

Report on December 1999 Workshop

AWs
'99

Achieving XXcellence in Science

*Advancing Women's Contributions to Science
through Professional Societies*

Sponsored by
Office of the Director
National Institutes of Health
in conjunction with
National Institute of Environmental Health Sciences
The American Society for Cell Biology

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Foreword

As we enter a new millennium, we are poised on the brink of exciting and unprecedented opportunities for women in science. The increasing emphasis on women's health issues and growing recognition of the contributions of women in all scientific disciplines pave the way for us to make significant strides toward equity for women scientists. This report documents a huge step in the right direction — the December 9–10, 1999 workshop entitled “AXXS ’99” (Achieving XXcellence in Science).

AXXS ’99 spotlighted the role of professional societies in helping to advance the careers of women in science. The 1 1/2-day event focused on five areas of concern, generated a practical vision of the future, identified barriers to success, and produced 14 recommended initiatives for achieving excellence in science by advancing the careers of women scientists. These initiatives form the foundation for activities within and across scientific societies to promote women in leadership roles, provide mentoring programs, replicate best practices, and share relevant resources and information.

Participants in AXXS ’99 came together from diverse societies, educational institutions, organizations, and businesses to demonstrate their commitment, voice their opinions, and learn from each other. Their ultimate goal: to help women succeed in scientific careers and thereby bring about scientific advances from which all persons could equally benefit, regardless of cultural and ethnic origins, geographic locations, and socioeconomic strata.

The Office of Research on Women's Health (ORWH) is proud to have co-sponsored this successful meeting as part of its overall efforts to increase the numbers of women in science. We are hopeful that the recommendations put forth at AXXS ’99 will inspire further action by societies, corporations, and academia — wherever scientists work or are represented. It is only with your enthusiasm and participation in the next steps, and the steps to come, that we can turn these initiatives into reality.

Vivian W. Pinn, M.D.

Director, Office of Research on Women's Health
Associate Director, Research on Women's Health
National Institutes of Health

Preface

“Why do synthetic organic chemists eat their young?” asked a participant at the summer 1998 retreat hosted by the National Institute of General Medical Sciences on that topic. In response, all 25 attending scientists began to hypothesize why fewer synthetic organic chemistry proposals were being submitted and funded in recent years. Late in the final session, their discussion turned to the even smaller number of women and minority academicians in this field. One participant observed that “some scientific societies do a really superb job of mentoring and advancing their young faculty, through mock study section meetings, sessions on how to write a grant, discussions of how to get tenure, and mentoring lunches organized around career issues. Other societies are only beginning to address the problem for the young scientists in their disciplines.”

Around the same time, in August 1998, Madeleine Jacobs, Editor-in-Chief of *Chemical and Engineering News*, spoke to the Women Chemists Committee Luncheon.¹ She detailed nine suggestions for how women scientists could promote the careers of the women who were their juniors. As she challenged attendees to come up with their own magic bullets and fire them into action, an interesting idea crossed my mind: “Why not address and enhance the scientific contributions and career progression of women through their scientific societies?”

Encouraged by colleagues and friends, I proposed to the Office of Research on Women’s Health (ORWH), in January 1999, that we plan an action-oriented meeting, full of working sessions, not speeches, to figure out how to carry forward this new idea. We formed a small planning committee,² wrote a statement of purpose, and interviewed and selected facilitators. The National Institute of Environmental Health Sciences agreed to review and manage a cooperative agreement to support the workshop, which would be funded

¹ “The Challenges for Women Chemists in the New Millennium, The XYC2K Problem, The XY Chromosome Year 2000 Problem.”

² The “dream team,” which planned and executed AXXS ’99, consisted of Donna Dean, Senior Advisor to the Deputy Director, NIH; Elizabeth Marincola, Executive Director, The American Society for Cell Biology; Pamela Marino, Ph.D., Program Director, National Institute of General Medical Sciences; Joyce Rudick, Director, Programs and Management, Office of Research on Women’s Health, and Anne Sassaman, Director, Division of Extramural Research and Training, National Institute of Environmental Health Sciences. Dina Dariotis, Presidential Management Intern, supported the planning phase and developed the annotated bibliography, which will be posted on the website growing out of the workshop. Thanks to each of you for making this such a uniquely productive experience.

by ORWH. The American Society for Cell Biology volunteered to host the gathering as a satellite session to their annual December meeting.

About 20 scientists from across the country, from all walks of science, including academia, industry, and government, met in July 1999 to develop a broad outline for the workshop. Their energy and the facilitators' skills and dedication³ created one of the most productive sessions I had ever participated in, for it led us to an overarching conclusion: A trained scientist represents an investment that should not be wasted. Anyone who wants to be a scientist should be limited only by her or his own skills and intelligence, not by the environment in which she or he works. In such a world, all would contribute according to their abilities — women and men alike, including persons with disabilities, regardless of their race or ethnicity. Thus was AXXS '99 shaped.

As this report details, more than 100 participants assembled for a dynamic day and a half of hard work. Twenty institutes and centers at NIH endorsed the workshop's goals. Dr. Ruth Kirschstein, now Acting Director of NIH, inspired us with her leadership. Dr. Vivian Pinn, ORWH Director, encouraged us with her words, claiming, "We can do that! Our office will support you." Workshop participants developed concrete action plans to

- enhance and acknowledge women's scientific contributions,
- keep women from leaving science for friendlier careers,
- support women's scientific career advancement, and
- help the next generation of women scientists readily make their contributions to the scientific community.

These same participants eagerly agreed to take the next steps to ensure that the action plans developed during AXXS '99 are transformed into a grand plan, and real action, paving the way for AXXS 2000. It's action long overdue!

W. Sue Shafer, Ph.D.
Assistant Vice Chancellor
Research Administration
University of California, San Francisco
(Formerly Deputy Director
National Institute of General Medical Sciences)

³ Many thanks to Michael Milano and Rae Thompson for their help in planning and pulling off AXXS '99. They contributed materially to the growth of the concept and led the team of 14 additional facilitators who helped the participants develop concrete action plans. They kept us right on target.

AXXS '99 Sponsors

Office of Research on Women's Health, National Institutes of Health
in conjunction with
 National Institute of Environmental Health Sciences
 The American Society for Cell Biology

AXXS '99 NIH Co-sponsors

Center for Scientific Review
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 National Eye Institute
 National Institute on Alcohol Abuse and Alcoholism
 National Institute of Allergy and Infectious Diseases
 National Institute of Arthritis and Musculoskeletal and Skin Diseases
 National Institute on Aging
 National Institute of Child Health and Human Development
 National Institute on Deafness and Other Communication Disorders
 National Institute of Diabetes and Digestive and Kidney Diseases
 National Institute on Drug Abuse
 National Institute of General Medical Sciences
 National Heart, Lung, and Blood Institute
 National Human Genome Research Institute
 National Institute of Dental and Craniofacial Research
 National Institute of Mental Health
 National Institute of Nursing Research
 Warren Grant Magnuson Clinical Center

Note: AXXS '99 was presented as a satellite meeting of The American Society for Cell Biology Annual Meeting.

Notice

This report was prepared by Murphy & Milano, Alexandria, VA, for the Office of Research on Women's Health, Office of the Director, National Institutes of Health; the National Institute of Environmental Health Sciences; and The American Society for Cell Biology. While it is primarily a record of the process and products of the December 9–10, 1999 workshop, it contains some interpretative content based on the review, compilation, and synthesis of data collected during AXXS '99. In addition, all reported comments are paraphrased.

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Table of Contents

Foreword	iii
Preface	v
Executive Summary	3
Overview and key recommendations from AXXS '99	
Introduction	7
Purpose and focus of the workshop, including the agenda and five issues addressed by participants	
A Pathways Model	15
A pathways model for analyzing scientific career choices and where they may be facilitated	
Opening Remarks and Presentations	21
Summary of remarks made by Dr. Randy W. Schekman, Dr. Ruth L. Kirschstein, Dr. Carola Eisenberg, and Dr. Vivian W. Pinn	
Workshop Methodology	25
Description of the working group process used	
Shared Vision: Desired Goals	27
Working groups' ideal vision for women in the scientific workforce; presentation of eight thematic goals in the vision of the ideal scientific community shared by all groups; and a table linking the vision themes to the issues discussed by each group	
Core Obstacles: Barriers to Success	33
Barriers to the success of women scientists; definitions of core obstacles to their success; and a list of working group data	

Results: Initiatives and Action Plans 39
 How working groups developed 14 initiatives and action plans; table showing the relationship between the five issues discussed and four categories of initiatives; list of initiatives within four thematic categories; and 14 action plans. Each action plan contains the initiative’s aim, indicators of success, method or action steps, presenter, and key feedback from the plenary panel and audience.

Leadership, Visibility, and Recognition **42**
 Five initiatives and action plans

Mentoring and Networking **56**
 Four initiatives and action plans

Best Practices **68**
 Two initiatives and action plans

Oversight, Tracking, and Accountability **74**
 Three initiatives and action plans

Next Steps 85
 Next step(s) for following through with proposed initiatives

Appendix A: List of Participants and Registrants 89
 Names and contact information for individuals taking part in AXXS ’99

Appendix B: Summary of Poster Board Presentations 109
 Overview of 16 poster board presentations; contact information on presenting organizations and societies

Appendix C: Key Resources 113
 References on women’s issues supplied by participants and workshop organizers

Executive Summary

The Office of Research in Women's Health, Office of the Director, National Institutes of Health, in conjunction with the National Institute of Environmental Health Sciences and The American Society for Cell Biology, convened "AXXS '99" to explore the roles of scientific societies in advancing science by building the careers of all women in science, from the predoctoral stage to the senior scientist level. The workshop was held December 9–10, 1999, as a satellite meeting to The American Society for Cell Biology Annual Meeting at the Washington Convention Center in Washington, D.C. More than 140 participants representing more than 50 scientific societies, organizations, and government agencies gathered to

- develop action items that societies can consider for their membership
- contribute to an annotated bibliography of the career resources that can be made available as a national resource on the Internet
- exchange information with other workshop participants on the strengths and weaknesses of existing and planned societal programs and resources for their female membership.

Action-planning tracks for the 1 1/2-day workshop focused on the roles of societies related to one of the following issues:

- Mentoring and networking to promote the contributions of women scientists
- Career development for women scientists at the mid and senior levels
- Representation of women in scientific societies
- Sharing model systems that work
- Outreach and collaboration within and between societies and other organizations to advance science by promoting women in science

Working groups developed goals for each issue, identified the major obstacles to achieving those goals, and designed action plans to reach defined goals. The action plans were presented for discussion in a plenary

session. The recommendations of the working groups include 14 action plans for addressing major obstacles to the careers of women in science. Major recommendations are to

- Establish a national report card on the status of women in science and engineering and develop a database of women scientists
- Create an umbrella organization of professional societies to facilitate the exchange of information on women's career issues and activities
- Establish a national mentorship system for women, through the societies, and encourage societies to develop effective mentoring programs and make mentoring a core society activity
- Formalize mechanisms for opportunities, awareness, and development for women in science
- Design best practices for the advancement of women in science and establish a best practices clearinghouse
- Encourage societies to increase the number of women in their organizations' leadership roles by establishing (a) leadership development programs for women, (b) forums to highlight the successes of their women membership, and (c) a networking website for the scientists whom they serve.

Workshop leaders and participants expressed a high degree of enthusiasm for the results-oriented event. A follow-on meeting in June 2000 is planned to capitalize on the momentum generated at AXXS '99 for advancing women's careers in science.

It was one of the best workshops I have attended! I am looking forward to seeing the action items generated play out as advances for women in science.

Julia B. Freeman
National Institute of Arthritis and
Musculoskeletal and Skin Diseases
National Institutes of Health

Congratulations on an excellent program and a really productive day and a half.

Jennifer P. Stevens
American Academy of Pediatrics

Congratulations. I was relieved to finally participate in a meeting that was so action oriented. Hopefully this is just the beginning.

Gina Pastino, Ph.D.
McLaren-Hurt, Inc./Chem Risk

I think this was a very worthwhile endeavor. It is rare that one walks away from a full day plus evening event with some concrete ideas that can be implemented quickly, and make a difference, as well as a sense of excitement about future plans. Bravo.

Joan R. Goldberg
American Society for Bone and Mineral Research

I thought the meeting was terrific. I arranged for a junior colleague to go to the AAMC mentoring meeting for new professionals this spring, and I'm spreading the word about ELAM — the development workshop for mid-career women. I learned about both at AXXS '99. I hope to incorporate more of the ideas from the meeting at the NSF.

Janice M. Hicks
National Science Foundation

It was exciting to participate in what may be another milestone event in the history of women in science. I learned a great deal and enjoyed the opportunity to interact with women from other disciplines.

Rosalyn C. Richman, M.A.
ELAM
National Center of Leadership in
Academic Medicine

Introduction

The Office of Research in Women's Health, Office of the Director, National Institutes of Health, in conjunction with the National Institute of Environmental Health Sciences and The American Society for Cell Biology, convened "AXXS '99" on December 9–10, 1999, as a satellite meeting to The American Society for Cell Biology Annual Meeting at the Washington Convention Center in Washington, D.C. The purpose of the workshop was to explore the roles of scientific societies in advancing science by building the careers of all women in science, from the predoctoral stage to the senior scientist level. Some 140 participants representing more than 50 scientific societies, organizations, and government agencies gathered to

- develop action items that societies can consider for their membership
- contribute to an annotated bibliography of the career resources that can be made available as a national resource on the Internet
- exchange information with other workshop participants on the strengths and weaknesses of existing and planned societal programs and resources for their female membership.

There were five action-planning tracks for the 1 1/2-day workshop. Each track focused on the roles of societies related to one of five issues, as described on the following pages.

Issue 1 Mentoring and networking to promote the contributions of women scientists

- What methods can scientific societies employ to provide mentoring for women scientists throughout the stages of their careers?
- In what specific ways can scientific societies use existing programs and mechanisms to increase opportunities for mentoring women in science?
- How can societies and individuals use networking to help women transition from early to mid-level science careers?

- Issue 2** Career development for women scientists at the mid and senior levels
- How can scientific societies capitalize on their experienced, high-profile women leaders, while enhancing the participation of increasing numbers of women in visible leadership and decision-making positions (e.g., on editorial boards, on study sections, and as committee chairs and speakers)?
 - What can scientific societies do to help senior women scientists seek and accept recognition, without making them “uncomfortable” or appear overly “self promoting”?
 - In what concrete ways can scientific societies track and exchange information about women in critical positions (e.g., through editorial boards, review committees, invited chairs and lectures, awards, career progression)?

- Issue 3** Representation of women in scientific societies
- What can scientific societies do to recruit, retain, and advance women scientists across diverse scientific organizations and industries?
 - What practical actions can scientific societies take to optimize the advances, fill in the gaps, and take advantage of opportunities in meeting the career needs of women scientists?
 - How can scientific societies make sure that their programs accurately reflect the demographics of all their constituents?

- Issue 4** Sharing model systems that work
- What can scientific societies do to provide access to proven strategies and resources for assisting women scientists in advancing in their careers, especially related to enhanced self-images and projected images?
 - What actions can scientific societies undertake to successfully address gender inequity issues affecting their constituents?
 - What model systems can societies develop and replicate to recruit, retain, and advance women scientists across diverse “industries”?

Issue 5 Outreach and collaboration within and between societies and other organizations to advance science by promoting women in science

- What policies can scientific societies implement to promote the recruitment, retention, and advancement of women scientists?
- What actions can scientific societies carry out themselves or in collaboration with others, to share information, strategies, programs, and assessment tools to advance women scientists at each stage of their careers?
- What mechanism(s) can societies develop and implement, beyond this December 10, 1999 meeting, to continue exchanging resources and developing cooperative actions for advancing women's careers in science?

Participants were asked to consider what the “ideal” situation for women in science would be once all career issues were resolved, set goals for attaining their ideal, identify barriers to reaching their goals, and develop action plans that could be implemented to overcome barriers and achieve defined goals. These goals, obstacles, and action plans are enumerated within this report.

After the workshop, at the ASCB Women in Cell Biology Committee meeting, there was a tremendous energy and feeling that something good will happen as a result of AXXS '99 . . . because it was well focused and mostly because it involved extremely high quality people.

Elizabeth Marincola
Executive Director
The American Society for Cell Biology

Agenda for AXXS '99

December 9, 1999

Noon to 5:45 p.m.

Registration

6–8:30 p.m.

Evening Session and Reception

Poster Session

Society Poster Presentations

Introduction

Dr. Vivian W. Pinn

Director, Office of Research on Women's Health
Associate Director for Research on Women's Health
National Institutes of Health

Opening Remarks

Dr. Randy W. Schekman

President

The American Society for Cell Biology

Award Presentation⁴

Dr. Vivian W. Pinn

Welcome Address

Dr. Ruth L. Kirschstein

Deputy Director

National Institutes of Health

Introduction of Keynote

Dr. Vivian W. Pinn

Keynote Address

“Without Struggle There is No Progress”

Dr. Carola Eisenberg

Dean of Student Affairs (Retired)

Harvard Medical School

Kickoff Networking Reception

⁴ The honor award was presented to Dr. Ruth L. Kirschstein by the Office of Research on Women's Health, NIH, for her “distinguished contributions to women's health research and career development” as a “Mentor – Clinician – Scientist – Leader.”

December 10, 1999

7:30–8 a.m. **Registration**

Morning Session: “Success in Science is Not Sex Linked”

8–8:15 a.m. **Plenary Session**

Introduction

Dr. Vivian W. Pinn

Director, ORWH

Charge to Working Groups

Mr. Michael Milano

President, Murphy & Milano, Inc.

8:15–11:30 a.m. **Working Group Sessions on Issues 1–5**

11:30 a.m.–12:30 p.m. **Networking Lunch**

First Afternoon Session: “Building Stairways to Success”

12:30–2:25 p.m. **Continuing Working Group Sessions**

Second Afternoon Session: “Societies — Key to the Future”

2:25–5:30 p.m. **Plenary Session**

Introduction of Panel

Dr. W. Sue Shafer

Assistant Vice Chancellor

Research Administration

University of California, San Francisco

Working Group Presentations and Feedback

Plenary Panel

5:30–5:45 p.m. **Closing Remarks**

Summation and Presentation

Dr. W. Sue Shafer

and

Dr. Anne Sassaman

Director, Division of Extramural Research and Training

National Institute of Environmental Health Sciences

National Institutes of Health

Plenary Panel Providing Feedback on Working Group Initiatives

- Chair *Ruth L. Kirschstein, M.D.*
Deputy Director
National Institutes of Health
- Cochair *Donna Dean, Ph.D.*
Senior Advisor to Deputy Director
National Institutes of Health
- Panel *Alfred Johnson, Ph.D.*
President Elect
NIH Black Scientists Association
Cochair, Communication and Membership Committee
- Carlyle B. Storm, Ph.D.*
Director
Gordon Research Conferences
- Zena Werb, Ph.D.*
Chair, Women in Cell Biology
The American Society for Cell Biology
Vice-Chair, Department of Anatomy
University of California, San Francisco
- Madeleine Jacobs*
Editor-in-Chief
Chemical and Engineering News
- Catherine Jay Didion*
Executive Director
Association for Women in Science
- Rona Hirschberg, Ph.D.*
Chief, Infectious Diseases and
Microbiology Integrated Review Group
Center for Scientific Review
National Institutes of Health

I appreciate that we really got something concrete and practical done. Now it's time to think of one thing that we each can do personally to push forward with these initiatives.

W. Sue Shafer, Ph.D.
Assistant Vice Chancellor
Research Administration
University of California, San Francisco

The focus and process took advantage of participants' energy, and the recommendations go beyond the scope of any one office. I challenge you to take something back with you from this meeting and do something with it. Let this be a landmark event! Let AXXS '99 be the day we galvanized into action!

Anne Sassaman, Ph.D.
Director, Division of Extramural
Research and Training
National Institute of Environmental
Health Sciences

A Pathways Model

for Career Progression in Science

by Pamela A. Marino, Ph.D.

Before the issue of the underrepresentation of women in the research ranks of the basic sciences can be addressed, it is necessary to understand the extent to which the problem exists, and what possible obstacles to career progression may be present. While the educational path for scientists is often thought of in terms of a “pipeline” that students “flow” through or “leak” from, data suggests that the progression from grade school directly to the Ph.D. is not linear. Rather, individuals often take different avenues to an eventual independent research career.

To address the dynamics of the rates of career progression, exit and re-entry to the career path, I have developed a Pathways Model for study of the career track of a U.S. researcher, focusing from high school to independent investigator in the basic sciences. This Pathways Model, Figure 1, is patterned after traditional biochemical models for enzyme reactions. It looks at career progression as a dynamic system, with measurable rates for progression up the career ladder, and delineates points to effectively leverage these rates or recover losses akin to biochemical “salvage pathways.”

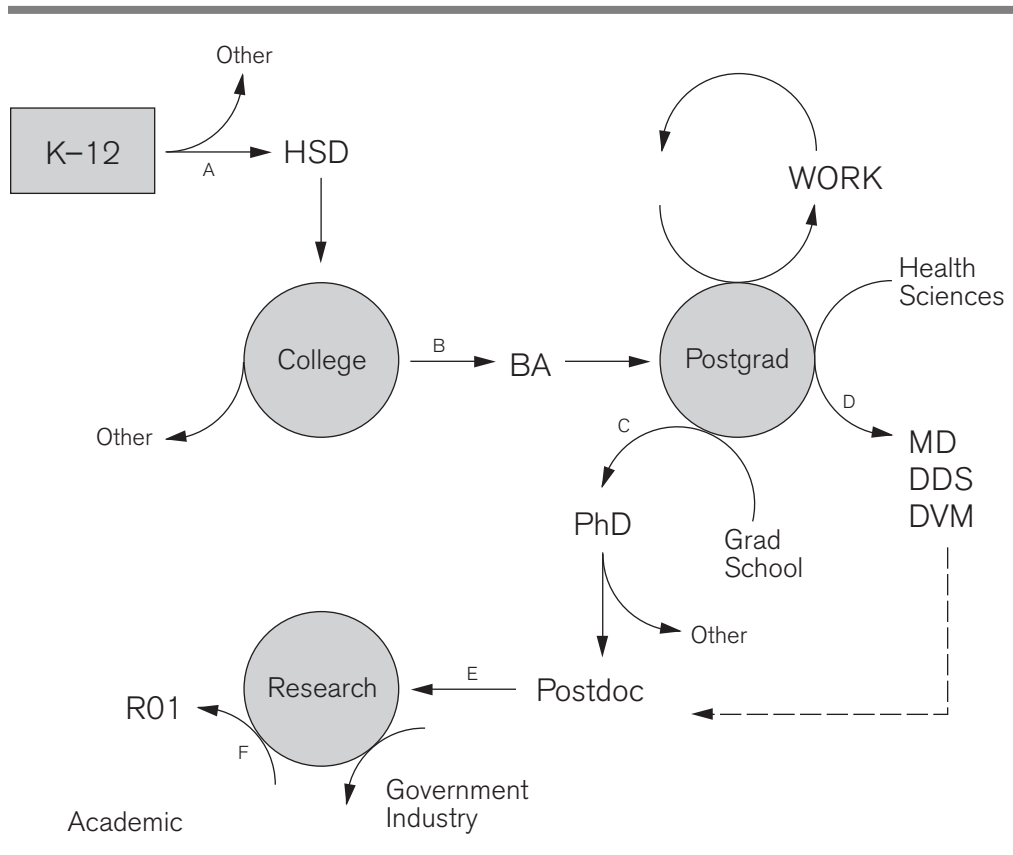
Data for women in the disciplines of chemistry and biology, as they progress through the career pathway (as compared to their male counterparts), are from the indicated references. Changes in the rates of progression for women in chemistry and biology over time are provided for comparison, as an indication of the present state of this system. The National Institute of General Medical Sciences, Office of Program Analysis and Evaluation’s, Ms. Christina Zimmerman and Dr. James Onken, Chief, furnished the information on the demographics of high school and college graduates, as well as the data on the demographics of NIH awards. The efforts of Ms. Zimmerman and Dr. Onken in helping to prepare the demographic data used in this report are gratefully acknowledged.

Pathways Model

- Step A**
- Women make up 52 percent of the U.S. population and earned 51 to 52 percent of the more than two million high school diplomas awarded for the period, 1982 to 1994.
 - 1982: 2.84 million high school diplomas were awarded, 52 percent earned by women
 - 1990: 2.75 million high school diplomas were awarded, 52 percent earned by women
 - 1994: 2.40 million high school diplomas were awarded, 51 percent earned by women

Reference: U.S. Department of Education, National Center for Educational Statistics. The 1994 High School Transcript Study Tabulation: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987 and 1982 High School Graduates, Revised NCES 99-532, by Stanley Legum, Nancy Caldwell, Bryan Davis, Jacqueline Haynes, Telford J. Hill, Stephen Litavec, Lou Rizzo, Keith Rust, and Ngoan Vo. Project Officer, Steven Gorman, Washington, D.C.: 1998. (<http://nces.ed.gov/pubs98/98532.pdf>)

Figure 1 Pathways Model



Step B

- Over the past 20 years, the percentage of bachelors' degrees in biology or chemistry being earned by women has increased steadily.
- In 1981, women earned 30.1 percent of the 11,540 bachelors' degrees awarded in chemistry and 44.5 percent of the 44,046 bachelors' degrees awarded in biology.
- By 1996, women earned 41.5 percent of the 11,137 bachelors' degrees awarded in chemistry and the majority (52.9 percent) of the 62,081 bachelors' degrees awarded in biology.

Note that while the total number of degrees being awarded in chemistry in 1981 to 1996 has remained rather constant, the percentage of these degrees being awarded to women has increased 11.4 percent since 1981. In biology, the number of degrees awarded to women since 1981 has increased by 8.4 percent.

Reference: U.S. Department of Education, National Center for Education Statistics (NCES), Integrated Post-secondary Education Data System (IPEDS). Data restricted to U.S. Citizens and Permanent Residents.

Step C

- The number of women earning a Ph.D. in chemistry or biology has increased steadily over the past 20 years.
- In 1981 women earned 15 percent of the 1,329 doctoral degrees awarded to U.S. citizens and permanent residents. By 1996, women earned 30 percent of the 1,461 doctoral degrees awarded in chemistry.
- Similarly, in 1981 women earned 29.1 percent of the 3,420 doctoral degrees awarded in biology. By 1996, women earned 44.5 percent of the 4,365 doctoral degrees awarded in biology.

The demographics of women earning the terminal degree in 1998 is similar to that of their male counterparts. Both women and men are taking 7 years to obtain a Ph.D. in biology and 6 years to obtain a Ph.D. in chemistry. The median age of women and men obtaining the Ph.D. in biology is 32 years, while the median age of women and men obtaining a Ph.D. in chemistry is 29 years. Slightly more men than women earning the terminal degree were planning on doing additional postdoctoral training upon completion of their degree. In biology, 54.4 percent of men and 50.6 percent of women were planning on pursuing postdoctoral training, while 49 percent of male chemists and 44.6 percent of female chemists were planning on postdoctoral work.

Reference: National Research Council (NRC) Doctorate Records File (DRF). Data restricted to U.S. Citizens and Permanent Residents and NSF/NIH/NEH/USED/USDA, Survey of Earned Doctorates, 1998.

Step D Medical schools enroll approximately 16,000 students each year. The percentage of women attending medical school rose from 9 percent in 1970 to 44 percent at present, and more than 90 percent of those entering medical school complete their medical degrees.

Reference: Association of American Medical Colleges (AAMC) Data Book. Statistical Information Related to Medical Schools and Teaching Hospitals, Issues from January 1991–1999.

Step E The demographics of faculty in the basic science departments of medical schools is reviewed annually by the Association of American Medical Colleges. Comparison of the demographics, at all faculty levels, between 1990 and 1999 reveals that the number of basic science faculty at medical schools increased by 937 positions from 1990 to 1998, with 349 (37 percent) of these positions filled by women. Similar to the 1990 demographics, the bulk of the women in basic science faculty positions at medical schools were at the instructor and assistant professor level in 1998. Slight gains over the 1990 levels (approximately 5 percent) at the associate and full professor levels were made in 1998.

- In 1990, 216 (40.9 percent) of instructors on the basic science faculty at medical schools were filled by women. In 1998, 302 (41.9 percent) of these positions were held by women.
- In 1990, 1,034 (29.3 percent) of assistant professors on the basic science faculty at medical schools were women. In 1998, 1,333 (32.8 percent) of these positions were held by women.
- In 1990, 669 (19.2 percent) of associate professors on the basic science faculty at medical schools were women. In 1998, 917 (25.4 percent) of these positions were held by women.
- In 1990, 410 (9.7 percent) of professors on the basic science faculty at medical schools were women. In 1998, 759 (13.6 percent) of these positions were held by women.

Reference: Association of American Medical Colleges (AAMC) Data Book. Statistical Information Related to Medical Schools and Teaching Hospitals, Issues from January 1991–1999.

Step F

Independent academic researchers must obtain outside funding to progress their research programs. Looking at NIH application and award rates for investigators not previously supported by NIH, more than twice as many men as women applied for NIH First Awards (R29 awards) between 1988 and 1997. However, women competed as well as their male counterparts in obtaining these awards. The average award rate for both women and men over the 10-year period, 1988 to 1997, was 26 percent.

The number of competing Individual Investigator Research Project Grant (R01) applications submitted by women grew from 2,401 in 1988 to 3,172 by 1997. In 1988, men were submitting more than four times as many competing applications to NIH as were women. By 1997, men were submitting only a little more than three times as many applications as women. In terms of competing R01 awards made, women have been as successful as men in obtaining funding. Women averaged an 18 percent award rate for competing NIH R01 applications from 1988 to 1997, while men averaged a 17.8 percent award rate.

Similarly, for competitive renewals of existing NIH R01 awards over the period 1988 to 1997, women have been only slightly less successful than their male counterparts in renewing their awards. During the 10-year time period of 1988 to 1997, women averaged a 35 percent success rate for competing R01 applications, compared to a 36 percent success rate for men over the same time.⁵

In summary, women have made steady gains in the number of undergraduate and doctoral degrees they are earning in both biology and chemistry. As of 1996, women, who make up 52 percent of the U.S. population, were earning 41.5 percent of the bachelors' degrees and 30 percent of the doctoral degrees in chemistry, as well as 52.9 percent of the bachelors' degrees and 44.5 percent of the doctoral degrees in biology. Women complete their graduate work in the same amount of time as their male counterparts. They pursue postdoctoral studies at similar rates, and compete as effectively for NIH funding as their male peers, when they apply. However, the percentage of NIH R01/29 individual Research Project Awards earned by women has increased only slightly over the past 10 years, from 18.3 percent in 1988 to 22.3 percent in 1997, and the promotion of women to senior (Associate Professor/Professor) career levels has been slow.

⁵ The National Institute of General Medical Sciences, Office of Program Analysis and Evaluation. Dr. James Onken, Chief, provided data on the demographics of NIH awards.

Opening Remarks and Presentations⁶

Opening Remarks: Dr. Randy W. Schekman

This was a remarkable century for women in science. For most of the past 100 years, women were not recognized for their contributions; even Marie Curie had no academic appointment at her own institution. As late as the 1970s, there were almost no women in most chemistry departments, with considerable antagonism against women in science. So, we've come a long way in a short period of time. The American Society of Cell Biology (ASCB) has helped this progress, with its strong, although short, history of representation for women. Half of the 9,500 ASCB members are women, the greatest proportion of whom are young women. As a progressive and activist organization, ASCB offers many programs to women through WICB (Women in Cell Biology). WICB holds career lunches, where 500 people meet to discuss furthering women's careers; has a standing column in the Cell Biology newsletter, in which articles such as "The Impostor Syndrome" are published; and sponsors annual awards to shine the spotlight on junior and senior scientists. On behalf of ASCB, thank you for coming to AXXS '99.

Welcome Address: Dr. Ruth L. Kirschstein

Welcome on behalf of the National Institutes of Health, particularly on behalf of Donna Shalala, Secretary of the Department of Health and Human Services. I'd like to talk about what Dr. Schekman said. While I agree that things have changed, I think we need to acknowledge that they have not changed that much. It is true, as of 1999, that 44 percent of medical school classes are women; that women earn more than 50 percent of graduate degrees in the biological sciences; and that young women are entering faculty positions. But, it is also true that when you go to look for outstanding, well-experienced, high-level cell biologists, biochemists, and biophysicists to serve on outstanding committees and advisory councils as full professors, they are hard to find. So, our challenge for next century is to continue the pipeline. You are here now for two things to happen: (1) to have more men at meetings like this, and (2) to have more women from whom to select to represent all of cell biology, all of biochemistry, and all of other specialties represented here.

⁶ All remarks are summarized and paraphrased.

It's good for the country to be represented by a broader array of scientists. Join me in this effort. We need all of you and all of your colleagues to make sure that we are taken seriously, and that we do plan for the future. I challenge you to work with all of us. The new millennium is a wonderful place to start. Thank you.

Keynote Address: Dr. Carola Eisenberg

Frederick Douglass, a former slave, abolitionist leader, and advisor to Abraham Lincoln, said, "Without the struggle, there is no progress." If women are to achieve equality in science, women have to lead the fight. We must help each other and ourselves. How many of you have nominated a female colleague for membership in the scientific organizations to which you belong? Asked a colleague to nominate a woman to membership? Nominated a woman for a prize? Solicited nominations from others on behalf of colleagues? If you have not, you are in default of duty.

Men generally do not think of women for membership, awards, prizes, and promotions. Once the names of women are put forward, men who are already in the club must make a conscious decision to include or exclude them. We have to see that the names surface. And what we cannot accomplish separately, we can accomplish when we join forces. We must join with our colleagues, insist on and analyze the facts, and seek allies among male faculty. It is up to us to fight until equity is achieved.

Gender discrimination is widespread. Most of us in this room are guilty of unintentional gender discrimination, because negative ideas about women in science are part of the academic culture we have grown up in. Yet, the issues go above and beyond academia, involving social and biological roles unique to women. While there are no tidy solutions, there are things universities can do: provide paid parental leave; subsidize quality day care; delay the tenure clock for the parent who stays home to care for the children; develop re-entry programs for women who have taken time off for children; and abolish gender-based salary discrepancies. But, after all of that has been done, the women's movement must take the lead in shifting social values to permit women to choose family and career, without penalizing them. We have to change an American ethos that exalts work over family life, that assigns family responsibilities disproportionately to women, and that fails to prepare men to be fully human. Indeed, if we succeed in moderating work demands in a society that is obsessed with work, the benefit will be no less great for men that it will be for women.

We have come a long way. We have a long way to go. It's a struggle we can win!

Closing Remarks: Dr. Vivian W. Pinn

I hope you feel that this meeting is a time of value, a positive meeting in terms of learning, exchanging information, and moving forward. We can no longer just reiterate problems; it's time to overcome the problems. I'm excited to hear the action plans and the comments on how to refine them and make them better. I love the focus on mentoring, which is an extremely important part of anything we do. Throughout the presentations, I kept thinking about what the Office of Research on Women's Health could do to help. We need to keep this momentum going. Your initiatives may require funding and organization to implement, and some may take a while to do. It will be lovely if, in a year's time, we see the birth of a new consortium. So, I think we should consider some sort of smaller follow-up meeting, within the next few months, to keep these ideas fresh. The group could be an ad hoc task force, with one or two representatives for each working group here. And there are other clinical societies that might like to join us. We've opened the door. Let's see what we can bring forward together.

Workshop Methodology

Each of seven working groups, assembled according to participants' personal preferences, addressed one of the following issues:

- Mentoring and networking to promote the contributions of women scientists (two groups)
- Career development for women scientists at the mid and senior levels (two groups)
- Representation of women in scientific societies (one group)
- Sharing model systems that work (one group)
- Outreach and collaboration within and between societies and other organizations to advance science by promoting women in science (one group).

Working group members collaborated, in a four-step facilitated process, to (1) describe a shared vision depicting their idealized situation for women in science, when the issue under discussion was ultimately resolved; (2) identify core obstacles to achieving their vision; (3) propose initiatives for realizing their vision; and (4) develop action plans for implementing their top two initiatives.

The highly structured process included a variety of activities designed to generate a wide range of views in a relatively short period of time, and to highlight and build upon common ground. Two facilitators in each working group guided participants through these activities, helped them stay focused, and insured that results were documented for the plenary meeting, this report, and follow-up action. Representatives from the seven groups then presented 14 initiatives and action plans at a plenary session, to both the general audience and a panel of recognized experts and authorities in science. The specific results of each of these activities, which have been compiled and synthesized, are presented on the following pages.

Shared Vision: Desired Goals

To define their vision for women scientists, including an “ideal” working model of the scientific community, members of each working group described what conditions would be like when the career issue being discussed by the group was finally resolved. They did so by first imagining a future point in time when the specific questions associated with their issue had been successfully resolved, and all concerns related to women’s careers in science had been fully addressed. Working from this future perspective, participants suggested observable data and intangible differences that would unquestionably indicate the successful resolution of their specific career issue. They organized their comprehensive list of items into categories, which they then titled according to the overarching theme of each category.

Themes crossing all working groups demonstrated remarkable agreement among participants about the ideal outcome of advancing women’s contributions to science through professional societies, regardless of the issue being addressed. Descriptions of the primary characteristics of the groups’ imagined future, in which all five career issues for women scientists have been resolved, follows. The characteristics are organized into eight goals and are presented in order, based on the number of groups that mentioned them, from most frequently mentioned to least frequently mentioned. Table 1 links these thematic goals to the five women’s scientific career issues under consideration, showing which goal was thought to be an important element in the desired outcome for each defined issue.⁷

Goal 1 A new cultural norm for women

At some imagined future point, when all career issues for women in science are resolved, “gender bias is eliminated, women’s leadership and communication styles are valued, the image and perception of women is highly valued, and science and family are compatible roles for women and men in this society.” Encompassing a broad spectrum of characteristics, this goal may represent the ultimate outcome of all the working groups.

⁷ Some interpretation was made with regard to these and other themes throughout the document. Further clarification may be required to fully capture the specific intention of each working group.

Goal 2 Equity with male counterparts

The existence of equity for women in science refers primarily to the equal representation of women in their disciplines and societies, as compared to their male counterparts. Many of the items involving equity focus on leadership positions and the holding of “influence and power.” The term “parity” can also be used to describe this goal. Equity/parity may be the easiest outcome to measure, as data becomes more available on society membership, honorary awards, grants, faculty positions, leadership roles, pay rates, journal editors, and so on.

Goal 3 High visibility and recognition

When current career issues cease to be obstacles for women in science, there is increased recognition and widespread “professional respect” for the accomplishments and contributions of women scientists. Large numbers of well-known women deliver keynote addresses and women routinely “receive awards” for their achievements.

Goal 4 Mentoring as an integral part of career development and advancement for women

Mentoring is “gender neutral” and refers to both one-to-one and institutional programs. Some of the characteristics of this goal are that “men seek out women mentors,” and “mentoring women is intrinsic to societies.” In the envisioned future, mentoring occurs in high schools, as well as at assistant professor and senior scientist levels. Mentoring may well be one of the most important activities for bringing about other desired outcomes.

Goal 5 Varied and valued career options for women

Expanded career possibilities for women in science are “widely promoted and highly visible” at all stages of the career pathway. As a result, more teen girls opt to take high school science, an “incubator” environment provides conditions favorable to the advancement of women in science, and greater numbers of mid- and upper-level women scientists remain on their chosen career tracks.

Table 1 Thematic Goals Linked to Issues Addressed by Working Groups

Issue – Thematic Goal	Mentoring and Networking	Career Development	Sharing Women in Societies	Model Systems	Outreach and Collaboration
1 A new cultural norm for women	x	x	x	x	x
2 Equity with male counterparts	x	x		x	x
3 High visibility and recognition for successful women	x	x		x	x
4 Mentoring as an integral part of career development and advancement for women	x		x	x	x
5 Varied and valued career options for women	x	x	x	x	
6 Readily available networking, resources, and support for women	x	x		x	x
7 Professional advancement and skill building for women through scientific societies		x	x	x	
8 Inner and outer empowerment	x		x		

Goal 6 Readily available networking, resources, and support

Women have access to, and are “included in,” non-gender-biased networks. These networks are formal and informal, as well as “faculty and employer sponsored.”

Goal 7 Professional advancement and skill building through scientific societies

There is significant support within societies to help women in science advance their careers. Such support exists in the form of “mechanisms to promote an individual’s career, funding for skill building and development, affirmative public statements from scientific societies, and job access and advancement through societies.”

Goal 8 Inner and outer empowerment

The final goal of the shared vision may sum up the entire set: empowerment. Inner empowerment refers to women being comfortable with themselves and their careers, feeling valued and effective, and holding an empowered attitude — free from any victim-like mentality. Outer empowerment includes the collaboration and exchange from peers and role models, and “MIT-type studies initiated by societies.”⁸

⁸ The MIT Study reported on the status and perceived marginalization of women faculty. See Appendix C for the complete reference.

Core Obstacles: Barriers to Success

To identify the core obstacles to advancing the careers of women in science, especially to the most senior levels, working groups listed the major factors that currently interfere with the achievement of their shared vision of an ideal scientific community. To be selected, each key impediment had to meet one or more of the following criteria:

- It has high impact (major detrimental effects).
- It is pervasive.
- It is systemic (underlying other obstacles).
- It is actionable (something can be done about it).

Once participants listed these obstacles to realizing their ideal outcome for women in science, they either grouped the obstacles (if there were similarities), or left them as they were (if each obstacle was unique). For the purposes of this report, obstacles from all working groups were combined and synthesized, then reviewed for common themes.

There was considerable overlap among the seven working groups concerning the core obstacles to advancing women's contributions to science through professional societies. A review of the raw data, presented in its entirety in Table 2, revealed five highly interrelated themes that may prove to be helpful in thinking about and addressing identified problems. These thematic core obstacles are briefly defined below.

They are listed in order, from the most mentioned to the least mentioned, with a slight adjustment for the number of groups mentioning them.

Core

Obstacle 1 Entrenched gender bias and cultural expectations

The widespread and longstanding attitudes, beliefs, and values about the role of women in society, held within the culture at large, transcend women in science and focus on the “social status quo” and the devaluation of women in general. Because obstacles falling into this theme exist on such a broad scale, addressing them (and achieving many of the conditions described in the shared vision) will require concerted efforts to change cultural perceptions and attitudes regarding women scientists, including their roles and contributions, their professions, and their families.

Table 2 Core Obstacles for Five Issues (Raw Data)

Issue	Core Obstacles
1 Mentoring and Networking	<ul style="list-style-type: none"> ▪ Isolation (due to leaving field and coming back or wrong career decisions or no professional contacts to help you) ▪ Stereotyping, role models, self-image ▪ Communication styles ▪ Knowing rules of game ▪ Sociocultural expectations and family responsibility ▪ Social status quo – maintenance of male-dominant hierarchy ▪ Institutional attitudes – current criteria for success, personal choices (women’s choices around children and family, etc. are not honored and supported by the institution) ▪ Gender attitudes – women not supporting women, men and women attitudes ▪ Professional preparation
2 Career Development	<ul style="list-style-type: none"> ▪ Senior decisionmaking by ‘old boys’ ▪ Success-oriented training – women’s aspirations, visibility, sensitivity to criticism ▪ Information – about women in the field, to women in the field ▪ Number of women – mentoring, role models, pool ▪ Career facilitation and strategies ▪ Institutional incentives – money, recognition ▪ Narrow view of scholarship ▪ Resource allocation to men ▪ Data and education to change attitudes ▪ Lack of support mechanisms – lack of mentoring ▪ Internal and external perceptions of one’s value ▪ Personal psychology
3 Representation in Societies	<ul style="list-style-type: none"> ▪ Lack of data ▪ Lack of dissemination of information ▪ Lack of collaboration among and between women ▪ Lack of mechanisms for organized action across societies ▪ Recognition of problem, especially middle career and up (to recognize the problem of lack of women representation in societies) ▪ Lack of self-confidence ▪ Fear, reticence, and lack of risk taking

(continued)

Issue	Core Obstacles
3 Representation in Societies <i>(continued)</i>	<ul style="list-style-type: none"> ▪ Stereotypes (about women roles) ▪ Tracking (related to data collection, subconsciously track in a particular less powerful past) ▪ Invisibility, intentional and unintentional ▪ Leadership's failure to understand importance to science of advancing women ▪ Lack of recognition ▪ Devaluation of women and women's role in society ▪ Lack of understanding in the professional societies of the value added of women ▪ Lack of motivation to change status quo ▪ Disciplines "eat their young" (competition among societies for their members) ▪ Entrenched power structure in societies and disciplines ▪ Changes standard of success (male model) ▪ Negative image ▪ Lack of women on appointment committees
4 Sharing Model Systems	<ul style="list-style-type: none"> ▪ Tradition based on male culture ▪ Academic structure ▪ Multiple demands on time ▪ Recognition of extent of family vs. work issues ▪ Disparity between behavior and culture (i.e., women are too nice, too naïve, not "slimy" or political enough) ▪ Economic funding and resources ▪ Barriers to career development ▪ Discrimination exists in appointment and promotion ▪ People promote and participate with "like people"
5 Outreach and Collaboration	<ul style="list-style-type: none"> ▪ Awareness to action (lack of advocacy from leadership, due to lack of awareness) ▪ Network is gender biased ▪ Number of women in power ▪ (Lack of) resources, money, power (within societies) ▪ Undervaluation of contribution of women ▪ Women's self-image and lack of history

Core**Obstacle 2** Male model of career success in science

This theme echoes the previous one on a more focused, albeit no less pervasive, scale. It highlights gender bias within the context of the institutions, industries, and organizations that employ scientists, and emphasizes the effects of such gender bias on women's careers in science. Specific obstacles include male-dominated and institutionalized structures and systems for professional advancement that place women at a disadvantage.

Core**Obstacle 3** Societies underutilized in promoting women's careers in science

In this theme, the focus turns to the opportunity for scientific societies to use their power and influence to advance women's careers in science. Included here are the general lack of awareness regarding the significance and scope of the problem, often due to insufficient information, and the dearth of mechanisms and incentives for changing the status quo, once the problems are recognized.

Core**Obstacle 4** Inadequate professional preparation and career support

Obstacles related to women's inability to find the support they require to move forward in their careers include the small number of women role models, the unmet need for both men and women mentors, and the often-unpublicized "rules of the game."

Core**Obstacle 5** Women's self perception

Women in science often feel isolated, which likely results from (and exacerbates) other obstacles. Whether such isolation comes from their attempts to balance careers and families, or from their being left out of the loop of traditional, male-dominated circles of influence, it affects women's perceptions of their own value. It may even increase their fears about moving ahead in their careers.

We don't have good data on the effectiveness of the programs we do have. Our data collection is not good science.

Jong-on Hahm, Ph.D.
Participant

Results: Initiatives and Action Plans

Keeping in mind their goals and core obstacles, working groups discussed potential initiatives and lobbied their fellow participants to consider their strongest proposals for maximizing the contributions of women in science. Then, by voting for the initiatives they considered most promising, members from each working group selected two initiatives to focus on for the remainder of their time together. Their task: to produce draft action plans for the selected pair of initiatives, each containing the aim, evaluation criteria, and the method of implementation, including specific action steps for societies to take to achieve the initiative's aim.

The seven working groups developed and documented action plans for 14 initiatives geared toward advancing the careers of women scientists. Representatives from the working groups then presented these top initiatives and their action plans to the general audience and a panel of recognized experts and authorities in various scientific disciplines. Panel members, as well as participants, raised questions and offered advice on how societies might proceed with each initiative.

For the purposes of this report, the 14 initiatives were reviewed for common themes and organized into four distinct, yet highly interrelated, categories. The four categories and their component initiatives are listed on page 35. Table 3 shows which initiatives, by category, were developed to address each of the five issues considered by the working groups. Note that, because there were two groups addressing issues one and two, there are twice as many initiatives (four) for these two issues than there are for the other issues, which have only two initiatives each. Interestingly, there is broad support, among groups addressing different issues, for initiatives in each of the four categories. For example,

- each of the two groups working on Issue 1 (Mentoring and Networking), developed one initiative about mentoring and networking and a second initiative related to leadership, visibility, and recognition;
- the two groups addressing Issue 2 (Career Development) generated initiatives in all four categories of leadership, mentoring, best practices, and oversight; and

Table 3 Initiatives Linked to Identified Issues and Categories

Issue and Initiative Category	Leadership, Visibility, and Recognition	Mentoring and Networking	Best Practices	Oversight, Tracking, and Accountability
1 Mentoring and Networking	<p>Formalize mechanisms for opportunities, awareness, and development for women in science</p> <p>Provide training and facilitate understanding regarding rules of the game</p>	<p>Establish a national mentorship system for women</p> <p>Create a networking website for scientists</p>		
2 Career Development	<p>Develop forums to highlight successes of women scientists</p>	<p>Establish mentoring as a core activity of professional societies</p>	<p>Design best practices for the advancement of women</p>	<p>Establish a report card on the status of women in science and engineering</p>
3 Representation in Societies	<p>Increase the number of women in society leadership roles</p> <p>Find and implement new strategies for leadership development programs within societies</p>			
4 Sharing Model Systems		<p>Develop effective mentoring programs</p>	<p>Establish a best practices clearinghouse</p>	
5 Outreach and Collaboration				<p>Create an umbrella organization of professional societies to facilitate networking and exchange of information and ideas</p> <p>Develop a database of women scientists</p>

- the group considering Issue 4 (Sharing Model Systems) developed initiatives related to mentoring, networking, and best practices.

Summary of Initiatives Societies Can Undertake to Address the Career Issues of Women in Science

- Initiative**
- Leadership, Visibility, and Recognition
 - 1 Develop forums to highlight successes of women scientists
 - 2 Formalize mechanisms for opportunities, awareness, and development for women in science
 - 3 Increase the number of women in society leadership roles
 - 4 Find and implement new strategies for leadership development programs within societies
 - 5 Provide training and facilitate understanding regarding the “rules of the game” as they pertain to networking, promotion, tenure, etc.
 - Mentoring and Networking
 - 6 Establish a national mentorship system for women
 - 7 Establish mentoring as a core activity of professional societies
 - 8 Develop effective mentoring programs
 - 9 Create a networking website for scientists
 - Best Practices
 - 10 Design best practices for the advancement of women
 - 11 Establish a best practices clearinghouse
 - Oversight, Tracking, and Accountability
 - 12 Create an umbrella organization of professional societies to facilitate networking and exchange of information and ideas
 - 13 Develop a database of women scientists
 - 14 Establish a report card on the status of women in science and engineering

Definitions for each theme follow, along with the detailed action plans for each initiative. Information on the action plans developed and presented by working groups is taken directly from workshop proceedings. Subsequent comments from the panel and audience are paraphrased.

Category 1

Leadership, Visibility, and Recognition

The five initiatives in this category involve shining the light on both the criteria and process of advancing in science, and the achievements of women in scientific careers. They focus on raising awareness within the general public and the scientific community about opportunities for women scientists. Strategies include extensive media campaigns, professional networks, periodic meetings to promote collaboration and share experiences, workshops and training in subjects such as mentoring and career advancement, and the tracking and use of awards. Several initiatives emphasize the need to examine and publicize models of success, disseminate criteria for promotion, and formalize oral traditions. Desired results will be measured in terms of equity — the number of women who are nominated for awards, selected as keynote speakers and session organizers, and promoted to leadership positions. Each initiative is listed below.

Initiative 1: Develop forums to highlight successes of women scientists

Initiative 2: Formalize mechanisms for opportunities, awareness, and development for women in science

Initiative 3: Increase the number of women in society leadership roles

Initiative 4: Find and implement new strategies for leadership development programs within societies

Initiative 5: Provide training and facilitate understanding regarding the “rules of the game” as they pertain to networking, promotion, tenure, etc.

Initiative 1: Develop forums to highlight successes of women scientists

Aim To make women more visible and to advance their careers by increasing the recognition of their scientific accomplishments

Evaluation (indicators of success)

- Women are equally represented
 - as nominees for awards
 - as journal editors
 - as major session organizers and speakers (by 50 percent)
 - as department chairs, professors, and deans (double percentage to 25 percent)
 - in NAS and IOM elections (by 50 percent)
 - in government and industry leadership posts.
- Women are recognized for their scientific contributions.

Method

Description of Initiative: This initiative will increase the visibility of women’s accomplishments through communication and public relations.

Action Steps:

- Produce newsletter or feature column on “Success Stories” — demystifying how process works
- Establish designated lecture with money
- Create member spotlight and develop web page highlighting accomplishments of women members, with reciprocal links to other useful sites
- Write success story column on attaining personal and professional balance
- Develop trans-society networks for women — AXXS for the millennium
- Produce lists, databases, and directories featuring women and their expertise
- Publish calendar and process for prestigious awards

- Develop topical listservs and group lists
- Distribute press releases about women
- Develop strategies to get women onto committees and editorial board lists, pairing two women to run for one position
- Identify best practices — facilitate exchange of success stories to increase visibility of women
- Use network to study progress of AXXS '99
- Notify recipients' institutions and congressional representative of honors and awards
- Encourage endowments for women's award lecture

Presenter Karla Saunders
 Legislative Associate, American Chemical Society

Question, Comments, and Suggestions from Panel and Participants
 (statements are paraphrased)

Alfred Johnson, Ph.D., Panel Member

In trying to promote visibility, especially at national meetings, did you think about how to get sessions dedicated to women?

Karla Saunders, Presenter

We thought that having a list would help, as well as getting involved with staffs at societies, especially women's committees, to push the issue forth.

Participant

Lists are not getting to people who need them. Some of the major conferences are notoriously bad for not using women. I don't know if they are not using the lists or not seeing them.

Participant

Is having a list enough? How can we get people to want to use it? How can we get it to people who need it? And how can we get people who have it to use it? Just sending the list doesn't mean people will use it.

Alfred Johnson, Ph.D., Panel Member

Is it possible for societies to provide lists of people whom they think will make good chairs and presenters to all societies that have national meetings? Is it feasible to go directly to societies' program planning committees?

Participant

This could be successful if you went to presidents of societies.

Carlyle Storm, Ph.D., Panel Member

Make sure you provide lists to conference planners.

At the Committee on the Advancement of Chemists, we've adopted exactly the tactics you describe and are working on awards, editorships, symposia, and so forth. It's about getting individuals to do the work.

Janet Osteryoung

Participant

Women in Cell Biology have a list of women speakers and a resource bureau where women are not necessarily putting themselves forward as speakers, but recommending others, especially at the mid level. Everyone knows the stars. We want to bring up women who are not yet recognized.

Participant

Initiative 2: Formalize mechanisms for opportunities, awareness, and development of women in science

Aim To create formal mechanisms and processes to support the development of women scientists, to engender networking and mentoring opportunities, and to increase public awareness of opportunities for women in science

Evaluation (indicators of success)

Progress toward aim is demonstrated through

- regular reports from Advisory Council
- the issuance of an Executive Order
- publication of proceedings of society meetings
- the distribution of related workshop and training curricula
- annual tracking of media campaign and awards
- annual tracking of school programs.

Method

Action Steps:

- Organize an Advisory Council, coordinated by the Office of Research on Women's Health, to develop activities between federal agencies, societies and professional organizations, and universities [by 2000]
- Promote public awareness and education through Presidential Initiative/Order, media campaign with recognition and awards, and women scientists reaching out to K to 12 schools — perhaps senior scientist paired with a junior scientist to teach students about women in science [by 2001]
- Establish national mentoring and networking programs through periodic meetings of women in science to promote leadership and collaboration; mentoring training workshops; and workshops on careers in science for undergraduates, so they can get the most out of mentoring [by 2000–2001]

When we talked about our ultimate goal, we saw men mentoring women and women mentoring men — both as common occurrences.

Lauren Fasig, Ph.D., J.D.
Presenter

What you propose is something we'd be interested in.

Vivian W. Pinn, M.D.
Director, Office of Research on Women's Health

Presenter Lauren Fasig, Ph.D., J.D.
Director, Society for Research in Child Development
Office for Policy and Communication

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Alfred Johnson, Ph.D., Panel Member
Your media campaign will probably require funding.
What were your thoughts about that?

Lauren Fasig, Ph.D., J.D., Presenter
We thought the Advisory Council would determine strategies and conduct fundraising activities as part of its overall planning.

Participant
A Yale survey of junior faculty showed that men were also dissatisfied with mentoring. We need to develop something that works for men and women.

Participant
Communication has to be addressed; entities involved in similar activities must be willing to share information and move forward together.

Participant
We need to teach people how to be mentees, who can then teach mentors how to be good mentors.

Participant

Most mentees will be website friendly; we could provide access through the Internet to mentors, for scientists at all levels.

At CAWMSET (Commission on the Advancement of Women, Minorities, and Persons with Disabilities in Science, Engineering, and Technology Development), we're also grappling with what has not worked in the past and what might work in the future, including a public relations campaign like nothing that has ever been done before. And there's an incredible number of activities here that are similar to what the commission is talking about. With NIH and NSF as partners to CAWMSET, I think it's important that we maintain linkages about these ideas and efforts, especially in the spring, when things can come together.

Donna Dean, Ph.D.
Panel Member

What about getting a postage stamp? People could pay a couple of cents toward women in science. Or maybe we can give people a place to check off on their tax returns to set money aside for the mentorship of women, minorities, and disabled persons in science.

Participant

Initiative 3: Increase the number of women in leadership roles

Aim To have societies implement a 5-year plan to ensure that leadership reflects each society's demographics

Evaluation (indicators of success)

Short term

- A plan is established and implemented within a year.
- At least five society-run pilot projects are begun during the first year.

Long term

- At 15 years, society leadership more accurately reflects the demographics, e.g., in its percentage of officers, board members, committee chairs, editorial boards, program chairs, session moderators, and lectureships.

Method

Action Steps:

- Identify society leaders who are willing to pilot the ideas
- Develop an information campaign with collected data (Internet, newspapers, professional journals, etc.)
- Campaign to promote results of pilot projects, i.e., success stories (what organizations have increased the number of women on their executive boards, etc.)
- Organize an event to share pilot experiences, in the second year (could take place on Internet)

We want to find five society presidents or executive boards that are interested in getting this initiative started. The results of the survey could be published on the Internet. One incentive for societies to participate is that women with limited resources for joining professional societies would choose societies that were most friendly to them, the societies that gave them the most opportunities for advancement.

Elaine Spector, Ph.D.
Presenter

Presenter Elaine Spector, Ph.D.
Associate Professor, Pediatrics, University of Colorado
School of Medicine (Professional Women in Genetics,
American Society of Human Genetics)

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Madeleine Jacobs, Panel Member

You talk about getting representation that reflects the demographics of societies. The problem for some societies, such as the American Chemical Society (ACS), is that the demographics of the society do not reflect the demographics of women chemists that are out there. ACS has 159,000 members, 27 percent of whom are women. Yet 50 percent of bachelors' degrees in chemistry go to women, and 35 percent of the doctoral degrees in chemistry are awarded to women. You need to look at each society.

Participant

Our membership is 48 percent women, and we expect a majority of women by 2003. We've been actively increasing our women members for 15 years, including bringing in two women from each state and teaching them about leadership. They're now in leadership positions.

Madeleine Jacobs, Panel Member

It's important that you tap into campus organizations.

Businesses describe getting more women and minorities in leadership positions as 'mission critical.' They talk about the business case for diversity. You don't hear that in academia. You don't hear that from societies.

Participant

Initiative 4: Find and implement new strategies for leadership development programs within societies

Aim To have more women in leadership roles in societies and to have societies understand that diversity is critical to their mission

Evaluation (indicators of success)

- Data supports progress toward aim in
 - events
 - awards
 - women’s participation at meetings.
- There is a higher percentage of women participating to explore and refine specific historical data of career development.

Method

Action Steps:

- Designate a board position dedicated to diversifying the membership of the board and positions of leadership
- Get external funding to support leadership programs
- Examine models of “tenure success” and formalize oral traditions
- Propose to societies that they prominently display a women’s section on websites with appropriate maintenance (staff and salary)
- Establish a “Shadowing Program” during society meetings, with travel money for young professionals, which pairs a junior and senior scientist for 5 days — a small commitment

In our group, we talked about how we’re trying to stick people into a model of doing things that doesn’t fit any more with the way people want to work — neither women nor men.

Jong-on Hahm, Ph.D.
Presenter

Presenter Jong-on Hahm, Ph.D.
Director, Committee on Women in Science and Engineering
National Research Council

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Participant

We're in a capitalistic society where economics are important. Why not partner with Bill Gates? Talk about web access! He's even reaching out to minorities. And what about Donald Trump? Let's get these men involved in a quest for mentorship; take our ideas to people with big bucks.

The Computing Research Association got women together who had been hired as Assistant Professors and told them what to do, and what not to do, to get tenure.

Jong-on Hahm, Ph.D.
Presenter

Initiative 5: Provide training and facilitate understanding regarding the “rules of the game” as they pertain to networking, promotion, tenure, etc.

Aim To create an informed scientific community that understands influence, resources, and career advancement

Evaluation

Indicators of success include

- equitable representation of women
- an informed scientific community with regard to career advancement.

Method

Description of Initiative: This initiative will clarify and actively publicize and disseminate written competency-based criteria for scientific promotion; provide training in communication styles and gender differences; disseminate “unwritten rules;” and increase access to role models.

Action Steps:

Promotion criteria

- Develop a model for institutional clarification of and adherence to criteria
- Find funding sources and professional societies to endorse (and possibly enforce)

Training to raise consciousness

- Provide training at annual meetings (and universities) under supervision of societies (similar to ethics training at universities)
- Include in website information

Unwritten rules

- Categorize information (what is important)
- Include in website (moderated, anonymous) and link to other sites

Role models

- Help societies maximize events where informal communication can take place
- Obtain and provide training grants to fund travel to mentoring events, including non-scientific venues
- Develop a database of biographies and descriptions of career paths and current situations of successful women in science

We need to be careful not to schedule women's career sessions at the same time as a major speaker.

Tamara Doering, Ph.D.
Presenter

Presenter Tamara Doering, Ph.D.
Assistant Professor of Molecular Microbiology
Washington University School of Medicine
and Society of Glycobiology

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Participant

I have some concern about promotion criteria that are supposed to be written, but have not been seen. It's important to be sure that people understand this.

Participant

A good example of how this can work is the "Systers" website, which started with 20 subscribers and now has 2,500 members. In a way, it has suffered from its own success. When it was smaller, it was more effective in dealing with unwritten rules; junior members would have questions of protocol that senior members could answer. Anybody can start one.

Participant

Check out WISENET (Women in Science and Engineering Network).⁹ There are lots of questions and answers about how to do “X” — from how to get tenure to how to find comfortable shoes. Also, with regard to promotion criteria, it can vary from institution to institution. For physician scientists, we found that certain things helped with promotion, so we posted what to do and how to do it on our website. This year, for the first time, two women are further along in the nomination process than ever before.

In surveying people about their career paths, ask what the barriers were and how they overcame them, to come up with the unwritten rules of the game. A lot of the answers will tie into gender differences.

Madeleine Jacobs
Panel Member

It’s amazing what faculty don’t know. We’ve tried to level the playing field and open up the unwritten rules. But you can’t do it in formal guidelines. We put them on a website and drafted a guidebook on planning for tenure that contains “tips.” You can get away with unwritten rules in a “tips” document. Also, some organizations have linked career development with other training. The women’s group at the American Society of Nephrology organized a session for junior nephrologists and offered scholarships for faculty to attend.

Page Morahan, Ph.D.
Participant

⁹ See Appendix C for information on WISENET.

Category 2

Mentoring and Networking

The four initiatives in this category entail developing a formal, organized mentoring system to encourage, support, and help advance the careers of women scientists. Action steps involve (1) conducting a survey of societies to identify what is already being done and to assess the interest in and need for mentoring programs; (2) forming a steering committee or working group to determine alternative models or templates for mentoring; (3) developing a training course on mentoring; (4) creating program evaluation tools; and (5) establishing a website with a mentoring database, chat room, and resource area. Incentives for participation in the mentorship system combine “carrots” (such as awards) and “sticks” (such as funding linked to mandatory requirements). The success of these initiatives will be measured by the number of participating institutions, societies, mentors, and mentees, as well as by an increase in equity between male and female scientists. Each initiative is listed below.

Initiative 6: Establish a national mentorship system for women

Initiative 7: Establish mentoring as core activity of professional societies

Initiative 8: Develop effective mentoring programs

Initiative 9: Create a networking website for scientists

Initiative 6: Establish a national mentorship system for women

Aim To increase the quality and quantity of mentorship for women in the sciences

Evaluation

Quantitative indicators of success

- Large number of mentees, mentors, and former mentees now recognized as mentors
- Statistics on short- and long-term results

Qualitative indicators of success

- Positive mentee evaluation of mentor
- Positive mentor evaluation of mentorship system and institutional support
- Positive institutional evaluation of mentoring impact
- Positive evaluation of the overall initiative

Method

Description of Initiative: This initiative will create a system to encourage, develop, and recognize mentorship for women.

Action Steps:

- Ascertain professional society interest
- Establish a working group from interested public and private entities (disinterested parties come later)
- Identify and assess resources available to encourage, develop, and recognize mentorship for women
- Define incentives to achieve aim and initiative, such as
 - developing courses about mentoring and linking course completion with financial incentives for individuals, such as merit increases, funding ability, promotions, and the number of graduate students allowed to recruit
 - tying mentoring activities to financial incentives

- establishing an institutional requirement for a mentorship development program
- developing a mandatory mentoring module for men and women in collaboration with professional societies
- establishing mentoring awards for individuals and institutions

Presenter Caroline M. Kane, Ph.D.
Adjunct Professor, University of California, Berkeley
Department of Molecular and Cell Biology
and Women in Cell Biology, ASCB/ASBMB

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Rona Hirschberg, Ph.D., Panel Member

Is anyone aware of a current institutionalized mentoring program that could serve as a model?

Participant

The Endocrine Society has a mentoring program in connection with Women in Endocrinology. Members select women for all positions and then all women vote for them. The society has had many women presidents and would be willing to share their template.

Participant

Scientists in industry need and could be mentors too. We need to include both public and private members.

Participant

We should coordinate letters to societies regarding different mentoring initiatives.

Participant

Let's think about targeting letters to societies. Our website has more than 600 active links to different societies and organizations. That's a lot of letters.

Schools with mentoring programs could recruit better students.

Carlyle Storm, Ph.D.
Panel Member

What we're proposing is a carrot and stick approach — tactical and strategic — mixing both voluntary and mandatory elements. We didn't think that providing information would be sufficient, so the stick is having 'mandatory' mentoring programs. Institutions not developing a mentoring program would lose graduate students.

Carolyn Kane, Ph.D.
Presenter

What about accrediting? Or bringing the issue of mentoring into the metric tally done by the US News and World Report. If you could do that, there would be an entirely different ranking of institutions than we normally see.

Jong-on Hahm, Ph.D.
Participant

Initiative 7: Establish mentoring as a core activity of professional societies

Aim To increase the number of mid- and senior-level women scientists and the number of women in leadership positions

Evaluation (indicators of success)

Short-term success is revealed by the

- identification and sustainability of mentors
- establishment of mentoring relationships and goals between mentors and mentees
- satisfaction with and continuity of mentoring relationships until goals are achieved.

Method

Action Steps:

- Create a Steering Committee of AXXS '99 attendees from professional societies [by December 1999], which
 - forms oversight group that generates report on outcomes [periodically, beginning in April 2002]
 - manages web site for progress reports and exchange of ideas among mentoring groups at different professional societies [ongoing]
- Develop alternatives models for mentoring with evaluations tools geared toward leadership and achievement at highest levels of science [by April 2000]
- Devise a marketing plan for promoting mentoring program to professional societies [by June 2000]
 - Identify interested societies
- Recruit interested societies [by August 2000]
 - Conduct a specific needs assessment of participating society members [by December 2000]
 - Adapt model [by January 2001]
 - Implement model, reporting outcomes periodically to Steering Committee [by April 2001]

We took the tact in looking at career development of scientists at the mid and senior levels that mentoring was one of the most important factors that led to the success of both women and men in high-level positions.

Rosalyn Scott, M.D., MSHA
Presenter

Presenter Rosalyn Scott, M.D., MSHA
Associate Professor, Charles R. Drew University
of Medicine and Science

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Donna Dean, Ph.D., Panel Member

There are many people out there who have it in their hearts and minds to be good mentors, but who inadvertently do things that are not quite right, some of which are subtle. They need to learn how to mentor others effectively.

Zena Werb, Ph.D., Panel Member

You want interested societies? The first step is to generate something (among societies) that resembles interest. How will you take the most reluctant groups — areas where women scientists don't have power — and try to empower your approach?

Rosalyn Scott, M.D., MSHA, Presenter

One example I can give involves women thoracic surgeons, who must be among the least empowered group, with only 98 women certified in the 51-year history of the American Board of Thoracic Surgery. We asked the Society of Thoracic Surgeons to hold a special symposium recognizing the contributions of women to thoracic surgery. It is happening in January. Our strategy was not to have women talking about their accomplishments, but rather to have highly recognized men as speakers. The only woman on the panel will provide demographics. All the qualitative presentations will be done by men.

Did you give any thought to how you would have societies go to the people who need to be mentors — the faculty of departments in academia? You need an implementation plan to keep it going.

Ruth L. Kirschstein, M.D.
Panel Member

There has to be good training for mentors, especially for men who are in the right level positions for becoming mentors. They need to know things like: What is a good mentor? How can you fit mentoring into your schedule? What are the issues and strategies you can help younger professionals with?

Andrea Zardetto-Smith, Ph.D.
Participant

Initiative 8: Develop effective mentoring programs

Aim To implement effective mentoring, career development, and support mechanisms for scientists at all levels of career development and achievement

Evaluation (indicators of success)

- There is male-female equity in awards, jobs, salary, positions, etc. (per society basis).
- There is equity in male-female committee appointments, officers, board members, and editorships.
- Societies are successful in their recruitment and retention of female members.

Method

Description of Initiative: This initiative will develop effective mentorship programs within societies.

Action Steps:

- Complete a baseline survey of societies' current mentoring activities [by December 2000]
 - Conduct annual update
 - Follow up on this meeting
 - Obtain funding from the government
- Publish survey results, with annual updates, on the web (as part of the website from this workshop)
- Review, compare, and create templates for mentoring programs to determine what works and what doesn't
 - Use different content templates for different types of mentoring (with outcomes)
- Disseminate templates for effective mentoring to all societies

We believe that many societies already have mentoring programs.

Joy Ware, Ph.D.
Presenter

We hope to get a broad base of societies involved and plan to send an email note to this workshop's participants asking for your help in identifying societies to include in the survey.

Dianna Bourke, Ph.D.
Working Group Member

Presenter Joy Ware, Ph.D.
Professor, Virginia Commonwealth University
Department of Pathology

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Madeleine Jacobs, Panel Member

When you do your survey, request information on all mentoring programs, including minorities, and not just programs for women. You will get a variety of ideas about what mentoring systems work. What has made the American Chemical Society's Scholars Program so successful in recruiting undergraduate students is its mentoring component: having a person assigned to each student throughout the undergraduate years. So, make sure your survey is large enough.

Donna Dean, Ph.D., Panel Member

Do you have any sense of the percentage of societies that have mentoring programs?

Joy Ware, Ph.D., Presenter

No. Our group had no consensus on how many, but we believe that many societies do have mentoring activities, ranging from formal one-to-one contact to informal mentoring lunches.

I've referred the group with this initiative to the National Research Council, which can assist them in sending surveys to selected societies. NIH and NSF have been working with the Committee on Women in Science and Engineering. It's a good locus and focus for many of these initiatives.

Donna Dean, Ph.D.
Panel Member

Initiative 9: Create a networking website for scientists

Aim To produce exemplary mentoring at every stage of career development, especially for women

Evaluation (indicators of success)

- Registered hits to website by category
- Assessed user satisfaction (were technical and career development questions answered?)
- Large number of mentoring contracts generated and fulfilled
- Large number of societies participating in website and training (health sciences, physical sciences, academia, and industry)

Method

Description of Initiative: This initiative will create a networking website for scientists, consisting of a mentoring database (who offers what), a chat room (for informal Questions and Answers), and a resource area (with links to other sites).

Action Steps:

- Develop website
 - Identify organization to oversee website [by March 2000]
 - Identify and assess existing databases [by July 2000]
 - Develop draft website with three components [by September 2000]
 - Develop registration profile [by September 2000]
 - Develop evaluation questionnaire [by October 2000]
 - Develop mechanisms for formalizing mentoring contracts [by October 2000]
- Market the website initiative (over 1 or 2 years through a series of workshops to teach faculty what it is to mentor and why they should be mentors)
 - Identify and create template for mentoring workshop
 - Have societies commit to workshop at their next annual meetings

- Identify formal list of benefits of mentoring
- Develop marketing materials

We need different types of mentoring for different issues. Co-mentoring can actually occur at a peer level.

Sue Hepplefinger, Ph.D.
Presenter

Presenter Sue Hepplefinger, Ph.D.
Assistant Professor, University of Cincinnati
Department of Pathology
Chair, Committee for Career Development,
Women, and Minorities
American Society for Investigative Pathology

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Participant

Do you have any thoughts about how to provide access to this information for people without web access? There are many people around the world without access to the Internet. And what about providing information in Spanish?

Sue Hepplefinger, Ph.D., Presenter

I have no answers and I appreciate the problems. Maybe we could put information in marketing materials and disseminate through society newsletters to get the word out about mentoring workshops at annual meetings. But then, only a small percentage of scientists go to their own society's meetings.

We've thought about bringing NIH activities together with other efforts and discussed the real dilemma of reaching people who don't yet have access to technologies. We might unfairly presume that significant numbers of people in graduate schools have access to some of these technologies. There are insufficient answers; it's something for all of us to grapple with.

Donna Dean, Ph.D.
Panel Member

I have the perception that there are areas of science where scientists don't appreciate the importance of belonging to societies, even in significant areas. There's increasing apathy among faculty and students, many of whom are the people who need to have access to what we are talking about. We need to encourage young people to belong to societies and get the attention of people not tuned into the mechanism of societies. How can we reach them?

Zena Werb, Ph.D.
Panel Member

It's hard to get to websites that do exist. Some are buried within organizations. And there's no single portal that opens up to 'women in science and engineering' for example.

Participant

Category 3

Best Practices

The two initiatives in this category emphasize best practices as models for increasing women's access to, and retention in, scientific careers. Each initiative, however, approaches best practices from a distinct point of view. One initiative requires the development of best practices for advancing women scientists in government, societies, universities, and industry; the other initiative focuses on identifying and publicizing best practices that already exist. The first initiative calls for written policies and procedures for achieving parity between women and men in science, a standard report card, job descriptions and evaluation tools that highlight requirements related to mentoring and other activities that help advance women, and public certificates for "women-friendly" organizations. The second initiative involves defining criteria for selecting best practices, surveying selected groups, and compiling information about winning programs on a highly sophisticated website. Each initiative is listed below.

Initiative 10: Design best practices for the advancement of women

Initiative 11: Establish a best practices clearinghouse

Initiative 10: Design best practices for the advancement of women

Aim To design organizational best practices for the advancement of women in diverse organizations (government, universities, and societies) through incentives, rewards, and accountability

Evaluation (indicators of success)

- Statistics show parity between women and men in science.
- Policies and procedures are in place to enable advancement.
- Job descriptions for leaders include requirements to advance women.
- Institutional climate surveys show differences in attitudes and behaviors of leaders.
- Leaders are held accountable (e.g., rewards, resources, advancement are linked to achieving goals).

Method

Description of Initiative: This initiative will involve designing, implementing, and publicizing these elements:

- Database and report card (pre, baseline)
- Climate survey of attitudes and behaviors (pre, baseline) (quantitative and qualitative)
- Upward or 360-degree survey of leaders, managers, and upward
 - Covering data, attitudes, and behaviors
 - Incorporating requirements in leaders' job descriptions, including
 - (1) Elements required for advancement of women, such as mentoring and coaching, advancement planning, and advancement results
 - (2) Self development and training in necessary skills
 - (3) Rewards and lack of rewards linked directly to achieving goals
 - *Rewards:* resources, release time, bonuses, merit awards, promotions

- *Lack of rewards:* withheld benefits, institutional and federal grants, and accreditation; censure list
- Public certification and awards to organizations designated as “women friendly”

Action Steps:

- Contact Shelia Wellington, Catalyst, about joint effort (ORWH or academia or AWIS coalition)
- Develop coalition to formulate the plan
- Develop nationwide baseline database, making data into “apples and apples”

Presenter Page Morahan, Ph.D.
Director, National Center of Leadership in Academic Medicine
MCP Hahnemann University

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Donna Dean, Ph.D., Panel Member

Many women are leaving to start their own corporations.

Participant

We worked to establish a coalition and developed a leadership circle, with a corporate sponsor for a workshop. We hope to do this on a yearly basis. I think industry has recognized women as the future market.

I take exception to industry being better. It's hard to get data, which may be deceiving.

Participant

Industry may be ahead on this issue because of manpower concerns for the future, but the glass ceiling is still in place. Is it at least cracking?

Carlyle Storm, Ph.D.
Panel Member

Initiative 11: Establish a best practices clearinghouse

Aim To disseminate best practices for increasing access, retention, and advancement of women in science, engineering, and math careers

Evaluation (indicators of success)

- Large number of hits on website
- Positive website feedback

Method

Description of Initiative: This initiative will create an interactive website to serve as a clearinghouse for best practices that increase women's access to careers, retention, and advancement in science.

Action Steps:

- Secure funding from government and industry partners
- Identify target groups
- Develop survey instrument to define and identify best practices
- Distribute instrument to identified target groups
- Evaluate responses for meeting criteria for best practice
- Compile best practices resource list and post on sophisticated and searchable website (available to everyone worldwide, enabling them to find out what we are doing right with regard to improving women's access to careers in science)

Who: Core group to write proposal and underwrite costs

When: Proposal completed by July 1, 2000

We hope to have a very sophisticated and interactive website with links to other sites.

Mary Ann Stepp, Ph.D.
Presenter

Excellent plan! You might make some kind of cooperative arrangement with an organization called Catalyst, in New York. It works to advance women in business and has put out several books and reports.

Madeleine Jacobs
Panel Member

Presenter Mary Ann Stepp, Ph.D.
Associate Professor, The George Washington University
Department of Anatomy and Cell Biology
Association of Anatomists
and Women in Cell Biology Committee

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Zena Werb, Ph.D., Panel Member

You could include best practices for education (K through 12 and the undergraduate world) for getting women into science, as well as for faculty and postdoctoral levels.

Mary Ann Stepp, Ph.D., Presenter

We thought that the first step was to do this at the post-graduate level and then move into K through 12.

Donna Dean, Ph.D., Panel Member

WEPAN, Women Engineering Program Advocacy Network, has links to Women in Computing, which has its own website. It's a good connection for you.

Participant

The Association for Computing Machinery has a Women's Committee with a NSF grant to compile information on what is being done. The CRA Women's Committee is also doing something focused on research universities. Both have good websites. It's a bit like what you are describing; we should keep in touch.

Jong-on Hahm, Ph.D., Participant

The Committee on Women in Science and Engineering, under the auspices of the National Academy of Sciences Council, is going to publish a best practices guide to women in science and engineering in academia.

In the business world, many organizations and businesses are required to subscribe to best practices. As something of this nature matures, you could have incentives for university departments to comply by tying their compliance to certification or federal grants.

Carlyle Storm, Ph.D.
Panel Member

Make sure that all societies have immediate linkage to your website, and that you have links to existing websites. You'll need them all to get rolling. Something like this is so worthwhile.

Alfred Johnson, Ph.D.
Panel Member

Category 4

Oversight, Tracking, and Accountability

The three initiatives in this category provide formal mechanisms for overseeing and documenting progress in advancing women's careers in science. All three initiatives involve the formation of a working group, committee and/or consortium to provide advice and accountability, as well as quantitative information on efforts to promote equity between women and men in science, engineering, and technology. These groups are responsible, in this category, for developing and managing a database of women scientists, and establishing a "report card" — which also includes a database — that tracks the number of women in leadership positions, career progression statistics, family-friendly policies, and resources within participating institutions and organizations. Success will initially be measured by the number of societies actively participating in the oversight groups and their projects, and by the number of institutions and organizations complying with policies established to advance women's careers in science. Over time, success will be evident in the equity that exists between women and men in scientific careers. These oversight groups may well offer the structure necessary to monitor progress on other initiatives. Each initiative is listed below.

Initiative 12: Create an umbrella organization of professional societies

Initiative 13: Develop a database of women scientists

Initiative 14: Establish a report card on the status of women in science and engineering

Initiative 12: Create an umbrella organization of professional societies to facilitate networking and exchange of information and ideas

Aim To move from awareness to action in addressing issues relating to women in science, engineering, and technology (SET)

Evaluation

- A committee is established with a good cross-sectional representation of SET groups, with commitment of resources and a timetable of initiatives.
 - A committee is established.
 - Financial resources are committed.
 - Membership composition is representative.
 - A significant number of projects and initiatives exist.
 - (1) List of action items and timeline
 - (2) Progress documented in reports, newsletters, etc.
 - There is resulting growth in interest and involvement.
 - (1) Greater input from science community (“assessment”)
 - (2) High status of committee within the SET community (credibility, visibility)
 - (3) Open channels of communication and information dissemination

Method

Description of Initiative: This initiative will establish an Organizing Committee and a Steering Committee to oversee the creation of an umbrella organization of societies.

Action Steps:

- Identify and recruit prominent and credible spokesperson(s) to spearhead organization
- Create mechanism to establish Steering Committee
- Disseminate idea to participating AXXS '99 societies

- Recruit and form Organizing Committee [by June 2000]
- Establish Steering Committee [by January 2001]
 - Example of Steering Committee composition: AAAS, AWIS, ORWH, WEPAN, SFN, Cell Bio, APA, IEEE, SOT, ACS, WICR, AWMA, FASEB, AMS, and ACM
 - Responsibilities:
 - (1) Develop mission statement and timetable (avoid duplication; don't reinvent the wheel; exchange ideas)
 - (2) Determine where umbrella organization will reside
 - (3) Identify tasks and resources

Presenter Andrea M. Zardetto-Smith, Ph.D.
Assistant Professor, Women in Neuroscience
and Society of Neuroscience

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Alfred Johnson, Ph.D., Panel Member

Who's on the Steering Committee?

Andrea Zardetto-Smith, Ph.D., Presenter

The organizing committee would discuss.

Participant

Why are you taking so long?

Andrea Zardetto-Smith, Ph.D., Presenter

Because of the internal politics of societies and the time it will take to report back from this workshop, get on the societies' agendas, and clear time for people willing to be involved.

Donna Dean, Ph.D., Panel Member

This might be one area where a group of societies is ready to move ahead to begin, with other societies coming on board later.

Participant

The Federation of Organizations for Professional Women already exists. It had some problems, which are important to look at to make this a strong and viable organization for women. Also, I think it won't take so long. There are a number of organizations that are ready to begin. It will depend on the size of the organization, whether it is run by volunteers, has a central office, etc.

This initiative should supersede politics of societies and be done more quickly. I urge you to keep the momentum going.

Participant

Initiative 13: Develop a database of women scientists

Aim To create and publicize a web-based database of women scientists

Evaluation

Short term

- Large number of participating societies
- Large number of entries and participants in database
- Positive feedback from users and large number of hits to site
- Good marketing statistics (brochures distributed, “media mentions”)

Long term

- Greater number of women on editorial boards
- Greater number of women receiving awards
- Greater number of women speakers (by percent)
- Positive feedback from societies (high number of requests to use site)
- Greater number of women in society power positions
- Positive feedback from listees (increased invitation rate)
- Greater number of women chairs, full professors, etc.

Method

Description of Initiative: This initiative will develop an online list of women scientists with links to societies (voluntary submission and universal access) to make names available for recruitment, speakers, advisory committees, editorial boards, and collaborative leadership positions.

Action Steps:

- Publicize the need and value of this initiative (editorial)
 - Communicate with societies regarding existing structures and establish links and buy-in

- Establish representative advisory group and meet [by May 2000]
 - Submit proposal to societies
 - Establish managing and working groups (with society collaboration)
 - Gain agreement for participation by societies
 - Write a grant and identify funding sources
 - Establish input fields
 - Ensure that each society is responsible for updating list
 - Hire point person
- Develop implementation plan — time line and proposal, website architecture, and budget [by January 2001]
 - Establish website (test and evaluate)
- Launch site [by July 2001]

Presenter Paula B. Kavathas
 Chair, American Association of Immunologists
 Committee on the Status of Women

Question, Comments, and Suggestions from Panel and Participants
 (statements are paraphrased)

Participant

I echo the need for a database and see societies following NIH's example to attend a certain number of meetings.

Participant

There have been lists of women before, but people not familiar with the names will not invite them. They don't know if they're good speakers. I'm not sure you can expect hits except for the people already known.

Paula Kavathas, Presenter

Some may not be looking for a good speaker, but rather for someone who has published something interesting. We could also match people to journals and papers.

Participant

One way to collect data is from societies using a common template and setting criteria for validation.

Participant

Physicians represent a large segment of medical communities and none have a woman president. The best resources for a speakers list are the societies. You could create a template and merge lists.

Participant

A list is not enough. It has to be organized by subject. You have to make it effective, so people want to use it.

Many times I've wished for a single web portal for identifying women and minorities when a request is made of me. This would be valuable to have for any of us. We could get speakers from across all fields of science.

Donna Dean, Ph.D.
Panel Member

AWIS has a database that requires references, someone who knows the work of listee. You also have to distinguish those who are willing to be contacted for jobs and you need to have consistency of information, standardized across disciplines and activities.

Catherine Jay Didion
Panel Member

Initiative 14: Establish a report card on the status of women in science and engineering

Aim To use a “carrot and stick” approach to encourage long-term change toward institutional equity

Evaluation

Short term

- Higher percentage of society participation
- Higher percentage institutional compliance
- Positive media reports

Long term

- Positive responses from institutions to questionnaires requesting 5-year evaluation of utility of database and report

Method

Description of Initiative: This initiative will compile and publicize information from institutions and departments in top 100 research universities to create a report card that can provide national visibility and ranking.

Action Steps:

- Request or recommend that AAAS establish a consortium of professional societies to
 - develop a questionnaire and mechanisms for gathering data
 - identify institutions and departments for inclusion in database
 - develop a database
- Identify key data on numbers and percentages regarding
 - structural demographics — the number of women in senior leadership, decisionmaking, academia, and administrative positions
 - career progress (rank, salary, time to tenure or professor)
 - resources (space, students, discretionary, institutional funding)

- other (e.g., such as flexible tenure, family-friendly policies, daycare)
- Collect and compile data on annual basis in web-based “report card” with subsequent professional and lay dissemination
- Evaluate and track in 5-year intervals

Presenter Merry Bullock
Associate Executive Director, American Psychological Association, Science Directorate

Question, Comments, and Suggestions from Panel and Participants
(statements are paraphrased)

Zena Werb, Ph.D., Panel Member

You've got to put thought behind this and determine the target group that would have the greatest impact.

Participant

How would you get data? How would you make it stick, especially regarding salary?

Merry Bullock, Presenter

We could ask for salary ranges or ask departments to rank themselves within national norms.

Participant

Be sure to consider bonuses, not just salaries. Being a woman has been shown to be a negative predictor of salary.

This would look at the assumptions behind what makes an institution a good one. It would help prospective students consider the 'success' rate of their predecessors.

Catherine Jay Didion
Panel Member

This is one of the best suggestions. It has teeth. If data is collected in a way that includes mentorship, it could help women decide where to get degrees and faculty positions. It needs to be part of the ranking of universities.

Zena Werb, Ph.D.
Panel Member

If we do this, we should offer tools and assistance to help institutions improve their scores, so that the program provides both incentive and assistance.

Participant

Next Steps

This is a historic day. I'd like to congratulate Dr. Pinn and all of you for bringing attention to an important subject. It's clear that we are nonprofit organizations with limited funds. We require grants. We need resources to make this work.

Participant

We have a number of parallel activities that might fit with several initiatives presented so far, and we may already have something underway on a smaller scale, or have mechanisms to help with implementing these ideas. So let me give a word of encouragement: we helped bring you all together, we're not going to abandon your recommendations.

Vivian W. Pinn, M.D.

Director, Office of Research on Women's Health

The next major step toward implementing the 14 initiatives developed at AXXS '99 is to bring together a small implementation group, at the National Institutes of Health in the spring or early summer of 2000, to clarify, synthesize, and expand initiative aims, indicators of success, and action steps; and to develop integrated implementation plans based on agreed-upon priorities.

To accomplish their task, this newly formed AXXS '99 Implementation Committee will explore the links between the categories of initiatives developed at AXXS '99 and make sure that each implementation plan draws from, and contributes to, other related plans as required. Some possible links are shown in Table 4. Additional overlapping steps may surface at the meeting.

Table 4 Possible Links between 14 Proposed Initiatives

	Leadership, Visibility, and Recognition	Mentoring and Networking	Best Practices	Oversight, Tracking, and Accountability
Leadership, Visibility, and Recognition		Role models Database Website Networks	Website Success stories Awards	Tracking awards Tracking school programs Online lists
Mentoring and Networking		Workshops and training		
	Role models Database Website Networks Workshops and training		Database Website Incentives (carrots, sticks) Publicity	Incentives Mandatory requirements Online lists Institutional ranking
Best Practices	Website Success stories Awards	Database Website Incentives (carrots, sticks) Publicity		Baseline survey Report card Incentives Database Website
Oversight, Tracking, and Accountability	Tracking awards Tracking school programs Online lists	Incentives Mandatory requirements Online lists Institutional ranking	Baseline survey Report card Incentives Database Website	

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Appendix B

Summary of Poster Board Presentations

Sixteen organizations, in addition to the Office of Research on Women's Health, National Institutes of Health, exhibited posters at AXXS '99. Individual presentations covered a multitude of topics, ranging from general information and handouts to specific and informative displays. Most presenting societies, commissions, and committees posted their mission, history, membership demographics, programs and/or women's committees activities, publications, and/or awards and initiatives. Many described their mentoring programs, offered web sites of interest to scientists, and reported on the demographics of women within a given field of science and/or engineering. The posters were on display throughout the meeting, allowing for a great deal of interaction and information exchange between individuals and presenting organizations.

The following associations, societies, commissions, and committees exhibited poster boards:

- American Association for Cancer Research
Women in Cancer Research
- American Association of Immunologists
Committee on the Status of Women
- American Psychological Association
- American Society for Cell Biology
Women in Cell Biology
- Association for Computing Machinery
Women in Computing
- Association for Women in Science
- Association of American Medical Colleges
- Association of Women Surgeons
- Commission for the Advancement of
Women, Minorities, and Persons with
Disabilities in Science, Engineering,
and Technology Development

- Committee on the Advancement
of Women Chemists
- Executive Leadership in Academic
Medicine
- Federation of Organizations for
Professional Women
- Office of Research on Women's
Health
- Science's Next Wave, GrantsNet
- Sleep Research Society
- Women in Engineering Programs
and Advocates Network
- Women in Neuroscience

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American Association of Immunologists Committee on the Status of Women

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Association for Computing Machinery

Women in Computing
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Association for Women in Science

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Federation of Organizations for Professional Women (FOPW)

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 Washington, D.C. 20006
 Phone (202) 328-1415
 Fax (202) 328-1215 (phone first)
 Email fopq@dgs.dgsys.com
 Website <http://www.fopw.org>

Office of Research on Women's Health

Contact: Joyce Rudick, Director of Programs
 and Management
 National Institutes of Health
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 Bethesda, MD. 20892-0161
 Phone (301) 402-1770
 Fax (301) 402-1798
 Email RudickJ@od1tm1.od.nih.gov
 Website <http://www4.od.nih.gov/orwh/>

Science's Next Wave, GrantsNet

Contact: Science's Next Wave
 1200 New York Avenue, N.W.
 Washington, D.C. 20005
 Email grantdoctor@aaas.org
 Website <http://www.nextwave.org>
 Website <http://www.grantsnet.org>

Sleep Research Society

Contact: Mary A. Carskadon
 President, SRS
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Women in Engineering Programs and Advocates Network (WEPAN)

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 Website <http://www.wepan.org>
 Website <http://www.engr.washington.edu/wepan>

Women in Neuroscience

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 Website <http://www.beemnet.com/win>
 (for job postings)

Appendix C

Key Resources

Annotated Bibliography

American Psychological Association. “Psychology Education and Careers Guidebook for College Students of Color.” Office of Ethnic Minority Affairs, March 1998. Also available on the Internet at <http://www.apa.org/pi/oema/>.

This pamphlet advises minority college students about steps they can take to prepare for a future career in psychology. The importance of mentorship, networking, and preparation for graduate training are outlined throughout the publication.

American Psychological Association. “Psychology Education and Careers Guidebook for College Students of Color: Applying to Graduate and Professional Programs.” Office of Ethnic Minority Affairs, March 1998. Also available on the Internet at <http://www.apa.org/pi/oema/>.

This pamphlet provides guidance about many aspects of the graduate school application process. Some of the topics in the guide include information about selecting a graduate program, the application process, and examinations required for graduate study of psychology. The pamphlet also contains advice about the factors that contribute to successful and unsuccessful applications.

American Psychological Association. “Psychology Education and Careers Guidebook for High School Students of Color.” Office of Ethnic Minority Affairs, March 1998. Also available on the Internet at <http://www.apa.org/pi/oema/>.

This pamphlet gives advice to minority high school students about seeking careers in psychology. The pamphlet explains the duties and educational background necessary for a career in psychology. Contributions of ethnic minorities to the field of psychology are also highlighted.

American Psychological Association. “Psychology Education and Careers Guidebook: Resources for Psychology Training Programs Recruiting Students of Color.” Office of Ethnic Minority Affairs, March 1998. Also available on the Internet at <http://www.apa.org/pi/oema/>.

This brochure gives guidance to psychology graduate and professional training programs in the development of minority recruitment and retention strategies. The brochure also contains advice for academic institutions about developing recruitment packets to attract ethnic minorities to psychology programs.

American Psychological Association. “Report of the Task Force on the Changing Gender Composition of Psychology.” October 1995. Also available on the Internet at <http://www.apa.org/pi/taskforce/>.

This report analyzes factors related to the increased representation of women and decreased representation of men in the field of psychology. More access to educational and employment opportunities has led to a significant increase in the number of women who are choosing to enter the field of psychology. The report cautions that female dominance in the field of psychology could potentially lead to lower salaries and prestige based on historical trends in other professions.

American Psychological Association. “Surviving and Thriving in Academia: A Guide For Women and Ethnic Minorities.” A Joint Publication of the Committee on Women in Psychology and American Psychological Association’s (APA) Commission on Ethnic Minority Recruitment, Retention, and Training in Psychology (CEMRRAT). May 1998. Also available on the Internet at <http://www.apa.org/pi/wpo/>.

This pamphlet helps new female and minority Ph.D.s to find jobs and gain career advancement. The pamphlet discusses strategies for maximizing chances for promotion and tenure, as well as strategies for coping with negative tenure outcomes. In addition, the pamphlet gives advice to women and minorities about how to functionally deal with adversity during their careers.

American Psychological Association. "Visions and Transformations...The Final Report." Commission on Ethnic Minority Recruitment, Retention, and Training in Psychology, January 1997. Also available on the Internet at <http://www.apa.org/pi/oema/>.

The Committee explored barriers to recruitment and retention of ethnic minorities in the field of psychology. The report outlines the American Psychological Association's 5-year plan for increasing minority recruitment and retention by promoting multicultural education, and increasing ethnic minority faculty and student recruitment and retention. In addition, the APA aims to provide national leadership for diversity education in science and the APA plans to promote data collection, research, and evaluation in the areas of minority recruitment and retention.

American Psychological Association. "Women in the American Psychological Association Women's Program Office Public Interest Directorate." Washington, D.C.: 1999.

This pamphlet is a biannual assessment of the status of women's participation in APA governance, in the journal publication process, program consultation and accreditation, and the governance structure of the APA. The pamphlet provides demographic information about women in the APA and their participation in APA divisions and state and regional psychological associations.

American Society for Cell Biology Newsletter. Women in Cell Biology Column (published monthly). Also located on the Internet at <http://www.ascb.org/ascb/>.

The "Women in Cell Biology" column, written by members of the Women in Cell Biology Committee, covers a variety of issues related to career development and advancement of women scientists. Topics include: transition between academia and industry, the tenure process, sexual harassment, and skill development.

American Society for Cell Biology. ASCB Membership Survey. Published September 14, 1998. Also located on the Internet at <http://www.ascb.org/ascb/survey/survey.htm>

The Education Committee of the American Society for Cell Biology conducted a Member Career Survey. The comprehensive survey of biomedical scientists and trainees compares real and perceived career prospects, measuring success by several objective parameters and satisfaction qualitatively across cohorts. The study found that during the past 20 years it has become increasingly difficult for scientists to complete Ph.D.'s and obtain full-time employment.

Benjamin, Ernst. "Disparity in the Salaries and Appointments of Academic Women and Men: An Update of a 1988 Report of Committee W on the Status of Women in the Academic Profession American Association of University Professors." American Association of University Professors. Also available on the Internet at <http://www.aaup.org/Wrepup.htm>. Accessed November 1, 1999.

Despite the fact that salary disparities between male and female academicians have decreased, the differences are still significant. Although female participation in scientific careers is increasing, the number of women in high-paying positions is still far less than that of men. The paper considers several factors that contribute to continuing disparities between male and female scientists.

Bowman, Sharon, Ph.D. and Stacia Davis Hill, M.A., et. al. "It Takes a (Small) Village: Mentoring Black Women in the Academy."

This paper discusses mentoring for African-American and international black women who are graduate or undergraduate students. There are issues related to racial identity that may have an effect on the relationships between mentors and mentees. The article provides suggestions for improving the mentoring process for international and African-American women students, including broadening the image of mentor to include Caucasians.

Brennan, Mairin. "Reflections of Women in Science." C&EN. April 6, 1998, pp. 37-41.

The New York Academy of Sciences held a conference to discuss major issues facing women scientists and engineers. The conference emphasized the importance of mentoring and networking, as well as "risk taking" and "trade offs" in science and engineering careers. The status of women scientists working in private industry and government is better than that of women working in academia. However, in private industry, there are few women scientists in top leadership positions.

Catalyst. "Women Scientists in Industry: A Winning Formula for Companies." Published 1999. May be purchased via the Internet at <http://www.catalystwomen.org/research/research14.html>.

Catalyst, a nonprofit organization that works for the advancement of women into leadership positions, conducted a study that found that corporations do not aggressively recruit women into scientific careers in private industry. The report recommends strategies that the private sector can use to attract, recruit, and retain highly qualified female scientists.

Clewell, Beatriz Chu and Angela B. Ginorio. "Examining Women's Progress in the Sciences from the Perspective of Diversity." (Chapter 6). *The Equity Equation: Fostering the Advancement of Women in the Sciences, Mathematics and Engineering*. San Francisco: Jossey-Bass Publishers, 1996.

This chapter analyzes the status of underrepresented populations in science, mathematics, and engineering careers (SME) focusing on the educational experiences of these populations, from kindergarten to undergraduate and graduate levels. The chapter discusses factors or variables relating to achievement, performance, and participation in academic disciplines relating to science, medicine, and engineering. In addition, the chapter identifies areas of future research in the education and career advancement of underrepresented populations in SME.

Davis, Clinda-Sue and Sue Rosser. "Program and Curricular Interventions." (Chapter 7). *The Equity Equation: Fostering the Advancement of Women in the Sciences, Mathematics and Engineering*. San Francisco: Jossey-Bass Publishers, 1996.

This chapter examines the effectiveness of federal investments in program intervention and curriculum reform in science, medicine, and engineering. The chapter identifies effective interventions at the undergraduate and graduate education levels. The authors also outline a model of science curriculum reform. In addition, the chapter identifies several effective science-teaching methods.

Dunkin, Mary Anne. "Polly's Spin." *Arthritis Today*. March-April 1999, pp. 41-42, 55.

The article discusses the career of Polly Matzinger, a researcher at the National Institutes of Health, who focuses on immunology. Dr. Matzinger has been questioning traditional paradigms with respect to the autoimmune system. The article outlines Dr. Matzinger's Danger Model hypothesis of the immune system, which challenges fundamental scientific beliefs and faces criticism from traditionalists in the scientific community.

Eisenhart, Margaret and Elizabeth Finkel. *Women's Science: Learning and Succeeding From the Margins.* Chicago: University of Chicago Press, 1998.

The book discusses the cultural alienation of women in the scientific community. Since society has traditionally discouraged women from entering scientific careers, less is expected from women who are involved in science. As a result of traditional societal bias, women scientists often internalize these lowered expectations, thus limiting their career advancement.

Herring, Susan C. "Gender and Democracy in Computer-Mediated Communication." *EJC/REC* Vol. 3, No. 2, 1993. <http://dc.smu.edu/dc/classroom/Gender.txt>. Accessed August 11, 1999.

The article evaluates claims that computers democratize communication with respect to males and females in two electronic academic discussion lists during the course of 1 year. The article finds that there is a tendency for a minority of males to dominate discussions. The author argues that this electronic form of communication may act as a form of censorship and limit the level of democratic discourse.

Massachusetts Institute of Technology (MIT). "A Study on the Status of Women Faculty in Science at MIT Numbers Faculty By Gender and School: October 1998." Written by Members of the First and Second Committees on Women Faculty in the School of Science. Available on the Internet at <http://web.mit.edu/fnl/women/Fnlwomen.htm>

A committee comprised of science faculty members studied the status of women faculty in science at MIT. The report found that many tenured female faculty felt "marginalized and excluded from a significant role in their departments." The report also found that the number of female faculty members has not experienced a significant increase in almost two decades.

The committee recommended strategies for improving the status of female faculty members and increasing recruitment of females and underrepresented minorities.

National Academy of Sciences. *Trends in the Early Careers of Life Scientists.* Washington, D.C.: National Academy Press, 1998. Written by Committee on Dimensions, Causes, and Implications of Recent Trends in the Careers of Life Scientists, Shirley Tilghman Chair. Also available on the Internet at <http://www.nap.edu/readingroom/books/trends/#contents>

This book examines the data concerning the production of doctorates in life science and the changes in the kinds of positions that graduates have obtained. It discusses the impact of those changes and suggests ways to deal with the challenges of supply versus demand for life science Ph.D. graduates. The book serves as an information resource for young scientists deciding on career paths.

National Institutes of Health. "Building Interdisciplinary Research Careers in Women's Health." Request for Applications OD-99-008. Release Date: September 7, 1999. Also located on the internet at <http://grants.nih.gov/grants/guide/rfa-files/RFA-OD-99-008.html>.

The Office of Research on Women's Health and co-sponsors invite institutional career development award applications to support research career development of junior faculty members, who have recently completed clinical training or postdoctoral fellowships, and who are commencing basic, translational, clinical, and/or health services research relevant to women's health. The goal of this initiative is to promote the performance of research and transfer of findings that will benefit the health of women.

National Institutes of Health. "Supplements to Promote Re-entry into Biomedical and Behavioral Research Careers." Request for Applications PA-99-106. Release Date: May 14, 1999. Also located on the internet at <http://grants.nih.gov/grants/guide/pa-files/PA-99-106.html>.

The National Institutes of Health (NIH) reannounces a program for administrative supplements to research grants to support individuals with high potential to re-enter an active research career after taking time off to care for children or parents or to attend to other family responsibilities. The aim of these supplements is to encourage fully trained individuals to re-enter research careers within the missions of all the program areas of NIH.

National Science Foundation. "Women, Minorities, and Persons With Disabilities in Science and Engineering: 1998." Arlington, VA, 1999. (NSF99-338). Also available on the internet at <http://www.nsf.gov/sbe/srs/nsf99338/>

This report is the ninth in a series of Congressionally mandated biennial reports on the status of women and minorities in science and engineering. The report documents both short- and long-term trends in the participation of women, minorities, and persons with disabilities in science and engineering education and employment.

Shibley Hyde, Janet. "Women's Slow Progress Up the Professional Ladder: Just One Big Schema?" *Contemporary Psychology: APA Review of Books*. February 1999, Vol. 44, No. 1, 31-33. Also located on the Internet at <http://www.apa.org/journals/cnt/feb99/cnt44131.html>

This article is a critique of Virginia Valian's book, *Why So Slow? The Advancement of Women*. The author examines factors that have traditionally hindered women's career advancement and critiques Valian's use of a schema approach to explain gender differences in career development and advancement.

Web Sites

American Psychological Association Women's Program Office

<http://www.apa.org/pi/wpo/>

The Women's Program Office coordinates the American Psychological Association's efforts to ensure equal opportunities for women psychologists as practitioners, educators, and scientists and to eliminate gender bias in education and training, research, and diagnosis. The web site contains information about academe, awards, conferences, and publications, including "Surviving and Thriving in Academia: A Guide for Women and Ethnic Minorities; Task Force on the Changing Gender Composition of Psychology" and "Women in the American Psychological Association and Women in Academe." In addition, the Office of Ethnic Minority Affairs web site, <http://www.wpw.org/pi/oema>, has a number of useful and informative publications with respect to the status of minorities in the field of psychology.

American Society for Cell Biology

<http://www.ascb.org/ascb>

This web site contains information about products, services, and meetings sponsored by The American Society for Cell Biology (ASCB). The site includes a Women's Resource Bureau, which is a list of prominent women scientists in a variety of fields who provide information for recommending excellent women scientists to study section membership and committee membership. In addition, members of the Resource Bureau can recommend women scientists who are also excellent and compelling speakers to meeting organizers. The site also contains an online monthly newsletter, which includes a column focused specifically on career advancement of women scientists. In addition, the site includes information about ASCB's Women in Cell Biology Committee.

**Arizona State University, College of Education
The IPEDS Interactive Database**

http://129.219.88.111/ipeds/
Accessed November 1, 1999

The web site contains a database developed by Arizona State University, College of Education. The database provides information on faculty salaries for different institutions and breaks out the data by gender.

Association for Women in Science

http://www.awis.org

The Association for Women in Science (AWIS) is an organization dedicated to the achievement of equity and full participation of women in all areas of science and technology. The web site provides information regarding AWIS programs and career development activities, including networking and mentoring opportunities. In addition, the web site contains information regarding scholarships and internship opportunities for women scientists.

**The Chronicle of Higher Education
"Career Network" Web Page**

http://www.chronicle.com/jobs

The web page contains advice about job hunting and other career-related issues, such as balancing work and family life. The site contains a searchable database of job announcements. In addition, the site provides useful information about the current job market. Also included is a section entitled "Ms. Mentor," which provides guidance about career advancement specifically for women.

Institute for Women and Technology

http://www.iwt.org

This organization aims to "imagine, design, create, and deploy technologies that have positive impacts on women around the world." The web site contains information about the organization's events and activities, research and development projects, and outreach initiatives.

The Math/Science Network

http://www.elstad.com/msn.html

The Math/Science Network (MSN) is a non-profit organization of educators, scientists, mathematicians, parents, community leaders, and government and corporate representatives whose mission is to promote the continuing advancement in mathematics and science education of all people, with particular emphasis on the needs of women and girls. The web site contains information about MSN history, membership, and programs, such as the "Expanding Your Horizons in Science, Mathematics, and Engineering" program.

**Office of Research on Women's Health
National Institutes of Health**

http://www.od.nih.gov/orwh/

The web site provides information about Office of Research on Women's Health (ORWH) career development initiatives for women scientists. The site contains information about the inclusion of women in health research. In addition, the site contains a comprehensive women's health research agenda that is followed by ORWH. Information regarding ORWH committees, meetings, and special events can also be accessed on this web site.

**Pathways to Careers for Young Women in
Mathematics, Science, and Technology**

http://www.moo.tappedin.org:8000/
Accessed November 1, 1999

This web site, developed by SRI International, provides biographies on women scientists and mathematicians. The site gives female students an opportunity to connect with mentors and engage in online discussions.

Sociologists for Women in Society

<http://socsci.colorado.edu/sws/index.html#general>

Sociologists for Women in Society is an organization of social scientists fostering social equality for women. The web page contains information about awards and scholarships for women's health.

The Women in Biology Internet Launch Page

<http://pingu.salk.edu/percent7Eforsburg/bio.html>

The site is a starting point for finding information about women biologists. The site provides lists of links to available information on the web regarding women in biomedical sciences, especially information relevant to women who are graduate students, postdocs, or more senior scientists. The topics range from science education, to practical career issues, to the history of women in science.

WISENET

<http://www.math.purdue.edu>

WISENET was set up to provide a way for women in science and engineering to meet with others having similar interests. There are no guidelines as to topic, presuming that women with some similarities in interest and background, and likely to be in a minority in their place of employment, will find it helpful and useful and supportive to talk with others about many things. The list is unmoderated. To subscribe to WISENET, send email to LISTSERV@uicvm.uic.edu. Leave the subject blank and in the body of the message type: SUBSCRIBE WISENET (your full name and email address).

Women in Science

<http://library.advanced.org/20117/>

This web site allows visitors to learn about women of the past and present who are involved in science. The site contains an International Registry for Women in Science, which allows women scientists to connect with each other. The site also contains a Mentoring Area, where female scientists can seek out mentors or learn about particular fields of science. In addition, the site provides a Chat Room that allows female scientists to engage in dialogue.



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