

# Women in Biomedical Careers



## NIH **U**pdates on Women in Science News for Yo**U** to Use!

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### **Volume 3, Issue 3 (May – June 2010)**

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

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## **Data on Graduate Student Enrollment, Postdoctoral Appointments, and Promotion Rates for Medical Faculty Illustrate Gender Gaps**

The National Science Foundation (NSF) recently released an *Infobrief* comparing graduate student enrollment and postdoctoral appointments in 2007 and 2008, and analyzing trends between 1999 and 2008. The data indicate that the increase in first time graduate school enrollments for men (2.9%) from 2007 to 2008 was slightly higher than for women (2.1%), a reverse in the observed trend in previous years. During the same period, enrollment increased for all race/ethnicity groups with the exception of Asian/Pacific Islanders (-1.3%). Among populations with increased enrollments – non-Hispanic blacks (3.8%), American Indian/Alaska Natives (15.7%), and Hispanics (1.4%) – non-Hispanic Whites (1.0%) had the smallest increase.

The data also show the number and percentage of women postdoctoral appointees has more than doubled between 1999 and 2008. Between 2007 and 2008 the rate of increase for women postdocs (12.9%) was more than six times that of men postdocs (2.0%).

An *Analysis in Brief* published by the Association of American Medical Colleges (AAMC) examined promotion rates for assistant and associate professors in American Medical Schools over a thirty year period. Using data from the [AAMC Faculty Roster](#) the authors showed that the gender gap in the ten year promotion rates for assistant professors has remained about the same but the gap in the average number of years to promotion has decreased. For associate professors, the gender gap in the number of years to promotion has stayed about the same but the gap in promotion rate for the 1987-1996 cohort was about half of that of the 1967-1976 cohort. The gaps in promotion rates and time to promotion between non-Hispanic white and non-white assistant professors have decreased steadily, but the gap in promotion rates for associate professors has increased.

[Jump in Fall 2008 Enrollments of First-Time, Full-Time S&E Graduate Students \(NSF\)](#)

[Promotion Rates for First-time Assistant and Associate Professors \(AAMC\)](#)

[Additional Data for Promotion Rates for First-time Assistant and Associate Professors Appointed from 1967 through 1997 \(AAMC\)](#)

## **Surveys Examine Differences in Salary and Career Satisfaction between Men and Women**

The journal *Nature* recently conducted an extensive survey of over 10,000 scientists worldwide to gauge their career satisfaction and the factors that affect it at various career stages. Sample sizes large enough for analysis were obtained in 16 countries. Analysis of the data indicated that a salary gap exists in all 16 countries and that the gap widens as the career progresses. In addition, the “two-body problem” was seen as an important factor by over 20% of respondents in North America, Europe, and Australia.

A study published in the *American Journal of Medicine* compared the number of men and women in several internal medicine subspecialty training programs and the average salary for physicians in each subspecialty. Although the study did not address other factors which influence subspecialty choice, the researchers did observe that women interns are overrepresented in lower paying subspecialties such as endocrinology, rheumatology, and geriatrics, and underrepresented in higher paying subspecialties such as cardiology and gastroenterology.

In a recent survey of *Clinical Faculty Satisfaction with the Academic Medicine Workplace* published by the AAMC, men reported working slightly more hours than women on average. Further, men were more likely than women to report being satisfied with their total time and the amount of time spent on various activities such as research, teaching, and patient care.

[For Love and Money \(Nature\)](#)

[Inequities Exposed in Salary Survey \(Nature\)](#)

[Gender and Future Salary: Disparate Trends in Internal Medicine Residents \(The American Journal of Medicine\)](#)

[Clinical Faculty Satisfaction with the Academic Medicine Workplace \(AAMC\)](#)

## **As More Women with Advanced Degrees are Becoming Mothers, Many are Serving as Role Models**

A recent report from the Pew Research Center, which analyzed 1992-1994 and 2006-2008 fertility and education data from the US Census Bureau showed that overall, American women were more likely to have no children in 2006-2008 than they were in the early 1990s. Further, women with a masters, professional, or doctoral degree are less likely to have children than women without an advanced degree. However, this subgroup of highly educated women was more likely to have children in 2006-2008 than they were in 1992-1994. The authors do not offer an explanation for this trend. A separate survey of general surgery residents, published in the *Archives of Surgery*, attempted to ascertain a relationship between marital and parental status with intent to pursue specialty training. They found that women, married residents, and residents with children were less likely to believe that specialty training was necessary for success than their male, single, and childless counterparts.

A recent article in *Molecular Cell* offers advice for this growing cadre of academic mothers on how to balance mothering and mentoring. This advice, which is based on the experience of the author and members of the "support and empowerment group for mothers in academia" that she formed centers on prioritization, delegation, and compartmentalization. Another example for academic mothers is Dr. Nancy Andrews, Dean of the Duke Medical School who spends Saturdays in her microbiology lab with her teen-aged daughter, sharing quality time learning and performing experiments with DNA. In an article which appeared in the *News and Observer*, a local newspaper covering Research Triangle, NC, Dr. Andrews noted that, "For me, the most effective way to have quality time with the kids has been around the activities we share an interest in."

[Childlessness Up Among All Women; Down Among Women with Advanced Degrees \(Pew Research Center\)](#)

[Impact of Family and Gender on Career Goals \(Archives of Surgery\)](#)

[How to Survive and Thrive in the Mother-Mentor Marathon \(Molecular Cell\)](#)

[Lab Time is Quality Time for Moms, Daughters \(newsobserver.com\)](#)

## **Measuring Science and Looking at the History of Women in Peer Review**

Peer review and metrics for decisions on grant funding and hiring, tenure, and promotion are the cornerstone of the academic science system. A recent survey by *Nature* asked researchers around the world to identify and rate their satisfaction with the metrics used to make hiring, tenure, and promotion decisions at their institution. While there was general dissatisfaction with the metrics currently in use, there was little consensus on what a better set of metrics would include and how stringently a set of metrics should be applied across the board.

The blogger Isis the Scientist recently posted a discussion of the history of the representation of women on NIH peer review study sections and how a lawsuit filed by the Association for Women in Science in 1972 led to an increase from 1.4% to 20% in a single year.

[Do metrics matter? \(Nature\)](#)

[The History of How Women Came to Serve on Study Section \(Isis the Scientist\)](#)

## **Highlighting Best Practices – Diversity Recruitment Programs**

*Contributed by Samantha Sass*

In 2008, the *Journal of the American Medical Association (JAMA)* published a study on racial/ethnic diversity in medical schools nationwide. It found that less than 7% of medical students were African American, 8% were Hispanic, just over 20% were Asian/Asian Pacific Islander, and less than 1% were American Indian or Alaskan or Hawaiian Native. In addition to much needed increases in diversity amongst medical school students, the JAMA study also stressed the importance of diversity-education training as foundational for comprehensive medical training. To enable these changes, underrepresented minorities and students from underserved communities must be recruited and supported through graduate school with expansive recruitment, retention, training, mentorship, and financial aid mechanisms.

For this month's spotlight on Best Practices, the efforts to decrease educational disparities at several universities and programs are described. These programs help to make medical school, as well as all health professional schools and science and engineering graduate programs, an attainable educational goal for all promising students.

The medical school at George Washington University hosted its second annual [DC Health & Academic Prep Program](#), a summer program for Washington, D.C. area high school students, aimed at preparing underrepresented minorities and underserved students for college and medical school admission. Students who take part in the program (Scholars) learn about various health-care jobs and attain academic skills which enable them to successfully complete academic programs which prepare them for medical school. Given the disparities in educational preparedness between students from well-funded and under-funded high schools, this type of program is crucial for students who wish to go on to medical school but who have not had the academic resources to achieve this goal. This program can also be pivotal for students who never viewed medical school as an attainable, or even plausible, aspiration.

In order to address the social and institutional set-backs that students may encounter, the 16 Scholars are paired with mentors currently enrolled in medical school or other health professional programs, many of whom are underrepresented minorities or come from disadvantaged backgrounds. These mentor relationships are intended to last for the duration of the program and continue throughout the Scholars' academic careers. In addition to the academic, social, and career support offered by this program, Scholars receive a \$1,000 stipend for participation and a \$4,800 scholarship for college tuition fees.

Georgetown University Medical School offers a similar program aimed at recruiting promising college students from disadvantaged backgrounds. [The Georgetown Experimental Medical Studies \(GEMS\) Program](#) is a year-long "medical school boot-camp" which prepares college graduates from disadvantaged backgrounds for medical school by teaching advanced course material, study and test skill preparation, and offering support for students. The program aims to help students who have followed a nontraditional pre-med course, but who nonetheless show great promise for success in medical school.

Begun in 1988, the [Meyerhoff Program](#) at the University of Maryland - Baltimore County (UMBC) offers undergraduate students an opportunity to participate in an intensive scientific career-training program. All Meyerhoff students are enrolled in UMBC and major in scientific and engineering fields, while also participating in Meyerhoff programming such as summer sessions, internship experience, course preparation, group-work, and mentoring. The Meyerhoff program accepts students of all background who are committed to increasing the representation of minorities in science and engineering. Students are aided by mentors, professors, family, and peers through supportive networks and mentor programs. Over 800 students have participated in the Program, many of whom go on to earn advanced degrees in medicine, engineering, and science-related fields.

What began as an experimental program aimed at increasing enrollment of African American men in science-related graduate schools has become an excellent program renowned for its success in improving rates of enrollment of all students from diverse backgrounds. The program also exemplifies the ideal of comprehensive student support, including institutional inclusion, professor and alumni mentorship, and financial aid; all of which help to make medical and health-professional school, as well as careers as independent scientific researchers, a reality for all students.

In a similar program at Rutgers University, undergraduate students prepare for medical, health professional and science-related graduate programs through intensive coursework and mentoring. Sponsored by the [Office for Diversity and Academic Success in the Sciences](#) (ODASIS), the program is dedicated to increasing the number of underrepresented minorities and disadvantaged students in science, technology, engineering, and mathematics. After students are accepted to Rutgers they can apply to the ODASIS program, which includes study halls, group study sessions, additional homework and testing courses, and mentoring from program advisors on a bimonthly basis. For students with a high GPA, they may also enroll in an admissions test-preparation course. As a result of the rigorous program, last year 50 out of 58 students were accepted into medical, dentistry, osteopathy, podiatry, nursing, and graduate biomedical sciences schools.

According to Kamal Kahn, the associate director of the program, as quoted in the Rutgers newspaper, “The key to ODASIS is nurturing, by showing [students] avenues to success, you’re helping them mature.” The program offers all promising students the chance to develop their scientific skills in preparation for advanced degrees and careers. Since its inception in 1994, the program has become a national model for student success and increased enrollment of diverse students in graduate programs.

The holistic focus of all of these institutions and programs promotes their success in recruiting, enrolling, and graduating promising young students in science-related fields. With minorities representing a disproportionately low number of medical, health professional, and science students, these programs offer essential career counseling and preparedness services at critical points in a student’s career. By focusing on personal, institutional, educational, and financial barriers to career success, these programs offer students a viable path toward advanced degrees and careers in science. These programs represent crucial initiatives that will hopefully increase diversity, improve medical and scientific training, and open doors for all promising students.

[Student Body Racial and Ethnic Composition and Diversity-Related Outcomes in US Medical Schools \(JAMA\)](#)

[Medical Schools Use Outreach Programs to Make Student Bodies More Diverse \(The Washington Post\)](#)

[Bringing Diversity into the Sciences \(Rutgers Focus\)](#)

## **Women Scientists in Action – Cherié Butts, Ph.D.**

*Contributed by Samantha Sass*

Cherié Butts, Ph.D., is a researcher and reviewer within the Division of Therapeutic Proteins (DTP) of the Office of Biotechnology Products in the Center for Drug Evaluation & Research ([CDER](#)) at the US Food & Drug Administration (FDA) whose scientific interests include understanding how factors secreted in the tumor microenvironment modify immune cell activity and contribute to development of endocrine and other cancers. The DTP is comprised of microbiologists, immunologists, chemists, and biochemists who conduct research and review drug applications. It is managed by the Office of Biotechnology Products that establishes policies consistent with CDER, which performs an essential public health task of making sure safe and effective drugs are available to improve the health of people in the United States.

Dr. Butts was first introduced to biomedical research as a high school student at the North Side High School for Medical Professions in Fort Worth, Texas. She was among the first cohort to complete the prestigious program that introduced students selected from throughout the Fort Worth School District to what was necessary to be successful in various medical careers. The program featured a rigorous curriculum of mathematics, science, and other courses as well as rotations at the local hospital and medical school. It was during this program that Dr. Butts' interest in biomedical research was piqued. After high school, she left Texas for college at The Johns Hopkins University in Baltimore, MD. As an undergraduate student, she fostered her interest in biomedical science by conducting clinical research in the Department of Gynecologic Specialties and basic science research in the Department of Hematology at the Johns Hopkins Hospital. Her clinical research examined the efficacy of different treatments for patients with various gynecologic conditions and diseases of the urogenital tract, including gynecologic cancers. Her laboratory research experience included studies using specimens from patients with fibrinogenemia - a condition characterized by elevated serum levels of fibrinogen, a globulin involved in blood coagulation - to identify mutations involved in development of this disease. Her efforts culminated in a publication and fueled her interest in biomedical research.

As an undergraduate, Dr. Butts became interested in immunology and deciphering how the human body is able to defend itself from internal and external pathogens. After obtaining her BA in Chemistry and Natural Sciences, Dr. Butts continued her training at Johns Hopkins in a master's degree program with a focus on immunology. She also chose to start a family at this point in her career. Her research focused on genetic immunization of neonatal mice and led to a second publication. These experiences further fueled her passion for biomedical research and also shaped her area of interest – regulation and manipulation of the immune system in gynecologic cancers and other malignancies. Dr. Butts continued her training in a predoctoral program when she returned to her native Texas to study immune responses of epithelial ovarian cancer patients in the Department of Gynecologic Oncology at the University of Texas MD Anderson Cancer Center/University of Texas Health Science Center at Houston Graduate School in Biomedical Sciences (GSBS). In addition to her focus on the immune system, she participated in the Reproductive Biology program at GSBS to gain a better understanding of steroid hormone biology. She postulated that steroid hormones could be modifying immune responses to limit anti-tumor immunity with gynecologic and other endocrine-related cancers.

After obtaining her PhD, she moved back to Maryland to study the role of steroid hormones on regulating immune responses as a postdoctoral fellow at the NIH National Institute of Mental Health (NIMH) in the laboratory of Dr. Esther M. Sternberg. Dr. Sternberg noted, "Even though that was not precisely the focus of my lab at the time, she made such a water-tight case for doing the research and was so clearly committed to it that we found a way to incorporate her project into the lab's research directions. Cherié has clearly continued to flower and grow into an independent, rigorous researcher and through her continued systematic studies is making important contributions in this critical area at the intersection of immunology, endocrinology and

women's health research." Under the tutelage of Dr. Sternberg, Dr. Butts enjoyed a highly successful fellowship experience and research career. This included over 15 peer-reviewed and invited publications, numerous travel awards and invitations to speak at international scientific meetings, receipt of the NIMH Tao-Chin Lin Wang Service Award, and her selection for the inaugural class of the Keystone Symposia on Cellular and Molecular Biology Fellows Program – a program that enables early-career scientists (senior postdoctoral fellows, assistant professors) who are committed to diversity in biomedical research to learn about the Keystone Symposia meeting development process. Dr. Butts also held two academic positions at the University of Maryland and Howard University to expose undergraduate students to biomedical research and encourage them to consider careers in science. After completing her postdoctoral fellowship, she transitioned to her current position at the FDA to continue her research and also learn about the process of regulating drugs and assessing their safety and efficacy in patients.

Dr. Butts' current research focuses on the role of steroid hormones and other factors in regulating immunity during infection and carcinogenesis. This involves exploring steroid hormone effects on immune cell activity during the clearance of infectious agents and development of diseases, such as cancer. Because she believes it is important to understand regulation of the immune system under homeostatic conditions, her research also involves investigating immune responses at urogenital mucosal sites to gain insight into immunity in endocrine-sensitive environments. This work is innovative because it brings together the fields of immunology, endocrinology, and cancer biology, and Dr. Butts hopes her research will further biomedical research by deciphering mechanisms of steroid hormones and other tumor-associated factors on immune cell function to understand their role in cancer progression.

In addition to her research and regulatory work at the FDA, Dr. Butts has continued her relationship with NIH, including contributing to the second phase of the Office of Research on Women's Health Science of Sex and Gender [on-line course](#), which was developed for researchers, clinicians, and members of academia in an effort to gain a basic understanding of the major physiological differences between the sexes, influences these differences have on outcome of disease, and implications for policy, medical research, and health care. She also co-coordinates a journal club in the Laboratory of Parasitic Diseases at the NIH National Institute of Allergy & Infectious Diseases and serves on the Steering Committee for the NIH Intramural Program on Women's Health (IPRWH). Of her former fellow, Dr. Sternberg concludes, "In sum, it was clear from very early on in her time in my lab that Cherié had all the makings of a future leader in science, and she is certainly living up to that prediction."

Throughout her career, Dr. Butts has served as a mentor to students at the University of Texas, Howard University, University of Maryland, Keystone Symposia, NIH, and the Howard Hughes Medical Institute's Medical Student Fellowship Program at NIH. Her commitment to mentorship is evidenced by her involvement in the NIH Speakers' Bureau and speaking to elementary through high school students to encourage promising young women who aspire to scientific careers. "My background and experiences helped me develop a unique perspective, and I have been afforded opportunities that very few others have been offered. Being an African-American female and having worked under and interacted with some of the greatest minds in the world is a rather impressive accomplishment. Being able to assist and open doors for those behind (and beside) me is a much more satisfying achievement. It is my hope that budding young, female scientists will see what I've done and believe they can attain similar success or, more importantly, better."

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