. The report presents the results of a survey carried out in 2004 and 2005 which asked tenured and tenure-track faculty at Research I universities about their funding status, productivity, experience with mentoring, salary, time spent at their current rank, and several other measures of resources and outcomes. This report, which presents a snapshot in time, is a companion to the 2007 report [\*Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering\*](#) which used an extensive review of the literature on women in science and meta-analysis to synthesize the evidence from existing studies. The session was webcast and the panel responded to questions submitted via the internet. The slide presentation and the full report are available for download and the full audio recording of the briefing has been archived online.

[More on Gender Differences in the Careers of Science, Engineering, and Mathematics Faculty](#)

[Download the report, view the slide presentation, or listen to the briefing](#)

## ***The National Academy of Sciences Includes Fourteen Women in the Class of 2009***

On April 28, the National Academy of Sciences (NAS) elected seventy-two new members and eighteen foreign associates. Eleven of the new members and three of the foreign associates are women. They include biologists, chemists, physicists, mathematicians, and geologists:

- Lorena S. Beese, Ph.D. - James B. Duke Professor, Department of Biochemistry, Duke University Medical Center, Durham, N.C.
- Marian B. Carlson, Ph.D. - Professor, Department of Genetics and Development and Department of Microbiology, Columbia University, New York City
- Sun-Yung Alice Chang, Ph.D. - Professor, Department of Mathematics, Princeton University, Princeton, N.J.
- Susan N. Coppersmith, Ph.D. - Professor of Physics, Department of Physics, University of Wisconsin, Madison
- Juli Feigon, Ph.D. - Professor, Department of Chemistry and Biochemistry, University of California, Los Angeles
- Sarah Hake, Ph.D. - Director, USDA Plant Gene Expression Center; and Full Adjunct Professor, Department of Plant and Microbial Biology, University of California, Berkeley
- Caroline S. Harwood, Ph.D. - Professor, Department of Microbiology, University of Washington, Seattle
- Barbara V. Jacak, Ph.D. - Distinguished Professor of Physics, Department of Physics and Astronomy, State University of New York, Stony Brook
- Ellen S. Mosley-Thompson, Ph.D. - Professor, Department of Geography, and Senior Research Scientist, Byrd Polar Research Center, Ohio State University, Columbus

- G. Shirleen Roeder, Ph.D. - Investigator, Howard Hughes Medical Institute, and Eugene Higgins Professor of Genetics, Department of Molecular, Cellular, and Developmental Biology, Yale University, New Haven, Conn.
- Shelley E. Taylor, Ph.D. - Distinguished Professor, Department of Psychology, University of California, Los Angeles

Foreign Associates:

- Dr. Sandra M. Díaz - Associate Professor, Instituto Multidisciplinario de Biología Vegetal (IMBIV), Universidad Nacional de Córdoba, Córdoba, Argentina
- Dr. Patricia A. Jacobs - Director, Wessex Regional Genetics Laboratory, University of Southampton, Wiltshire, United Kingdom
- Dame Mary Anne Salmond - Distinguished Professor of Anthropology and Maori Studies, Department of Maori studies, University of Auckland, Auckland, New Zealand

In 2008, sixteen women were elected, down from an all time high of nineteen women in 2005.

[NAS Elects New Members](#)

## ***Two Women Confirmed and Two Nominated to Head Federal Public Health Agencies***

The month of May saw two confirmations and two nominations of women to serve as agency heads within the Department of Health and Human Services (HHS). On May 6, Yvette Roubideaux, M.D. was unanimously confirmed as the first woman Director of the Indian Health Service (IHS). Dr. Roubideaux, a member of the Rosebud Sioux tribe, has conducted extensive research on American Indian health issues, with a focus on diabetes in American Indians/Alaska Natives and Indian health policy. On May 18, Margaret Hamburg, M.D., was confirmed as the Commissioner of Food and Drugs, the head of the Food and Drug Administration (FDA). Dr. Hamburg is a nationally and internationally recognized leader in public health and medicine, and an authority on global health, public health systems, infectious disease, bioterrorism and emergency preparedness. She has previously served as Assistant Director of the National Institute of Allergy and Infectious Diseases of the NIH.

On May 4, President Obama nominated Kathy Greenlee, the current Secretary on Aging, Kansas, to head the Administration on Aging (AoA). Ms. Greenlee has held numerous positions in the Kansas state government including State Long-Term Care Ombudsman and general counsel at the Kansas Insurance Department, where she oversaw the Senior Health Insurance Counseling for Kansas program. On May 6, the President nominated Carmen R. Nazario to head the Administration for Children and Families (ACF). Ms. Nazario, who holds an MSW, is currently an Assistant Professor at the Inter American University of Puerto Rico. She served in the ACF during the Clinton administration and has held leadership positions in state and local social service agencies in Puerto Rico, Delaware, and Virginia.

In addition, President Obama has announced his intention to nominate women to at least three of six remaining Assistant Secretary positions within the HHS - Sherry Glied, Ph.D. as Assistant Secretary for Planning and Evaluation, Nicole Lurie, M.D. as Assistant Secretary for Preparedness and Response, and Ellen Murray as Assistant Secretary for Resources and Technology, the Chief Financial Officer of HHS.

[Yvette Roubideaux, M.D. Confirmed as Director of the IHS](#)

[Margaret Hamburg, M.D. Confirmed as FDA Commissioner \(Reuters\)](#)

[Kathy Greenlee Nominated for Assistant Secretary for Aging \(aahsa.org\)](#)

[Carmen Nazario Nominated for Assistant Secretary for Children and Families \(whitehouse.gov\)](#)

### ***NIH Co-Hosts Conference on Understanding Interventions which Broaden Participation in Research Careers***

On May 7-9, the Third Annual Conference on Understanding Interventions that Broaden Participation in Research Careers was held in Bethesda, MD. The conference was co-sponsored by the NIH, along with the American Association for the Advancement of Science and the American Society for Cell Biology. The National Institute of General Medical Sciences of the NIH supported the conference through a grant from its [Minority Access to Research Careers \(MARC\) program](#). The three day conference included plenary sessions on exploring self-efficacy as a key to student success, large scale interventions for systemic transformation, undergraduate STEM degree attainment, communication and dissemination beyond scholarly literature, and understanding what works in institutionalizing success on campuses. There were also a number of concurrent workshops that included discussions of strategic programming, using technology to make programs more effective, specific issues related to preparing and retaining undergraduate and graduate students, preparing postdoctoral fellows and faculty, and presentations on the general state of the research in this field. Speakers included university professors and administrators, program directors at professional societies, advocacy groups, and government agencies, as well as consultants and reporters who specialize in higher education. Sixty-eight posters were presented covering topics ranging from evaluations of existing programs, cross-cultural mentoring and collaboration, K-12 education, and research on interventions.

The First Understanding Interventions Conference, which was organized by the National Academies, addressed the needs of the biomedical research and training community interested in increasing the number of underrepresented minority students at the undergraduate and graduate levels. That conference revealed commonalities between the barriers and successes faced by women and underrepresented minorities throughout the STEM fields and some methodological approaches to researching this topic. The Second Understanding Interventions Conference illustrated how research on minority students can also be successfully applied to or adapted for other underrepresented groups, including women, first-generation and low-income students, immigrants, and students with disabilities.

[Third Annual Conference on Understanding Interventions that Broaden Participation in Research Careers](#)

[Report of Second Annual Conference on Understanding Interventions that Broaden Participation in Research Careers \(PDF\)](#)

[Report of the First Annual Conference on Understanding Interventions that Broaden Participation in Research Careers](#)

## ***Highlighting Best Practices – University of Virginia***

As part of its broader efforts to diversify its student body and faculty, the University of Virginia (UVa), has developed an online tutorial which all members of faculty search committees are required to complete. The tutorial takes about 20-30 minutes and search committee members become certified for two years. The tutorial covers topics such as what UVa does well in its recruitment efforts, how UVa ranks in terms of diversity compared to peer institutions, how to write a position description that will attract a diverse applicant pool, developing best practices, active recruitment of candidates, and how to assess reference letters. It also presents empirical research on cognitive errors and implicit bias which can effect the outcome of searches. Finally, the tutorial addresses why a search may result in the top candidate declining an offer or no offer being made at all and points out that interactions between the search committee and the candidates can have an important impact on the outcome of the search. The tutorial was developed by the office of the Vice Provost for Faculty Advancement, which also sponsors faculty development lecture series. One series, specifically for new faculty is called "Getting Started @ UVa" and includes lectures on time management, course design, and planning an academic career.

UVa also provides many resources which promote work/life balance including an online faculty and staff guide that brings together in one place information ranging from salary and benefits to the locations of restaurants and children's museums. The Office of Dual Career Resources is available to the partners of all newly recruited or hired faculty. Their services include not only help in locating positions, but career counseling and continuing education for those facing career changes. UVa is a member of the Mid-Atlantic Higher Education Recruitment Consortium (M-A HERC), which was established in 2008 by Loyola College in Maryland, the National Institutes of Health, the University of Richmond, and Washington & Lee University and recently hosted the Spring Membership meeting of the M-A HERC. The M-A HERC has twenty-three member institutions located in Virginia, Maryland, and Washington, D.C. It is one of eleven regional HERCs each of which has a website where all member institutions post their current job opportunities. Job seekers can search the postings using two sets of criteria simultaneously, making it easier for dual-career couples to locate jobs near each other.

[The University of Virginia Faculty Search Committee Tutorial](#)

[Office of the Vice Provost for Faculty Advancement](#)

[National HERC website](#)

## ***Women Scientists in Action – Catherine K. Kuo, Ph.D.***

Catherine K. Kuo, Ph.D., Assistant Professor in the Biomedical Engineering Department at Tufts University in Medford, Massachusetts is this month's featured successful junior women scientist. In addition to pursuing cutting edge interdisciplinary research, Dr. Kuo is also an active advocate of women in bioengineering. As a postdoctoral fellow at the NIH, Dr. Kuo served on the NIH Working Group for Women in Biomedical Careers as the Co-Chair of the Subcommittee for Integration of Women into Bioengineering Fields along with Dr. Belinda Seto, Deputy Director of the National Institute of Biomedical Imaging and Bioengineering. Under their leadership, that Subcommittee sponsored the first two women bioengineers to present as part of the prestigious NIH Director's Wednesday Afternoon Lecture Series, and organized the first dedicated symposium on tissue engineering and regenerative medicine at the annual NIH Research Festival. They also created the Engineering and Physical Sciences Scientific Interest Group at the NIH which aims to promote interaction between investigators and laboratories whose research interests involve integrating engineering or physical science with biology, and to educate the NIH community about these approaches.

Dr. Kuo received much of her training at the University of Michigan where she earned a BSE in Materials Science and Engineering, followed by a joint doctoral degree in Biomaterials and Macromolecular Science and Engineering in 2002. Her thesis work focused on tissue engineering, an interdisciplinary research area that includes biology, chemistry, and engineering to generate new, living tissues, such as cartilage. The new tissues can then be used to replace or repair tissues such as eroded cartilage in osteoarthritis patients. As a graduate student, Dr. Kuo developed novel scaffolds made of water soluble materials, such as alginate, and characterized how the structure of these "hydrogels" affected their properties, and vice versa. For instance, her research showed that alginate gels that set more slowly were stronger than gels made with a faster setting reaction. These results demonstrated how alginate gel could be designed with controlled structure and material properties for tissue engineering and other biomedical applications.

After receiving her doctorate, Dr. Kuo undertook a postdoctoral fellowship at the National Institute of Arthritis, Musculoskeletal and Skin Diseases (NIAMS) Cartilage Biology and Orthopaedics Branch, where she brought her engineering perspective to investigating the potential of mesenchymal stem cells (MSCs) in tissue engineering and regenerative medicine. MSCs are stem cells that can differentiate into a variety of cell types, including cells found in bones, cartilage, muscles, fat, and most recently, the pancreatic islets cells responsible for making insulin. Dr. Kuo's research particularly focused on the regeneration of tendons, which connect muscles to bones, and ligaments, which connect bone to bone to stabilize joints. Nearly half of all skeletal injuries involve tendons and ligaments. Poor healing ability of these tissues and imperfect repair strategies provide an opportunity for regenerative therapies. There are no known chemicals in the body that induce differentiation of MSCs into tendons and ligaments (tenogenesis), rather mechanical stimulation is required to induce tenogenesis. Dr. Kuo created tendon-like tissue constructs by seeding three-dimensional scaffolds with MSCs, culturing the constructs while applying either static or dynamic tension, and monitoring tenogenesis by measuring the appearance of scleraxis, a unique marker of tendon progenitors during embryonic development. In order to carry out this work, Dr. Kuo had to first develop the engineering devices and tools to place the

constructs under either static or dynamic tension. She observed a similar increase in gene expression of collagens in both static and dynamic conditions, but noticed persistent expression or upregulation of scleraxis and collagens over time when dynamic tension was applied.

After her time at NIAMS, Dr. Kuo became an Assistant Professor at Tufts University where she is pursuing an interdisciplinary approach to research with two main objectives: development of tissue engineering models with which to study developmental biology and disease mechanisms of musculoskeletal tissues as alternatives to current animal models; and regeneration of functional orthopaedic tissues with postnatal stem cells.

In support of these objectives, the research is largely centered on developing the tools necessary for this work. One major focus area of her lab is to identify the best stem cell source for musculoskeletal tissue regeneration, and to understand the potential for stem cells to mimic embryonic mechanisms during new tissue regeneration. Various stem cell sources are being screened and tested for their response to external factors, such as scaffolds, that may be used to control their differentiation and function. Thus, research in Dr. Kuo's lab is also focused on the fabrication and implementation of novel scaffolds that can direct new tissue formation by stem cells. Her lab is developing new methods to fabricate complex scaffold structures that can direct stem cells to differentiate toward multiple lineages and support complex tissue formation. Another major area of research in her lab is to identify and understand the role of specific factors active in tissue formation during embryonic development, and apply these factors to enhance stem cell based tissue regeneration. Dr. Kuo's work aims to develop innovative methods to monitor these factors and their effects in real-time during embryonic or fetal development. The knowledge gained from this particular project may enhance current strategies to study and prevent birth defects, as many of these abnormalities are due to aberrant representation of factors present in the uterus or developing embryo or fetus. Identification and understanding of embryonic factors that can direct adult stem cells to differentiate and regenerate new tissue may promote the development of innovative strategies to engineer new tissues with stem cells.

Dr. Kuo began her career as an engineer by exploring opportunities in the automotive industry (General Motors, MI). It was a subsequent experience in the snowboarding industry (Morrow Snowboards, OR), where she analyzed the composite structure of snowboards, that ultimately led to an interest in research a return to school to pursue graduate studies. It was in graduate school that her interest in polymeric materials transitioned from snowboards to tissue engineering scaffolds. In her postdoctoral fellowship at NIH, she gained a background in mesenchymal stem cell biology and musculoskeletal developmental biology. Integration of her engineering and biology training has now enabled her to develop an active cross-disciplinary basic science research program with the long-term goal of developing tissue regeneration strategies that translate from bench to bedside, to help improve quality of life for patients that suffer from challenging orthopaedic injuries and incurable diseases such as arthritis.

“As an engineer, I've had some great male mentors in my academic career, but I didn't come to fully appreciate the need and benefits of having successful female scientist role models and support for women scientists and engineers until my experience with the NIH Working Group for Women in Biomedical Careers. Drs. Elias Zerhouni, Vivian Pinn, Belinda Seto and the other members of the Working Group provided me with a unique opportunity to help make a difference for women in science and engineering. I will always be grateful to them, my postdoctoral advisor Dr. Rocky Tuan,



and the additional mentors and role models I was fortunate to have throughout the NIH, including Drs. Lillian Shum, Sharon Milgram, Joan Schwartz, Joan McGowan and Christine Kelley. It is my hope that I will be able to positively influence the lives of junior scientists and engineers as they did mine. I am excited about the changes NIH will continue to make for women scientists and engineers, and look forward to the continued progress with Building Interdisciplinary Research Careers in Women's Health (BIRCWH) and other programs under Dr. Pinn's leadership at the ORWH."

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