REPORT ON

2003 WORKSHOP ON GENDER ISSUES IN THE SCIENCES

June 11-13, 2003
Colby College
Waterville, Maine

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Contact information for workshop speakers can be found at the website stated above.

2003 WORKSHOP ON GENDER ISSUES IN THE SCIENCES
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EXECUTIVE SUMMARY
by
Dr. Suzanna Rose

The groundbreaking Workshop on Gender Issues in the Sciences, organized by Colby College in Waterville, Maine, from June 11-13, 2003, addressed five major issues concerning gender in the sciences, including: Gender Issues in Teaching Science; Gender Bias in Teaching Evaluations; Balancing a Career and a Personal Life; Recruitment, Retention, and Mentoring for Women Scientists, and Successful Strategies for Advancement.

At the Workshop, leading scholars with expertise in each of the preceding areas presented their remarks and led breakout groups for the nearly 100 conference participants. This in-depth exploration of crucial barriers to women's advancement in the sciences was warmly welcomed by conference participants, including a provost, deans, department chairpersons, faculty, graduate students, and undergraduates from many different colleges and universities. According to participants, noteworthy aspects of the conference included excellent speakers and organization of the conference; varied, insightful, and informative presentations; high quality information on all aspects of the issue; good source of new ideas for effective institutional and curricular change; helpful discussion of undergraduate retention; and the opportunity to meet other women in science.

The 2003 Workshop on Gender Issues in the Sciences was meant to serve as a blueprint for other colleges and universities to use when exploring ways to recruit and retain women in the sciences. This website provides the format and content of the conference, including a summary of each speaker's presentation, bibliographic resources, and transcripts of the speakers' talks and of speakers' summaries of the discussion groups. We hope that other institutions and individuals will use the content to develop a deeper interest and understanding of issues facing women in the sciences and to organize similar workshops that will continue the discussion. Key points from the conference were:

1. More academic women today are in the sciences, but inequities persist. Strategies for change must be aimed at reconstructing institutions to facilitate and respond to the entry of women scientists.
2. The traditionally male pedagogical style and content of teaching science may have a negative effect on women students unless efforts are made to send the message that "women belong" through the use of a broader range of examples, greater student participation, and a variety of formats for student interactions.
3. Gender bias in student evaluations of teaching is more prevalent in the sciences than in the humanities. Specific risk factors that might result in lower teaching evaluations for women scientists include: being in a male-dominated profession, teaching mostly male students, having lower faculty rank, being younger in age, having high grading standards, and exhibiting an authoritative rather than a warm and nurturing personality.
4. More women would be competitive for academic jobs in the sciences if hiring groups focused on specific skills instead of comparing applicants to the ideal candidate. Once hired, peer mentoring is an effective way to support and retain women faculty. Colleges and universities that are successful at recruitment nevertheless do not do enough to retain women. Lack of recognition, lack of communication from senior colleagues, exclusion from (mostly male) informal networks, and dual-career-couple issues contribute to attrition. Institutional efforts that are directed specifically at the retention of women in the sciences are required.
5. Women faculty members tend to value service to the institution and community and contribute more in this area. However, women are advised to choose service roles that dovetail with their broader career objectives, because publishing—not service—is the gold standard in academe.

INTRODUCTION
by Bets Brown, Ph.D.

On June 11-13, 2003, Colby College's Forum for Women in Science hosted the 2003 Workshop on Gender Issues in the Sciences[1] on the campus in Waterville, Maine. This workshop addressed important and timely issues facing female science faculty in higher education. Invited speakers included a stellar roster of scholars nationally recognized for their work in the field.

Because the 2003 Gender and Science Workshop was a natural outgrowth of the activities of Colby's Forum for Women in Science, establishing the context of the workshop necessitates a description of the history of the Forum and of women in the sciences at Colby.

Women in the Natural Sciences at Colby.
The presence of women in the sciences on our campus harkens back to the early 20th century when the first Dean of Women, Ninetta Runnels, also served as professor of mathematics. Recent records (Table 1) indicate trends that reflect aspects of the national status of women in the sciences. We have seen a marked increase in numbers of tenured or tenure-track women in the sciences and, in recent years, a marked decrease in turnover. The increase in number of women on the tenure track in the sciences has increased at a greater rate than the total number of faculty lines, such that women now make up 30 percent of the faculty in the Division of Natural Sciences.[2]

The year 2000 marked the first during which every department in the Division had a female faculty member. In the years between 1997 and 2004, nine female scientists were hired. All of these women are currently active and productive faculty members, and three of them have attained tenure. A female statistician will also join the faculty in fall 2004.

Since 1991, 17 women have served as visiting faculty. All but three of these women have served in the capacity of sabbatical replacements. Of those three, one was a post-doctoral fellow, working at Colby from 1998 to 2001, one was part-time continuing faculty, and one is a Research Scientist in Biology who teaches periodically on campus. During the 2003-2004 academic year, there were five female Teaching Associates, all of whom hold Masters degrees, employed by the Natural Sciences Division.

Table 1 indicates that over the past 30 years, eleven women resigned from their positions: two were recently tenured women and the remainder were untenured women. The resignations came from several departments and for a variety of reasons. Not unexpectedly, women faculty in the sciences engaged in discussions that focused on factors such as strategies for academic success, balancing careers with family life, challenges facing them, and student evaluations of and interactions with female faculty. These discussions germinated the formation of Colby's Forum for Women in Science.

Colby's Forum for Women in Science.
The 1994-1995 academic year heralded the first year of "official" status for the Forum on Women in Science and the first in which the Division of Natural Sciences provided funding for the Forum. At that time, there were five tenure-track women faculty in the Science Division, no tenured women faculty, several women teaching staff, and a few part-time women instructors. The Forum was intentionally designed as an informal group that was open to all faculty, teaching associates, and visiting faculty. The Forum conducted a series of informal meetings to address issues pertaining to women pursuing careers in science and mathematics. During the first year, meetings included reporting on the research of women scientists at Colby, mentoring young women

[1] The primary sponsor of the workshop was the Howard Hughes Medical Institute (HHMI). Other contributors to the conference included Colby's Forum for Women in Science, IBM Lecture Fund; the Women's, Gender, and Sexuality Studies Program; and the Special Programs Office.

[2] The Division of Natural Sciences includes the following departments: Biology, Chemistry, Computer Science, Geology, Mathematics, and Physics.

Table 1. Recent History of Tenured or Tenure-Track Female Faculty in the Sciences

Date	Total Women	Number Hired	Number with Tenure	Number Granted Tenure	Number Departing	Comments
1975-1980	3	1	2	0	0	
1980-1985	3	0	2	0	2	one retired, one resigned
1985-1990	5	4	1	0	2	two resigned
1990-1995	8	5	1	0	4	one retired, three resigned
1995-2000	12	8	3	3	5	five resigned, two of which were tenured
2000-2004	12	5	3	2	0	

scientists through research apprenticeships, discussing careers as research scientists, reviewing literature related to the topic of women in science careers, and balancing a career with a family. Attendance at events typically numbered 25 to 30 with a good mix of both genders and of faculty, staff, and students.

During the second year, the Forum further examined questions of science careers and gender as they applied to Colby. The Natural Sciences Division supported the Forum as they co-hosted an invited Science and Technology Studies seminar given by Dr. Clarise M. Yentsch, who spoke on the concepts in her book, The Woman Scientist: Meeting the Challenges for a Successful Career, published with C. J. Sindermann in 1992. Highlights of the group's activities since then have diversified, but continue to draw interested parties to the discussions. In April 2002, the Forum for Women in Science joined with the Women's Studies Program to sponsor a seminar by Rebecca Herzig, Assistant Professor of Women and Gender Studies at Bates College, titled "Suffering for Science: Love, Labor, and Knowledge in Fin-de-Siecle American Life."

In November 1995, the Forum for Women in Science participated in submission of a proposal to the Howard Hughes Medical Institute. A very effective, important, and highly successful workshop on gender relations was one result of the successful proposal. This event was attended by over 30 interested faculty and staff members within the Natural Sciences Division led by Drs. Holly Sweet and Lee Perlman of the Cambridge Center for Gender Relations. Drs. Sweet and Perlman also had the opportunity to meet with students during their two-day visit. The workshop was very useful and incorporated role playing and gender role reversal exercises that brought home key points and helped all of the participants internalize the experiences of women in the sciences.

By 2000, the Forum had also hosted speakers discussing such topics as "Women Scientists in Muslim Society" and co-hosted speakers with Women's Studies, including Professor Bonnie Shulman of the Department of Mathematics at Bates College. Women science faculty had led two successful panels of science students who discussed the impact of research on their career development (in 1994 with then-current students and in 1998 with alumni/ae). The group showed films and facilitated discussions at a Science Lunch[3] and represented Colby at a meeting of Clare Boothe Luce professors hosted by the Henry Luce Foundation in 1997. The group has also met with a number of guests speaking to other groups on campus (e.g., Kathie Thomas-Keptra from NASA's Johnson Space Center and Lockheed-Martin Corporation who gave a Spotlight Lecture on the evidence for primitive life on Mars in 1996; geoscientist Dr. Julie Brigham-Grette in 1995; chemist Dr. Barbara Cole in 1997; and physician Dr. Patricia Murphy from Albany Medical School in 1998). In addition, the Forum continues to meet

[3] Science Lunch, held every Tuesday during the academic year, is open to all scientists from the Natural Sciences Division. The topics selected for discussion range widely from rigorously scientific talks to informal discussions of matters of concern on campus.

informally for discussions and sharing of concerns and ideas. Once or twice a semester, Forum participants convene at a local coffee shop for social reasons as well—an important venue for free-flow in exchange of ideas. In April 2004, the Forum joined with the Women's, Gender, and Sexuality Studies Program[4] to host Emily Martin of New York University as a speaker. Martin's interests include the anthropology of science and medicine, gender, money, and other measures of value. Her extensive publications, including The Woman in the Body: A Cultural Analysis of Reproduction (1987), have modified how a generation of women think about the representation of women in medicine, in medical texts, and in the media.

Members of the Forum on Women in Science were also intimately involved in the preparation of Colby's 1999 *Plan for the Sciences to Begin the New Millennium*, produced collaboratively by many representatives of the Natural Sciences Division. The 1999 *Plan* contained several suggestions for ways that the College could support women in scientific careers. During this same year, the Forum conducted its first career panel for students in the Natural Sciences Division. In this case, six alumni panelists, one alumna or alumnus for each department, gave a short presentation of her or his career choices, advice for planning one's career, resources to take advantage of at Colby, and influence of Colby on her or his career.

In 1999, as members of the Natural Sciences Division prepared the next major proposal to the Howard Hughes Medical Institute, the Forum stepped up once again to prepare its portion. In 2000, Colby's HHMI proposal was funded, including provision for $53,000 for a continuation of science-and-gender-related activities that built on the work-to-date of the Forum for Women in Science. This work included support for annual career panels, which featured a diversity of panelist types. The Forum was funded to invite external experts on gender issues in academia and in the sciences during three of the four years of the grant. The final piece of support was for the 2003 Workshop on Gender Issues in the Sciences.

In March 2001, Dr. Bernice Sandler came to Colby for an exciting two-day visit, including small workshops and a larger public presentation on women in non-traditional fields and the chilly classroom climate. In spring of 2002, Dr. Suzanna Rose, Director of Women's Studies at Florida International University, spent two days on campus visiting with faculty collectively and individually, giving a seminar, and providing extensive advice on ways to advance in academia. In spring of 2004, the Forum hosted Dr. Valerie Young, expert on the "Imposter Syndrome." Sandler, Rose, and Young met with the president and dean of faculty during their visits and, to follow-up these meetings, provided letter reports with recommendations on ways to support women in the sciences.

None of the women in the Forum is expert in the area of gender issues in the sciences. After all, their training, which has immersed them in specific scientific disciplines, did not bring them into the arena of sociological, psychological, and cultural concepts that were needed to tackle these gender questions. Precisely because the Forum members were not experts in this area, they decided that they could not make significant progress without developing a framework that would present a realistic picture of the matters that come to bear on gender issues in the sciences. Thus, the idea of the 2003 workshop was born.

The agenda for this workshop was developed by canvassing over 300 people at colleges and universities in New England concerning what issues they thought were of highest interest. The resultant topics were *Gender Issues in Teaching Science; Gender Bias in Teaching Evaluations: Balancing a Career and a Personal Life; Recruitment, Retention, and Mentoring; and Successful Strategies for Advancement*. The meeting format was intentionally informal to leave time for discussions. The workshop received full support from the College's administrators. Dr. Suzanna Rose, who served as a gender expert in

[4] In 2003, the Women's Studies Program was renamed the Women's, Gender, and Sexuality Studies Program.

2002, agreed to serve as moderator of the panel and compiler of and lead editor of the Workshop. The program was designed to leave significant time for discussion and networking.

A total of 89 people registered for the program, approximately 39 more than expected. These data do not include people who attended the morning session on the first day, which did not require in-house registration (e.g., a dozen or so Colby students). This design allowed students to attend and to hear of the many issues being discussed.

Gender issues in science form a multidisciplinary topic, and the composition of the workshop speakers and participants reflected this mixture with representation from a wide diversity of the sciences, as well as from communication science, economics, interdisciplinary studies, history, languages, life technology and society, social work, and women's studies. About 70% of the participants were women and 30% men. The group represented different roles in academe; the vast majority were faculty or teaching associates, but researchers, administrators, and students attended as well. Ten undergraduate institutions of various types were represented and eleven graduate institutions from as far away as Colorado, Texas, and Florida. The Association for Women in Science also was represented. Sixty-nine participants were from Maine institutions; other areas represented included Connecticut (1), Colorado (1), the District of Columbia (1), Florida (1), Georgia (1), Louisiana (1), Maryland (1), Massachusetts (5), Pennsylvania (3), Tennessee (1), Texas (1), and Vermont (3). The following organizations were represented:

Amherst College (1)
Association of Women in Science (1)
Bates College (4)
Bowdoin College (6)
Bryn Mawr College (1)
Colby College (28)
Connecticut College (1)
Florida International University (1)
Georgia Institute of Technology (1)
Harvard University (1)
Lafayette College (1)
Louisiana State University (1)
Maine Maritime Academy (2)
Middlebury College (3)
Pennsylvania State University (1)
Sewanee – The University of the South (1)
Smith College (2)
Unity College (2)
University of Colorado at Boulder (1)
University of Maine (25)
University of Notre Dame of Maryland (1)
University of Southern Maine (2)
University of Texas at San Antonio (1)
Wheaton College (1)

The evaluations were outstanding and indicated that this workshop was unique. Few opportunities exist in academics to discuss sociological issues that influence the conduct of science. Participants repeatedly reported that the coverage of the workshop was extremely useful. They also appreciated the opportunity to network with other women scientists. Numerous women participants indicated that they did not feel comfortable discussing gender issues at their home institutions and appreciated the opportunity to discuss openly the issues without fear of backlash or of being perceived as a trouble maker. The Forum members found the workshop to be of tremendous utility in setting their agenda for years to come and remain hopeful that this effort will make the climate increasingly supportive for women in the sciences.

A Broader Perspective: Beyond Colby. When I introduced this topic of the Workshop, I stated, "So, why are we here? Some might say: 'It's the pipeline. It's leaky.' " On April 14, 2003, *Chemical and Engineering News* published an article about achieving gender equity in chemistry that pointed to "the pipeline issue." Many women chemists have trusted that as more women were educated as chemical scientists, their representation in upper levels of the sciences could correct itself. However, Madeline Jacobs, the editor-in-chief of *Chemical and Engineering News*, concluded that progress has been very slow because, although "the pipeline is robust, it is leaky and doesn't enter into a neutral pond."

The evidence to support her conclusion is strong. In 1999-2000, about 58% of the bachelor's degrees in the biological and life sciences nationally went to women. But as women proceed along the career path, their numbers decrease. In that same year, only 14% of the full professors in the biological sciences were women. Biology offers a better picture than the other sciences, where the outlook is even less favorable for women. In the physical sciences, women earn 40% of the bachelor's degrees, but only comprise 6% of the full professors. In engineering, women earn 18% of the bachelor's degrees, but only comprise 2% of the full professors.

These data repeatedly confirm that retention of women in science is a key issue. We know that half of the undergraduate science and engineering degrees are earned by women. However, at the doctoral level the proportion of women drops to about one-third of the doctoral degrees awarded. At the faculty level, the number of women drops to about 20% of the faculty. In the National Academy of Sciences in 2002, only 7% of the members are women. One of those women is Elizabeth Blackburn. Because of her work in telomeric DNA, she has been nominated for the Nobel Prize. Only ten women scientists have won this honor since it was first awarded in 1901. Blackburn concurs with Jacobs and many others that just getting more women in the pipeline will not remove the inequities. Women are leaving math, science, and engineering at every point along the academic career ladder. As Blackburn puts it, "Women are voting with their feet."

Leaks remain in the pipeline. The Workshop was designed to think about those leaks, and, more importantly, to learn about methods for stopping the leaks in our institutions. We want to ask: "What is causing those leaks?" Are they due to subtle unintentional biases from colleagues or students or to the difficulties of balancing a career with family responsibilities? Or due to lack of help, mentoring, and support from colleagues? Perhaps they result from the sometimes combative style of scientific debates? Are they due to the tenure process and possibilities of advancement? Is the leaky pipeline the result of gender bias in teaching evaluations that, at least in liberal arts colleges, carry heavy weight in the tenure process? Is it due to discouraging results from teaching science? Is it subtle behaviors such as exclusion, condescension, role stereotyping, tokenism, hostility, invisibility, sexual innuendo, or just not being taken seriously? While this Workshop on Gender Issues in the Sciences cannot answer all these questions, it provides very useful advice to women, department chairs, and administrators for achieving success in the sciences, particularly in academic institutions.

2003 WORKSHOP ON GENDER ISSUES IN THE SCIENCES
Colby College, Waterville, Maine, June 11-13, 2003
AGENDA

Wednesday, June 11, 2003
2:00 p.m. onward - Registration at Dana Dining Hall
6:00 Reception - Whitney Room, Roberts Union
7:00 Dinner/Welcome - Whitney Room, Roberts Union

Thursday, June 12, 2003

7:00 a.m.	*Breakfast* - Dana Dining Hall
7:00 a.m.	Registration opens - outside of Keyes 105
8:00 a.m.	INTRODUCTION - Keyes 105
8:15 a.m.	WELCOMING REMARKS - Colby College President William D. (Bro) Adams - Keyes 105
8:30 a.m.	OVERVIEW OF TOPICS - Keyes 105
8:30 a.m.	Gender issues in teaching science - Dr. Sue V. Rosser, Dean of the Ivan Allen College, Georgia Institute of Technology - Keyes 105
9:15 a.m.	Gender bias in teaching evaluations - Dr. Susan Basow, Charles A. Dana Professor of Psychology, Lafayette College - Keyes 105
10:00 a.m.	*Break*
10:15 a.m.	Balancing a career and personal life - Dr. Robert Drago, Professor, Labor Studies & Industrial Relations and Women's Studies, Pennsylvania State University-Keyes 105
11:00 a.m.	Recruitment, retention, and mentoring - Dr. Catherine Didion, Executive Director, The Association for Women in Science - Keyes 105
11:45 a.m.	*LUNCH* with clustered seating - Dana Dining Hall
1:15 p.m.	Successful strategies for advancement - Dr. Emily Toth, Robert Penn Warren Professor of English, Louisiana State University - Keyes 105
2 p.m.	DISCUSSION GROUP I Gender Issues in Teaching Science - Olin 1 Gender Bias in Teaching Evaluations - Keyes 102 Balancing a Career and Personal Life - Olin 335 Recruitment, Retention, and Mentoring - Olin 235 Successful Strategies for Advancement - Keyes 103

Thursday, June 12, 2003 (Continued)

3:15 p.m.	DISCUSSION GROUP II Same as for DISCUSSION GROUP I
4:30-5 p.m.	TOUR OF COLBY'S SCIENCE FACILITIES By science faculty - meet outside Keyes 105
5:30 p.m.	*Social Hour* - Johnson Pond (In case of rain, Roberts Dining Hall)
6:30 p.m.	*Lobster Bake* - Johnson Pond (In case of rain, Roberts Dining Hall)
8:00 p.m.	Colby's Pub will be open for workshop participants.

Friday, June 13, 2003

7 a.m.	*Breakfast* - Dana Dining Hall
8 a.m.	INTRODUCTORY REMARKS - Dr. Edward H. Yeterian, Colby College Vice President of Academic Affairs and Dean of Faculty - Keyes 105
8:15 a.m.	TOPIC LEADERS REVIEW DISCUSSION GROUPS - Keyes 105
8:15 a.m.	Gender issues in teaching science - Keyes 105
8:45 a.m.	Gender bias in teaching evaluations - Keyes 105
9:15 a.m.	Balancing a career and personal life - Keyes 105
9:45 a.m.	*Break*
10 a.m.	Recruitment, retention, and mentoring - Keyes 105
10:30 a.m.	Successful strategies for advancement - Keyes 105
11 a.m. -12:00 p.m.	NEXT STEPS/GENERAL DISCUSSION - Keyes 105
12:00 p.m.	*Lunch* - Dana Dining Hall

BIOGRAPHIES OF SPEAKERS AND MODERATOR

President William "Bro" D. Adams is Colby's 19th president and has served in that office since July 2000. He oversaw the development of a strategic, long-range *Plan for Colby*, approved in 2002, and is now presiding over the implementation of that plan, including the biggest campus expansion since Colby moved to its Mayflower Hill location more than a half century ago. The Colby Green, centerpiece of the 14.5-acre, $50-million campus expansion project, will tie together the existing admissions building with three new buildings, the first of which is under construction in April 2004.

Adams is a magna cum laude graduate of Colorado College who subsequently spent a year in France as a Fulbright Scholar. He earned a Ph.D. in the History of Consciousness program at the University of California at Santa Cruz. He was president of Bucknell University in Pennsylvania for five years and previously worked at the University of North Carolina, Chapel Hill, Stanford University and Wesleyan University before that.

Dr. Susan Basow, Charles A. Dana Professor of Psychology at Lafayette College, Easton, PA, is author of numerous professional publications, including the textbook, Gender: Stereotypes and Roles, now in its third edition. A licensed psychologist, Dr. Basow conducts research in several areas, most prominent among them the effects of gender on teaching and student ratings of professors. This research has been influential in several tenure decisions and appeals, as well as court cases. Dr. Basow has presented her research at many colleges and universities across the country: for example, University of Maine, University of California Santa Cruz, Ball State University, and Arizona State University.

Dr. Bets Brown came to Colby in 1991 as a Research Scientist in the Department of Biology where she taught fulltime for two years. After a short hiatus as Director of the Marine Biodiversity Program at the Maine Natural Areas Program, she returned to Colby in 1993 in as Associate Director of Corporate and Foundation Relations. Her responsibilities include campaign planning, proposal preparation, grants stewardship, and researching and tracking foundations and corporations for the College. She continues her responsibilities as a Research Scientist in Biology where she teaches *Biology of Women.* She is actively involved as a Facilitator in Colby's Valuing Differences Program. She received her M.S. and Ph.D. in Marine Biology from the University of Delaware. She is a member of the Association of Fund-Raising Professionals, the Biological Society of Washington, and the Council for Advancement and Support of Education and is Program Vice President of the Educational Foundation of the American Association of University Women. Some of her work has been published in *Biological Bulletin*, *Journal of Experimental Marine Biology and Ecology*, *Proceedings of the Biological Society of Washington, Bulletin of Marine Science*, *Journal of Invertebrate Pathology* and *Bulletin of Marine Science.*

Dr. Catherine "Kitty" J. Didion was Executive Director from 1990 to July 2004 of the over 5,000 member strong Association for Women in Science (AWIS) in Washington, D.C. She now works with The Didion Group. During her term, AWIS has been actively implementing through its 76 local chapters an undergraduate and graduate mentoring program supported by the Alfred P. Sloan Foundation and the National Science Foundation (NSF). It has also produced several major publications including: A Hand Up: Women Mentoring Women in Science (1993 & 1995, 2nd Ed.); Mentoring Means Future Scientists (1993); Grants at a Glance (2nd Ed., 1992); Taking the Initiative: Proceedings from a Leadership Conference for Women in Science and Engineering (1995); and Cultivating Academic Careers: AWIS Project on Academic Climate (1998).

Didion has over fifteen years experience administering nonprofit organizations both in the United States and overseas. As Executive

Director of AWIS, she discussed its programs at numerous professional meetings, wrote about women and science for *The Scientist*, *Science*, and *Initiatives* (the journal of the National Association for Women in Education), and presented testimony to Congress. She speaks frequently to the media about issues important to women in science and science education. Didion also writes the bimonthly column, "Women in Science" for the *Journal of College Science Teaching.* She is the co-chair of the Science and Transportation Task Forces for the Coalition for Women's Appointments. Didion worked closely with the Bush and Clinton Administrations to facilitate the appointment of women scientists to high-level federal positions.

Didion works closely with the European Commission's Women in Science Unit and has been an invited speaker to several conferences including Karolinska Institute in December 2001 and the "Networking the Network" Conference in Brussels in February 2002. Didion was invited by the Government of South Africa in 1998 to be the keynote speaker at a national conference on women in science. As one of the official representatives for AWIS to the United Nations, Didion was head of the twelve-member delegation to the Fourth World Conference on Women in Beijing, co-chaired the first science and technology caucus at a U.N. women's conference, and was instrumental in the Beijing+5 meetings. She is one of the co-founders of the Global Alliance Diversity Project - a partnership exploring the global impact of diversity. She is active on many advisory boards including, National Academy of Engineering's Celebration of Women in Engineering, Women in Science and Engineering (WISE) Committee on Institutional Cooperation (CIC) representing the Big Ten Universities, Science Linkages in the Community (SLIC), American Chemical Society's Athena Project; the American Association for Advancement of Science's Mentoring Award Review Committee, and judge for the National Inventors Hall of Fame.

Dr. Robert W. Drago is Professor of Labor Studies and Women's Studies at the Pennsylvania State University and moderates the work/family newsgroup on the internet (www.la.psu.edu/lsir/workfam). Often introduced as "the leading figure in work/family research," he holds a Ph.D. in Economics from the University of Massachusetts at Amherst, and has been a Senior Fulbright Research Scholar. Recent research includes the development of a work/family policy network and a study of faculty and family issues, both funded by the Alfred P. Sloan Foundation. He is the 2001 recipient of the R.I. Downing Fellowship from the University of Melbourne (Australia), serves on the Boards of the Alliance of Work/Life Professionals and of the College and University Work/Family Association, is a member of the Council on Contemporary Families, an Advisory Council member for the "Top 100" list compiled annually by Working Mother magazine, and is a proud soccer dad. Since 1995, Drago has published articles in *Australian Economic Review, Change: The Magazine of Higher Learning*, *Economics Letters*, *Feminist Economics*, *Industrial and Labor Relations Review*, *Industrial Relations*, *Journal for Quality and Participation*, *Journal of Economic Behavior and Organization*, *Journal of Family Issues*, *Journal of Labor Economics*, *Labor Law Journal*, *Monthly Labor Review*, *Perspectives on Work, Society and Leisure*. He has been recently quoted in or interviewed by: AP, C-Span, *Chicago Tribune, Chronicle of Higher Education, Chronicle of Philanthropy, HR Magazine, Los Angeles Times, Minneapolis Star-Tribune, National Report on Work & Family, New York Times, Philadelphia Inquirer, San Francisco Chronicle, St. Paul Pioneer Press,* UPI, *Washington Post, Working Mother, Working Woman*.

Dr. Suzanna M. Rose, Conference Consultant, is Director of the Women's Studies Center and Professor of Psychology at Florida International University in Miami. She has published extensively on issues related to women, including personal relationships and professional networks. She has edited two books on women's career development: Women's Careers: Pathways and Pitfalls, and Career Guide for Women Scholars,

and lectured widely on salary negotiation for women. Dr. Rose currently serves on several editorial boards for psychology journals. She has been quoted in or interviewed by: *New York Times, Wall Street Journal, Chicago Tribune, Miami Herald, St. Louis Post-Dispatch, Women's Day, and Chronicle of Higher Education.*

Dr. Sue V. Rosser received her Ph.D. in Zoology from the University of Wisconsin-Madison in 1973. Since July 1999, she has served as Dean of Ivan Allen College, the liberal arts college at Georgia Institute of Technology, where she is also Professor of History, Technology, and Society. From 1995-1999, she was Director for the Center for Women's Studies and Gender Research and Professor of Anthropology at the University of Florida-Gainesville. In 1995, she was Senior Program Officer for Women's Programs at the National Science Foundation. From 1986 to 1995 she served as Director of Women's Studies at the University of South Carolina, where she also was a Professor of Family and Preventive Medicine in the Medical School.

Dr. Rosser has edited collections and written approximately 100 journal articles on the theoretical and applied problems of women, science, and technology and women's health. She is author of the books Teaching Science and Health from a Feminist Perspective: A Practical Guide (1986), Feminism within the Science and Health Care Profession: Overcoming Resistance (1988), Female-Friendly Science (1990) from Pergamon Press, Feminism and Biology: A Dynamic Interaction (1992) from Twayne Macmillan, Women's Health: Missing from U.S. Medicine (1994) from Indiana University Press, Teaching the Majority (1995), Re-engineering Female Friendly Science (1997). Her latest book is Women, Science, and Society: The Crucial Union (2000) from Teachers College Press. She currently has a book contract with Routledge for Overworked and Undervalued: American Women Scientists. She also has served as the Latin and North American Co-editor for Women's Studies International Forum from 1989-1993 and currently serves on the editorial boards of *NWSA Journal*, *Journal of Women and Minorities in Science and Engineering*, and *Women's Studies Quarterly*.

She has held several grants from the National Science Foundation, including, "A USC System Model for Transformation of Science and Math Teaching to Reach Women in Varied Campus Settings," and "POWRE Workshop." From 2001-2005, she serves as co-PI on Georgia Tech's $3.7 million ADVANCE NSF grant. During the fall of 1993, she was Visiting Distinguished Professor for the University of Wisconsin System Women in Science Project.

Dr. Emily Toth comes from a long line of outspoken and eccentric women who have never hesitated to give advice, share gossip, and solve problems. She was born in New York City, grew up in Cleveland, and earned her B.A. from Swarthmore College and her Ph.D. from Johns Hopkins University—after which she became an academic gypsy, crisscrossing the country for jobs in Louisiana, North Dakota, and Pennsylvania. She was awarded tenure at Penn State and (without knowing it) had begun gathering material for a different kind of look at academic women. In 1988, she moved to Louisiana State University, where she is the Robert Penn Warren Professor of English. She is the author of ten published books, including five on Louisiana author Kate Chopin. Her biography of author Grace Metalious, Inside Peyton Place, has been optioned for the movies.

Emily Toth's Ms. Mentor's Impeccable Advice for Women in Academia is in its third printing, and her "Ms. Mentor" advice column on academic culture for the *Chronicle Of Higher Education* was named one of the "Hottest New Columns on the Net." It can be found at careernetwork.com, click on "Ms. Mentor," and once a month in the *Chronicle Of Higher Education*'s printed edition. Emily Toth is planning a second volume of Ms. Mentor's perfect wisdom, including fan mail, titillating tidings, secrets, and rants from readers.

Dr. Edward H. Yeterian became Colby's Vice President for Academic Affairs and Dean of Faculty in July 1998. After attending Trinity College where he obtained his B.S. in Psychology,

he earned his M.A. in Experimental Psychology and his Ph.D. in Physiological-Comparative Psychology, both from the University of Connecticut. From 1975 to 1978 he held a postdoctoral fellowship in neurology and neuroanatomy at Harvard Medical School. Dean Yeterian joined the Colby faculty in September 1978 in the Department of Psychology. He has served as Chair of Psychology and of the Social Sciences Division. His research focuses on the functional and anatomical organization of the forebrain in primates, with special interest in the ways in which anatomical organization provides a substrate for higher cognitive and emotional processes. He is a member of the Society for Neuroscience, the National Association of Advisors for the Health Professions, the Eastern Psychological Association, the Council for the Teaching of Undergraduate Psychology, the Council on Undergraduate Research, and the National Association for Armenian Studies and Research. He has a long list of publications and has served as a reviewer for the *Journal of Comparative Neurology*, *Neuropsychologia*, *Cerebral Cortex*, *European Journal of Neuroscience,* and *Neuroinformatics* as well as of grants for the National Science Foundation and the Department of Veterans Affairs.

SUMMARY
of
2003 WORKSHOP ON GENDER ISSUES IN THE SCIENCES
by
Suzanna Rose, Ph.D.

GENDER ISSUES IN TEACHING SCIENCE

Dr. Sue V. Rosser[5], Dean of Ivan Allen College at the Georgia Technological Institute, presented the first Workshop address, which focused on *Gender Issues in Teaching Science*. She examined three levels of concern regarding teaching in the science classroom and laboratory, including the need for professors to use female-friendly teaching techniques that facilitate women's grasp of concepts and encourage their use of laboratory equipment, how gender and race dynamics can influence the success or failure of group work, and the importance of integrating gender into curricular content. Dr. Rosser provided specific examples for improvement in each area that faculty could easily adopt.

Female-Friendly Teaching Techniques

Female-friendly teaching techniques were explained.[6] Dr. Rosser noted that because faculty are more open to changing their teaching techniques than they are to changing curricular content, so a focus on trying new teaching techniques in science classes is a good place to start when aiming for curriculum change. The techniques encompassed four areas, including observations, methods, conclusions and theories drawn from data gathered, and the practice of science.

A. Observations

- Expand the kinds of observations beyond those traditionally carried out in scientific research.
- Increase the number of observations and remain longer in the observational stage of the scientific method.
- Incorporate and validate personal experiences women are likely to have had as part of the class discussion or the laboratory exercise.
- Undertake fewer experiments likely to have applications of direct benefit to the military and propose more experiments to explore problems of social concern.
- Consider problems that have not been considered worthy of scientific investigation because of the field with which the problem has been traditionally associated.
- Formulate hypotheses by focusing on gender as a crucial part of the question asked.
- Undertake an investigation of problems of more holistic global scope, rather than the more reduced, limited scope problems that are traditionally considered.

B. Methods

- Combine qualitative and quantitative methods in data gathering.
- Use methods from a variety of fields or interdisciplinary approaches to problem solving.
- Include females as experimental subjects in experimental designs.
- Use more interactive methods, thereby shortening the distance between the observer and the object of study.
- Decrease laboratory exercises in introductory courses in which students kill animals or render treatment that may be perceived as particularly harsh.

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[5] http://www.spp.gatech.edu/people/faculty/srosser.htm

[6] See also Female Friendly Science (1998) and Building Inclusive Science: Connecting Women's Studies and Women in Science and Engineering (2000) by Dr. Rosser.

C. Conclusions and Theories Drawn from Data Gathered

- Use precise gender-neutral language in describing data and presenting theories.
- Be open to critiques of conclusions and theories drawn from observations differing from those drawn by the traditional male scientist from the same observations.
- Encourage uncovering of other biases such as those of race, class, sexual orientation, and religious affiliation that may permeate theories and conclusions drawn from experimental observation.

D. Practice of Science

- Use less competitive methods to practice science.
- Discuss the role of "scientist" as only one facet that must be smoothly integrated with other aspects of students' lives as they address balancing a career with personal life.
- Put increased effort into strategies such as teaching and communicating with nonscientists to break down barriers between science and the layperson.
- Discuss practical uses of scientific discoveries to help students to see science in a social context. This is very important for women students in particular.

Gender and Race in Group Work

Group work in science is important and is being pushed, explained Dr. Rosser. However, for each course, faculty should consider whether group work is appropriate for the course, and, if appropriate, how groups should be formed in introductory compared to advanced courses. Gender issues in forming groups also should be considered. Professors first need to assess if the group work fits with the course objectives. Then they should consider what gender composition works best given those goals. Other considerations involve whether the groups should be assigned or self-formed, whether leaders should be assigned or chosen by the group, selecting appropriate assignments, and how grading will reflect group versus individual effort.

In terms of gender, a typical approach to an introductory physics class of 25 students, five women and 20 men, is to assign five groups with one woman per group. However, that is one of the worst things that can be done from the standpoint of gender. A woman or a person of color in science or engineering who is isolated in this way often will drop out. It would be better to make a group that has two women, another group that has three women, and three groups that are all men.

A senior course in engineering design could use a different arrangement. By that time, the women students are preparing to go out into industry where often they will be the only woman in a group. If one objective of the senior course is to get people ready to go into the workplace, a woman would benefit from the experience of being the only woman in a group of men.

Group leadership also should be considered in light of course objectives. If students do not rotate roles, they may not learn to function in areas where they have less skill. For instance, a woman might be chosen as leader because she is socially skilled and good at group dynamics, but this approach might not give her the experience she needs with hardware. The man who is good at theory, but not socially adept, may not learn to interact well with the group unless he has responsibility for the group. It is very important for the faculty member to rotate the roles in groups and to monitor what is happening.

Appropriate assignments are also important. Group assignments should involve problems that can only be solved by a group or where students can learn the value of teamwork. Some students really resent group work because it may take longer, given that everyone's schedule has to mesh. For instance, very talented African American women especially may resent group work if they see no need for a group.

Finally, assessment of group work should match with course objectives. It may not be appropriate in an introductory course to have the grade be the same for the group. On the senior level, giving the same grade may be important if the point is to

show that if the team fails, then the individuals fail.

Phase Theory for Integration of Curricular Content

Dr. Rosser proposed a six-stage model for curriculum transformation in science and mathematics to aid in including more information on people of color and women.

Stage 1. Absence of women not noted. For instance, the absence of women as subjects in cardiovascular research was not noted for many years; nevertheless, research findings based on all male samples were applied to the general population.

Stage 2. Recognition that most scientists are male and that science may reflect a masculine perspective on the physical, natural world. The initial research on cardiovascular disease was based on men between 40-45. Later, women participants in that age group were added to the design, but this failed to take into account the fact that women die from cardiovascular disease at the same rate but at a later age.

Stage 3. Women are recognized as a problem, anomaly, or are absent from science and the curriculum. Women may be seen as victims, as protesters, or as deprived or defective variants who deviate from the white middle- to upper-class norm of the male scientist. For example, bypass surgery initially had two to four times the death rate in women than men because the research, norms, and surgical equipment were based on male patients and designed for male bodies.

Stage 4. Search for women scientists and their unique contributions. The extent to which the role of women has been overlooked, misunderstood, or attributed to male colleagues throughout the history of science could be addressed.

Stage 5. Science done by feminists/women about women. We now have programs like the Women's Health Initiative that gather baseline medical data for women.

Stage 6. Science redefined and reconstructed to include us all. Ultimately, we want a model of health that is inclusive of both men and women, not just half of the population.

Lessons Learned

Dr. Rosser described several lessons that she learned from working with faculty to address gender issues in science. First, she reported that it is easier to get faculty to change their pedagogical techniques than to change the content of the curriculum. Second, initially, both faculty and students are likely to resist making changes to traditional approaches in pedagogy and curriculum. For instance, evidence indicates that males receive up to two thirds of a teacher's attention in most classrooms. Thus, gender-fair teaching that equalizes the attention given to females and males might erroneously be perceived as favoring females. Thus, criticism on teaching evaluations might result when a gender-fair approach is first adopted. Third, support for integrating gender and race into pedagogy and curriculum must be reflected in the reward structure for promotion and tenure and reinforced by key administrators to be successful.

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GENDER BIAS IN TEACHING EVALUATIONS

Dr. Susan Basow, Charles A. Dana Professor of Psychology at Lafayette College, Pennsylvania, presented her remarks on *Gender Bias in Teaching Evaluations* focusing on the main question: "Is there gender bias in student evaluations?" This issue is extremely important for women faculty because student evaluations are used at almost all colleges and universities to evaluate faculty performance and they play a very significant role in many employment decisions, particularly at small liberal arts colleges.

Dr. Basow[7] described two major concerns regarding evaluations. The first concern was the question of validity; the second pertained to reliability. In terms of the validity of student evaluations, the question is: "Do student evaluations reflect teaching in a way that people

[7] See also http://www.awm-math.org/newsletter/199409/basow.html.

would agree really measures a good teacher?" One good method for determining this would be to have students in several introductory biology courses (with different teachers) take a common examination and see if students who score highest also give their teachers higher evaluations. In the few studies of this type, the expected correlation occurs. In terms of reliability, the questions asked are: "Are student evaluations reliable over time?" and "Are they reliable in that students within a classroom give similar evaluations of the professor?"

Biasing factors are problematic in addressing teaching evaluations. One factor frequently mentioned in the *Chronicle of Higher Education* is the grading leniency effect, sometimes called grade inflation. Student evaluations correlate highly with expected (not actual) grades. Personality is another biasing factor. Professors who get rated highly tend to be extroverts. In addition, race, social class, sexual orientation, and national origin also might affect student evaluations of teaching, but these variables have not yet been studied.

Gender is a significant biasing factor in student evaluations of teaching. However, the traditional research design used to study gender bias might not reveal this. The traditional method compares the average overall teaching effectiveness rating for male and female faculty. Using this methodology, the general trend is to find no significant difference between women and men on the average rating, taken across the entire college and student population. These data have been used to conclude that faculty gender does not affect student ratings. This conclusion is not accurate, however, because women are not equally distributed among the faculty ranks or among the disciplines.

Gender of the rater, gender typing of the field of study, faculty status, and various interactions among these three variables must be taken into account when assessing student evaluations with respect to gender. For instance, male and female students typically rate a male professor similarly. Males are the norm and are not marked for gender in the way that women faculty are. For women faculty, the picture is more complicated. In many cases, women faculty are rated lower by male students than by female students. Male students with traditional attitudes tend to evaluate women faculty more negatively. In contrast, women students often rate women faculty higher than men students do. This same-sex preference by female students is more prominent in more recent studies. The result is that if female instructors are rated higher by their female students and lower by their male students, the average is going to fall very much in the middle. But just looking at the average difference between female and male professors hides this interaction between faculty gender and student gender.

Other things that affect student ratings are the academic field and the specific questions asked. Overall, natural science professors get the lowest evaluations, and humanities professors get the highest evaluations. Patterns also occur by student year: first year students are actually most critical and seniors are less so. In terms of gender, in the natural sciences, some studies find that most students rate female professors lower, particularly on questions pertaining to "demonstrates knowledge." This result may reflect gender stereotypes or differences in teaching styles.

Gendered personality traits may also play a role in ratings. The best professors tend to combine traditionally masculine traits such as being active, instrumental, and competent, with traditionally feminine traits such as showing an interest in students and being caring, expressive, and nurturing. This combination seems particularly important for female professors. The expectations that women faculty must meet are very high.

Another possible explanation for gender bias in teaching evaluations is that gender stereotypes lead to perceptual biases. We have expectations of how a professor should behave and evaluate people who do not behave in that way negatively. Expected behavior for women involves a lot of nurturing, caretaking, warmth, and expressive behavior. Women faculty need to fit into this range to be seen as accessible, but they also need

to demonstrate the competence and assertiveness that are expected of professors. Because women are expected to be nurturing, students might also expect them to give easier grades or use less strict criteria.

Gendered teaching styles might also affect teaching evaluations. Male professors tend to lecture more than female professors, whereas female professors often use discussion and group work as well as lecturing. Students tend to like male professors who lecture, but not female professors who lecture. A teacher/student interaction may be at work as well, with female students preferring the female style of teaching and male students preferring the typical male style.

In sum, women professors have to meet contradictory expectations, but male professors do not because there is direct overlap between what is expected of men and what is expected of professors. A narrower range of behaviors is considered appropriate for women professors. If women are too feminine, they might not be seen as knowledgeable or as a source of authority, but if they are too professorial, they might not be seen as feminine enough.

Gender differences in student evaluations of teaching generally are quite small. However, if several risk factors are present, there might be a noticeable gender effect. Evaluations of other faculty with minority status (based, for example, on race, sexual orientation, religion) might also be affected by these factors. The risk factors that might bias student evaluations against women include:

1. Predominantly male students.
2. Students who have traditional attitudes toward women, either because of the institution or because that is what they have been taught.
3. A subject area that is non-traditional for women (e.g., science or engineering).
4. Teachers who have non-nurturing and non-expressive personality traits. Women faculty with a style similar to male faculty may be at a disadvantage.
5. A lecture-based teaching style (for women).
6. Women who are tough graders.
7. Status. Being untenured and young looking is a double whammy.
8. Teaching lower level courses. Teachers in lower level courses often get lower evaluations, often because they are required courses or survey courses. Because women tend to be in the lower ranks, they are more likely to teach the introductory level courses.
9. If they have a reputation as a feminist. That term can cause a lot of strong reactions, much of it being negative.
10. If a woman professor addresses issues of gender. Women who address gender are seen in a more negative way than if the male brought up those same issues.

Not any one of the above variables is likely to be of great importance alone, but if several risk factors are in play, the cumulative effect may result in gender bias. For example, a fairly no-nonsense female professor who is teaching lower level courses to predominantly traditional male students in a non-traditional field and who is a very tough grader will be at high risk for gender bias. She is likely to be rated lower than a male professor with similar characteristics.

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BALANCING A CAREER AND PERSONAL LIFE

Dr. Robert Drago,[8] Professor of Labor Studies and Women's Studies at Pennsylvania State University, spoke on gender issues related to *Balancing a Career and Personal Life* for science faculty. Dr. Drago presented the results of his research on faculty for the last three years involving web surveys of over 5,000 faculty in

[8] See: (1) http://lsir.la.psu.edu/workfam/drago.htm and (2) http://lsir.la.psu.edu/workfam/mappingproject.htm

chemistry and English from over 500 schools nationwide. Case studies were conducted at ten schools as follow-up.[9]

Dr. Drago indicated that academic institutions are about ten to 20 years behind the corporate world in dealing with work and family issues. America's corporate world has established family responsive workplaces. The Working Mother Top 100 List, which Dr. Drago helped develop, lists all the corporations that have created flexible work arrangements, on-site childcare, and resource and referral services. Academic institutions, however, have been slow to respond to the needs of women and families. Women entering the academic career ladder run into a conflict between the academic clock and their biological clock. The average woman in the United States gets her Ph.D. at age 34 and receives tenure at age 40. Less than 1% of all live births of all women are to women age 40 or over. Thus, women assistant professors must decide on having a family at the same time that they need to focus on establishing their careers.

It is still the case in academe that junior women faculty who have children and family commitments may be seen as less serious about their careers. Women (and men) with families have responded to this pressure using what Dr. Drago and his colleagues have labeled, "bias avoidance." There are two forms of bias avoidance. In *narrow form bias avoidance*, people with family commitments hide those commitments to appear committed to the job. *Broad form bias avoidance* has to do with maintaining or increasing productivity at the expense of family commitments, such as not getting married, not having children, or juggling several to many different care providers.

Dr. Drago explained, "The context for all this [bias avoidance] in the academy É. is that people hang around for a long time due to the tenure system. And the people in charge in the academy are managers who tend to have been around for 20 or 30 years—and those tend to be a bunch of white guys, because if you go back 30 years ago, that's who was being hired. Now those guys are into their second transitionÉ. The first transition was that women came in to their department. They were told by their universities, 'You have to go out and hire women' É. After decades, they finally got some women tenured and they are really proud of themselves. Now, they have women coming in and saying, 'I want to have kids.' [And their reaction is:] 'Now, what do you mean? É. We didn't sign up for this. We signed up to hire women who were going to work like men. We didn't sign up to hire women who were going to be mom.' So, for a lot of these guys you've got to realize that's the context for them."

Because the numbers of women faculty are still very low in many fields, work and family issues may not have received as much emphasis for women in science as for women in other disciplines. As those numbers rise, as has happened in the social sciences, issues of family and personal life are likely to rise on the agenda. Dr. Drago provided the following summary of important problems pertaining to balancing a career and personal life, as well as numerous possible solutions.

Problems Confronting Women Faculty in Science:

1. Sleep deprivation and guilt. Many parents feel badly while at work about their children and feel badly about their work when with their children.
2. Men (and also women without children) "have no idea" how tough it is to be a good parent. As a result, many faculty hide commitments to children or minimize the number of children.
3. For many women faculty, there were few or no role models for successfully balancing work and family life.
4. The tenure system loads too much pressure on faculty at the wrong time. It might be better if the pressure were spread out.
5. Faculty often have too little personal time due to extreme demands from their

[9] This research was supported by The Alfred T. Sloan Foundation.

colleges and universities, including from their students.

6. The settings for these problems are diverse. Departments differ markedly, even across an individual campus. Disciplines have distinct demands in terms of the timing of research. Personal and family circumstances run from dual career couples in the same or related fields to individuals with multiple children, younger or teen children, and elder care commitments.
7. Individuals who contemplate getting off of the tenure track often face no job security and little prestige.
8. For parents, access to information on childcare is inadequate, and a need exists for on-site childcare, for back-up childcare in emergencies, and for sick child childcare when kids cannot go to school due to illness.
9. Many scientific conferences are blatantly "anti-child" by limiting the ability of parents to bring children to conferences and by not offering childcare facilities.
10. As children grow, parents need more flexibility from their institutions to transport teens so they can engage in learning outside of school hours and not become latchkey children.

Broad Answers to These Problems:

1. Parents and non-parents need to start saying "no" to extra work. As more committees are formed, individuals need to clamp down on work demands in response.
2. Our institutions need to improve the climate on campus so that time spent on activities external to the academy is viewed as healthy and positive.
3. Faculty, particularly those who are tenured, need to act as role models in terms of balancing their own lives.
4. Funding of course releases during parental leave needs improvement. Most institutions depend on colleague coverage to fund parental leave. Funds to hire faculty to cover leaves would resolve these problems.
5. Colleges and universities must implement back-up and sick child childcare systems, which are typically very inexpensive systems because individual faculty are willing to pay a premium for these occasional services.
6. Individuals must be viewed as "whole people," not just as professionals. Because people are diverse, no one model is right for handling people. Programs to help with balance need to be inclusive of faculty, staff, administrators, and students to confront life and family and disciplinary diversity.

Quick Wins or Little Answers to These Problems:

1. Colleges are resources for youngsters (particularly middle and high school students) as well as for students; find ways to make them welcome on campus.
2. Administrations need to coordinate spring breaks across the institution and local school systems.
3. Faculty, students, and staff need to be involved in obtaining work/family benefits at the institution, such as childcare.
4. Resource and referral services for child and elder care should be introduced on campuses. Such services are very inexpensive and very helpful. If possible, institutions could provide contact information for those who have used local services as a quality check.
5. Faculty can develop cooperative childcare arrangements in neighborhoods.
6. Faculty should press for flexibility and understanding of diverse circumstances around the scheduling of courses, meetings, and events.
7. Women need to have a little courage. For example, many women would find life with an infant easier if breastfeeding in public became acceptable. However, someone has to take the initiative.

8. The College and University Work/Family Association (see www.cuwfa.org) is a place to find out what other institutions are doing.

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RECRUITMENT, RETENTION, AND MENTORING FOR WOMEN IN SCIENCE

Dr. Catherine Didion, Executive Director of The Association for Women in Science (AWIS),[10] addressed issues related to the *Recruitment, Retention, and Mentoring of Women in Science*. AWIS, which has a network of 76 chapters across the U.S., is committed to the achievement of equity and full participation of women in all areas of science and technology.

Mentoring

The AWIS chapters generally focus their work on mentoring. The following conclusions about mentoring have been drawn from AWIS research and experience:

- Peer mentoring is important, both in woman student-to-woman student mentoring and in professor-to-professor mentoring. Peer mentoring has as much value as a student or junior professor being mentored by a senior person in the field.
- Mentoring programs should include a mix of informal and formal activities. Both should have some structure but also allow time for casual interaction.
- Junior and new faculty may benefit from mentoring; being hired into a tenured position does not guarantee that new faculty will learn the ropes.
- Cross-departmental mentors can be highly effective. Knowledge and problems can be shared without fear of negative appraisal.
- Mentoring programs should help new faculty clarify the expectations they will expected to meet.
- Mentors can provide a context for negative feedback and help students and faculty understand what is personal versus what is standard practice in the department (e.g., hazing).
- Sharing strategies for success is an important aspect of mentoring.
- Women face a double bind in terms of expectations for professional versus gender-typed behavior. Mentors might offer advice on how to cope with this.
- Women graduate students in male-dominated fields such as computer science, physics, geology, mathematics, chemistry, and biology are less likely than men to say they are treated very much as a colleague by the other graduate students. Mentors can partially compensate for the lack of collegiality women face.
- Mentoring that focuses on grant writing may help junior faculty.
- Mentoring programs must aim to create a supportive environment. In the sciences, many students are from cultures that may hold very traditional views of women. If that gets acted out on the female graduate students in the department, it can have a chilling impact.
- Mentors (or department chairpersons) might be able to act as advocates for women, especially in terms of protecting them from taking on a heavy service load before they have tenure.

Recruitment

In terms of recruiting women faculty into science departments, Dr. Didion described the research of chemist Dr. Donna J. Nelson[11] from the University of Oklahoma. Nelson showed that there was a pool of qualified women scientists with Ph.D.s who were available for faculty and postdoctoral positions, but who were not being hired at the rate one would expect. This situation was particularly true at the top 50 chemistry departments across the U.S.[12] One reason is that institutions tend not

[10] See http://www.awis.org

[11] See http://cheminfo.chem.ou.edu/faculty/djn/djn.html

[12] See http:// cheminfo.chem..ou.edu/faculty/djn/diversity/top50.html

to hire their own graduates. However, in many cases, both faculty positions and women candidates were available, but women were not hired.

Departmental expectations concerning hiring may be detrimental to women. Faculty need to be educated to understand why it is in their interest to get the best hire, whomever that might be, and how a flawed process might affect the outcome. For example, the National Institute of Health (NIH) was doing very poorly at hiring senior women. Candidates were compared to a perfect candidate. The department members had never asked, "Do we have the appropriate attributes for this perfect candidate? Has anyone ever reviewed what's listed?" When AWIS convinced NIH to review the attributes of the perfect candidate, many turned out not to be critical for the position they were trying to fill. This dramatically changed the number of women that they could hire.

The number of women in science departments tends to depend on the type of institution. In recent years, more women have been going to smaller liberal arts colleges rather than choosing or trying for positions at large research universities. Historically black colleges and universities also tend to have more women science faculty.

Retention

The American Physical Society has established site visit teams that look at the climate in physics departments across the U.S. AWIS took that model and expanded it to biology, chemistry, and mathematics, and worked with NSF to develop a survey to assess what the climate was like for women at that institution. A positive environment for women encourages the retention of women faculty. Conversely, women scientists cited a number of factors that contributed to a "chilly climate" and subsequently to poor retention of women, including:

- **Lack of communication between senior and junior faculty**. For example, one department Dr. Didion described had approximately 30 to 40 faculty. The junior faculty indicated that the senior faculty communicated with them very little. One male junior faculty member who just had his third year review did not have any advance information about the third year review process until after the review was completed. He was not asked to prepare a dossier. Junior faculty also indicated mixed messages were given about what was important. Women faculty were being told to spend more time on service and on writing grants, whereas the male faculty were being told to spend more time on research. The department appeared to rely on an oral tradition to communicate what was expected, but there was no regular interaction between senior and junior faculty that would encourage this communication.

- **The issue of dual careers**. Many women in physics or biology have partners in the same discipline. In the American Physical Society, nearly 87-90% of the female members have a partner who is in the same discipline. Dual career couples tend to want to interview as a couple, but it is not always wise to do so because the accompanying spouse may be seen as less desirable regardless of qualifications. The institutions that are the most successful in dealing with dual career couples are those that have an institutional policy and mechanisms in place for hiring couples, rather than doing it on an ad hoc basis. The Alfred P. Sloan Foundation is now examining part-time tenure as a solution, as well as trying to codify a non-tenure track career for academia.

- **Lack of recognition for women faculty in science.** Dr. Didion described meeting with the physics faculty at a school that had a strong reputation. She met with all faculty in the department, with one exception. An interview had not been arranged with a woman who had been there for 18 years and who had won all their teaching awards and taught all the basic courses. But the woman did not have tenure, so as far as the chair was concerned, she did not need to be included in the interviews.

Other factors unrelated to a "chilly climate" also influence retention, including:

- **Not enough women science faculty in the pipeline to replace retiring women scientists.** For example, one university in Washington D.C. for a while had over a dozen women full professors in science. All those women are now over 65.

- **Institutional efforts can make the issue of women in science more salient**. NSF added "Criterion 2" to its funding criteria. Criterion 2 specifically requires principal investigators to address how the funding will benefit women and underrepresented minorities. However, this change will only have an impact if is really truly required and if there is some accountability.

Many women scientists leave before or after they get tenure. Institutions are doing more to recruit women, but the women are not staying and they are not advancing. There has been a lot of discussion about why women might leave a tenure track slot, and this area is in need of further research.

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SUCCESSFUL STRATEGIES FOR ADVANCEMENT

Dr. Emily Toth,[13] Robert Penn Warren Professor of English at Louisiana State University, explored a wide variety of *Successful Strategies for Advancement*. Dr. Toth regularly gives advice on these issues in her "Ms. Mentor" column in *The Chronicle of Higher Education*. Dr. Toth quoted Peggy Wilson, one of the first women to be elected to city council in New Orleans. Wilson commented that politics was easy after family life, especially since a lot of behavior was the same. There was sulking, corruption, and grasping (like getting your hand caught in the cookie jar). The boys and men in the city council were calling Wilson the same names she got called at home, such as "mean cat" and "doo-doo head." So why should the world of politics – or academe - be different? Some specific advice Dr. Toth gave follows.

Every academic woman should have friends or connections outside academia to provide reality checks, to give honest answers to the question: "Am I really being dumped upon?," and to laugh at the pomposities of colleagues. With non-academic friends, one can ventilate frustrations, give colleagues satirical nicknames, or be as ugly as one wants to be.

Keep in mind that there are no secrets within academia. Be careful what you put in e-mails. Ms. Mentor, Dr. Toth's alter ego, was asked: "If I tell my office mate about secret affairs, kidney stones or other spicy problems, will my office mate keep the secret?" Ms. Mentor's response was succinct: "Ha ha."

Most academic women have messy houses. In fact, one of our achievements may be that a lot of us don't cook very well. We know that if you are spending huge amounts of time in the kitchen, you're not spending it in the lab, the library, or on the computer. Time spent in the kitchen means less time for the things that matter—including gossip, or networking.

Much of academic (male) fighting is really about "Whose Is Bigger." Men give it away with their language. They talk about the thrust of an argument, whose idea is seminal or penetrating. Anthropologists particularly favor "thick description." There also is "peacocking," which is what happens in the question period after a woman gives a public presentation. The first question is almost always from a man, and it often is not a question at all, but an opportunity for self-display. It is long, thick, and it extends till completion, whereupon, if the peacocking continues, other men join in. Ms. Mentor tells women to hold their ground, to be firm and polite, and smile only if we must.

There is a double standard about aggression in academia, and women are expected to smile more. Too often, what a man does is considered

[13] See http://www.english.lsu.edu/dept/fac/prof/etoth/970773261

forthright, but if a woman does the same thing, she's a "bitch." He's assertive, but she's a bitch. He's a smart deep thinker, but she's a shallow, though hardworking bitch.

Academic fashion is a controversial issue for women. There has always been a uniform for professional men. A man who wants to be taken seriously as a professional knows how to look and what to wear, and to wear black, brown, grey or blue (maybe a little green). The situation is much more complicated for academic women. Ms. Mentor wrote in her book that a wise woman goes to a job interview in a skirt or a dress, because you don't want to be screened out on the basis of your clothes. If a woman is going to an interview in a skirt or a dress and she is not used to them, she should practice walking and sitting.

Networking is another strategy for successful advancement. Women often do it well. It is accepted that women talk to each other everywhere and share information, but networking is not something that men do. It's one of the reasons that by age 30 or so, women know much more than men do about life and relationships, because we are constantly in a hidden curriculum, learning from each other.

Understanding the hidden academic curriculum is crucial. This statement refers to what really works, not what people say will work. Good conversational skills and good manners are a great help. For instance, women almost invariably write a thank you note or a follow-up note after a job interview. Somebody who writes a follow-up note has a leg up, and that is just a courtesy that women learn. Women are also more apt to be friendly with secretaries and assistants, who may later share critical information.

You have to be liked: you have to be "collegial." Some of Ms. Mentor's correspondents want to believe that getting a job in academia is solely a matter of academic "merit," but it is not. Kate Chopin in 1868 said, "All you have to do to be thought of as a good conversationalist is to look into the other person's eyes, and say, 'What do you think?' and 'What did you do?'" Toth said, "If you do this, 20-to-1, you will be reported as the most intelligent person around. Being an engaged listener, especially for women, is what makes for a good interview. People who interview well get the jobs."

Be able to describe your research precisely in a small package. Provide some kind of sound bite or distinctive flare, something that makes you memorable. It can be a joke, a story, a reference, even a colorful scarf. When a person is hired it should be a matter of merit, but what often sells is really charm. If the interviewers like you, they'll hire you, and women are good at being likeable.

Service or committee work is not valued very much, unless your colleagues like you and you have a weak record in the other areas. Then they will use your service work to promote you for tenure. Otherwise, committee work does not help you, and it uses up a lot of time.

Top research universities rarely reward good teaching. A teaching award is often a tip-off that you are not going to get tenure. Teaching can be construed any way those in power choose to construe it. Bad teaching, meanwhile, is punished only if the people in power really dislike you for some other reason. Then teaching is a convenient kiss of death.

If teaching does count, then aim to get good teaching evaluations. Smile for the first 30 seconds of a course, and if you're dramatic and walk around, if you give out wine and cheese, and if you're good-looking, you'll get high evaluations.

Never stop publishing. Many academics hate to write. That's not a strategic decision. Writing is what this profession requires. The only criterion for tenure that is quantifiable, documentable, and

memorable is research and publishing. Do not listen to anyone who tells you that you don't have to publish. Publication is what people look at, publication is the way you become nationally known, and it's the only way to move if you want to change jobs. No matter what people think, you must publish, and if you are a woman you have to publish more than the men, and let them know that you have published.

Criterion number four for tenure—after service, teaching, and research—is collegiality. Some schools now say openly in their tenure and promotion policies that collegiality is a factor. What they mean is whether you fit in, which sometimes can mean whether you are the right gender, nationality, or sexual orientation. It always means: "Do they like you?" Collegiality doesn't mean sucking up to people, although you never do go wrong when you flatter somebody. They're flattered that you made the attempt, even if it's transparent. Make sure senior faculty get to know you. Invite them to lunch, but bring your credit card.

The last strategy for successful advancement is to have a thick skin. But you can't really grow a thick skin, so cultivate a healthy indifference until you get tenure. If you have a thick skin and you smile and don't take it personally, you can have a great time in our profession, because it's almost the only one that really pays you to think. When you are in front of a class, you get to express your opinions, and mostly you get to express them freely because, if they don't listen to you, you can give them bad grades. This is a heady feeling.

Dr. Toth concluded that an academic career requires planning and scheming. We are very well suited as women to a profession that requires schedules, because we are the planners in life. We are the ones who keep track of the birthdays, who keep the lists, who know when the toilet paper runs out. We are the responsible parties.

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"Statement of Principles on Family Responsibilities and Academic Work," American Association of University Professors, http://www.aaup.org/statements/REPORTS/re01fam.htm
"Do Babies Matter? The Effect of Family Formation on the Lifelong Careers of Academic Men and Women," Mary Ann Mason and Marc Goulden. See http://www.aaup.org/publications/Academe/index.htm and click on "back issues" in the right-hand corner, click on Nov-Dec 2002, then click on the article.
"The Status of Women at MIT," (also known as the "MIT Report II"), http://web.mit.edu/faculty/reports/overview.html
"The Women's Place," Ohio State University, http://womensplace.osu.edu/

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TRANSCRIPTS OF PRESENTATIONS

William "Bro" D. Adams
President, Colby College

Good morning. I want to welcome everyone, particularly those from "away," as we say here in Maine. I know that many of you are from Maine, and it is great to have you here on Colby's campus. I especially want to welcome those from elsewhere in the United States, and I know that includes at least Texas, because I ran into someone last night from Texas. So, welcome indeed. I think the people from "away" might have brought the good weather. Thank you for that. It has been a long spring here in Maine. Just how long reminded me of a trip I took many years ago as a young man, in Norway. I was completely staggered and astonished by how little in the month of June people in Norway slept, which was never virtually! This was of course because the rest of the year was dark, and they were making up for lost time. I didn't really understand that until moving to Maine, when I discovered how long we wait for a day like today, and now it has come and here we are. For those who are from elsewhere, I hope that you have a chance to experience this beautiful state in a couple of ways in the days following your time here. It is a wonderful place and certainly worth a visit.

I also want to thank Bets and the organizing committee for all the work they have done. I remember talking to Bets about this at least a year ago, so it has been under way for some time. Congratulations and thanks also to you for your hard work.

I wanted to provide just few brief remarks pertaining to gender and science from both a national and local perspective. First, it is continually surprising and impressive how central and significant scientific progress is to the well-being and future of the country. But we also are all aware of the unfinished work that lies before us with respect to the role and place of women in the sciences. Nationally, we have made some progress, but there is a long way still to go. This is particularly resonant for me in a local context. As Bets mentioned, we have been involved in a fairly deliberate and self-aware diversity mission on the campus over the last couple of years. That initiative has involved a lot of forums of what I would call awareness building — what we used to call in the 60's, "consciousness raising" — with respect to all the areas of difference and diversity that exist on campuses and organizations like these. In the course of our awareness efforts, many of us have come to a deeper realization about the impact of gender not just on the academic side of the institution, but throughout the institution.

The diversity initiative on this campus has uncovered a lot of unfinished business with respect to the issue of gender. We need to continue to work very hard to understand the obstacles that remain with some analytical and conceptual precision. And in looking to the future, specific institutional strategies will have to be developed to surmount those obstacles. I hope that with respect to both of those tasks — the understanding task and the moving ahead task — that the discussions you have today will help us here at Colby and also others beyond this campus. Thank you again for your willingness to take part in this with us. It is good to have you here.

Gender Issues in Teaching Science

Sue V. Rosser
Dean, Ivan Allen College, Georgia Technological Institute

Today, I want to talk about some of the numerous issues that arise in teaching science. First, I will discuss what I call "female friendly pedagogical techniques" and then will spend a little time on gender dynamics and group work because group work is pushed so heavily these days in the laboratory and classroom. However, I find that often faculty fail to take into account the considerable work that has been done on the dynamics of race and gender and how those can enter into those groups and very much influence who does what, what is learned, and how group work is evaluated. Also, from my long background for almost a quarter of a century as the Director for Women's Studies, I need to talk about something very near and dear to my heart: integrating gender into curricular content. This aspect is a very important issue for attracting and retaining women in science and engineering. Finally, I will share some lessons I have learned from doing this work for a long time: what works best and what seem to be stumbling blocks. I am very eager to hear your interactions and reactions on this, because this is a constantly evolving process.

Back in 1990, I published a book called Female Friendly Science. In that book, I laid out several pedagogical techniques that were effective teaching techniques that I had drawn from Women's Studies. I translated them into a science classroom environment, particularly biology. I would like to quickly go through those to give you an idea of what I had in mind.

One of the lessons that I have learned from doing this work a long time is that faculty are more open to changing their teaching techniques than they are to changing their curricular content. This situation is not particularly a surprise because, when you start to do curriculum integration, you are really asking people to rethink everything they learned in graduate school and integrate entirely new information and new approaches, which is very difficult. Because in most cases students usually react well if you try a new teaching technique, it is much easier to change that than a whole course or a whole way of thinking about your teaching.

Observations

1. Expand the kinds of observations beyond those traditionally carried out in scientific research. The first idea I had was to expand the kinds of observations beyond those traditionally carried out in scientific research. Within the classroom sometimes women students, men of color, or people from different backgrounds may see new data that would make a valuable contribution. Where did I come up with this? I was thinking of the work of female primatologists. As you may know, work in primatology had gone on for many years. When it was mostly men primatologists doing the work, they tended, when looking at lower primates, to focus on male-male interaction and male-female interaction. I am not suggesting there is any reason they couldn't look at female-female interactions; they simply did not. They tended to transfer their interaction experiences to their work, and, because they were men, they had interacted with other men and with women, and somehow this affected their observation of lower primates.

It was not until we had a considerable number of female primatologists doing work that suddenly we began to get new data. Those data were on female-female interactions in lower primates. What was very interesting was that this caused a shift in the theories and conclusions born from the data because it turned out that much of the information about dominance hierarchies was no longer true when you added these female-female interactions. Many more collaborative interactions were identified. Entirely new species were examined, whereas before there was a predilection to look at chimpanzees and baboons. Yerkes said he chose those species because they mimic human social organization where the male is dominant.

This sort of circular logic was going on. Women started looking at species such as the bonobos, and you all know about the very interesting interactions that they have.[14]

How do you translate this to your individual classroom? Students who come from different backgrounds, when they propose something new and different, may not be correct 99% of the time. On the other hand, if you figure that most of the people who have been doing science in this country come from a relatively similar background with regard to gender and race, it may be a benefit to have people coming from a different set of experiences who see new and different things. That may be the most exciting thing that happens all semester.

2. Increase the number of observations and remain longer in the observational stage of the scientific method. Continuing reports of the National Assessment of Educational Progress show that girls and women have less hands-on experiences with equipment than boys and men. Most of this is not because of classroom time; there is pretty equal time in K-12. However, many boys get extracurricular experiences with equipment, perhaps through scouting. Girls Scouts now has taken this on and some programs, such as Girls, Inc., have worked very actively to provide girls with more experience with equipment. But there still is a gender difference that increases with increasing age, so that 9-year-old girls are closer than 17-year-old girls are to boys' experience with equipment.

Another big issue concerns hands-on experience versus simulation. We all try to save our laboratory budgets, and believe me, as a dean I appreciate this. However, I began my teaching career at a small women's college, and, as an administrator, I noticed that we had the lowest equipment breakage rate. Those from the men's colleges had the highest equipment breakage rate. The breakage rate at the coed institutions was right up there with the men's colleges. As an administrator, this was nice, but it was not so great for the women. While the men were fooling with the equipment and breaking it, they were learning how it worked. This equipment phobia issue is reflected in terms of the number of women in a field. If you look at how women are distributed in different fields, there often is an inverse correlation between the number of women and the amount of hands-on equipment required for that field.

The other thing I emphasize is that it is important to pair females with females as laboratory partners. If you pair females with males, often the male works with the equipment and the female takes the data. This is great for her clerical skills; it does nothing for her in her next science or engineering class.

3. Incorporate and validate personal experiences women are likely to have had, as part of the class discussion or the laboratory exercise. I am sure that in this room where the emphasis is on teaching, people are intimately interested in this. I don't need to belabor the fact that it is easier to start talking about a topic with something that is familiar. In many classes, if you use examples strictly from sports, this can be a turn off for women. Be sure that you are thinking about different experiences and rotating through the different kinds of experiences that folks have had. Sometimes this is what you might call a "class issue" or a "geographic issue." I see math classes where vectors are taught using sails and sailboats. This may work very well in this part of the country. I am originally from the Midwest, and I can tell you that there are a lot of students who have never seen a sailboat. They may never be able to understand the idea that you are talking about vectors and listen to the math. Because they are so panicked over the fact they know they are not familiar with the example, they think they can't understand what this person is going to be talking about. These are very important things to consider.

[14] The bonobo is a primate species in which females take a more dominant role than is common among other primates such as chimpanzees. Bonobo females are sexually free-wheeling, have feeding priority, and may share their food with the offspring of female friends (S. B. Hrdy, 1999, Mother Nature, NY: Ballantine Books, p. 220).

4. Undertake fewer experiments likely to have applications of direct benefit to the military and propose more experiments to explore problems of social concern. You know the voting patterns and the so-called gender gap in terms of guns and butter. That translates very easily into some of the research that I have done over the years where you ask women students who have the ability or who are clearly doing well, why they are not interested in continuing in science. A significant number of them will say that they associate science and engineering directly with the military and that they do not want to have anything to do with that. If you look at some engineering or physics textbooks, sometimes there are problems about dropping bombs at regular intervals or about rocket trajectories. Research suggests that, on the whole, women are more context dependent than men are in terms of their learning styles. Of course, there are wide variations in this, and there are many men who also are context dependent and some women who aren't. Jan Harding, a researcher in England, took what was basically an engineering problem and embedded it in different social contexts. She found that, for the women, the social context made a large difference. For men, the context was not very important. If the problem involved "something like this will help in an elderly person with a prosthesis," the women solved that problem as quickly and as well as the men. For the men, the context did not seem to matter.

5. Consider problems that have not been considered worthy of scientific investigation because of the field with which the problem has been traditionally associated. Some of the work that has been done in science has been defined as non-science primarily because of who did the work and the field with which it was associated. For example, I am thinking of the work of Ellen Swallow Richards. Who was Ellen Swallow Richards? She was a woman who did interdisciplinary work, so they created a school of home economics for her. What she did was solve problems in sanitation chemistry. The state of Massachusetts still uses her water tables. Many of the OSHA food purity tests came from her work, but this work was defined as home economics, which many people think of as non-science. Sometimes when you are looking for examples, you might want to look in different areas that are interdisciplinary and defined as non-science.

6. Formulate hypotheses by focusing on gender as a crucial part of the question asked. This comes from my PhD in zoology. For many years I taught introductory biology. I was always bothered by that *Beta splendens*[15] lab, where we asked the students to look at the reaction of the male *Beta splendens* to another male, to self (holding a mirror up), and to a female *Beta splendens*. End of exercise. Even though I had been teaching women's studies for a long time, it took me forever to figure out what bothered me about that whole exercise. Not only was the female being treated as a sex object, but it wasn't good science. If you are really going to study animal behavior, you need to look at the reaction of the female *Beta splendens* to another female, to self, and to the male. Because gender was removed, which is something we like to do in science to make it more objective—we want to remove race and gender—it ended up not being good science because it was not formulated the proper way. We have had a similar problem for clinical trials for many drugs and much research because women were not included as experimental subjects.

7. Undertake an investigation of problems of more holistic global scope, rather than the more reduced, limited scope problems that are traditionally considered. I'm thinking of those tests done by Perry at Harvard in which he showed that the average 18-year-old female scores higher on the Perry Scale of Development than the average 18-year-old male. What this means is that she is more ready to deal with issues of ambiguity, shades of gray. The average 18-year-old male is still at the stage where he likes one concrete answer, a yes/no or exact number. If you think of the way that we teach many of our introductory science and engineering courses, they are geared towards that male preferred learning style at that stage. Many of the females will hang in there if they can see the connection to the larger shades of

[15] *Beta splendens* also are known as Siamese fighting fish.

gray. This difference became clear to me when I would ask these women why they were dropping out. They would say, “Science doesn’t answer the questions I am interested in. I am interested in environmental issues, or in urban planning, etc.” They didn’t understand how this little number or whatever piece they were learning in that introductory course related to the broader field. Although we faculty knew the broader context, we were not somehow transferring this to our students. Again, this may be more problematic for some students sitting in the classroom than others.

Methods

8. Combining qualitative and quantitative methods in data gathering. Particularly in introductory courses, some of the students may not be able to do the more sophisticated mathematics or scientific manipulation. However, if you combine that with a question where they can use some qualitative approaches, students may become interested. For example, in an introductory course on biology, women students are often very interested in changes during pregnancy. You can, therefore, do urine analysis samples, various other measurements of what is going on, combined with qualitative information such as asking the women how they are feeling during their pregnancy. This is the kind of issue that appeals to women and girls. If you were to do a meta-analysis of what really makes a difference in all these studies, women are particularly attracted and retained in science when they can see its social usefulness, particularly to solve problems to help people. Making that connection is important. Of course, there are many men students who are interested in that, too. Let’s not kid ourselves. We lose a lot of males majoring in science and engineering, also, and many of them are interested in those issues.

9. Use methods from a variety of fields or interdisciplinary approaches to problem solving. If you use qualitative methods, you are going to be getting into social science and other methods. I am very pleased that in organizing the conference, you have both social and natural sciences represented. The humanities also are important.

10. Include females as experimental subjects in experimental designs. You no doubt know of many of the errors that occurred because females were not included as experimental subjects or in the experimental design. Females were excluded from experimental trials. That is partly because male rats are cheaper, not only when you buy them from a biological supply company, but mostly because pharmaceutical companies want clean baseline data, they don’t want that female estrus cycle. Just as in humans, the menstrual cycle interferes with the metabolism of the drug being tested. Of course, the real issue for human beings was that the pharmaceutical company feared testing drugs in women of childbearing age because they were afraid if the women gave birth to a deformed fetus, they would have liability issues. The truth is, when drugs come on the market, women take them as often as men, and the menstrual cycle does change the metabolism of the drug. We need that information. It took a long time to change the rules to get women included in clinical trials. Because of that change, we found whole areas of medicine, such as cardiovascular disease, that were way off base in terms of how women should be treated. We, therefore, don’t have the baseline data for women because women and the female animals were excluded from experimental trials.

11. Use more interactive methods, thereby shortening the distance between the observer and the object of study. I am referring to the work of Barbara McClintock, a Nobel scientist, who had “a feeling for the organism.” Women students like to have a relationship with what they are studying, whether it is corn kernels, animals, or human beings. The social interaction is very important. In physics or engineering there are many, many socially important issues, but that often isn’t conveyed in the classroom and that is what has to happen to make these fields attractive to women.

12. Decrease laboratory exercises in introductory courses in which students kill animals or render treatment that may be perceived as particularly harsh. I just have to mention the whole pithing the frog exercise and killing animals because, except for when I taught or took introductory biology, I

never pithed frogs. Somehow, that is still part of a lot of introductory classes, and this experience becomes very negative for many students in the class. They develop the idea that to be a scientist you have to kill frogs. This is a very big issue because biology is such a gateway course to the other sciences. Perhaps if you are going a straight math/physics track it isn't, but otherwise it becomes a gateway course. The pithing turns away many people. When I ask faculty why they still included the "pith the frog exercise," they often reply, "Well, it's kind of an initiation rite." Now many other ways exist to do the exercise such as computer simulations and people are not doing it so much, but it still does linger in the classes.

Conclusions and Theories Drawn from Data Gathered

13. Use precise gender-neutral language in describing data and presenting theories. Again, we know historically that research has often been done on one part of the population and extrapolated inappropriately to the population as a whole. This was rampant in medical research where research would be done on men, but it was reported as research done on humans. Often it did not apply to women. People changed their behavior on the basis of these experiments. Remember when the report came out that caffeine was problematic in causing cardiovascular disease? That immediately changed people's behavior. At my local coffee place, they said they went from serving nine brown pots (caffeinated) and four orange pots (decaffeinated) to the exact reverse. The truth was that what should have been said is, "We know caffeine has a negative effect on men with cardiovascular disease." They didn't really know the effect in women because no women had been included in that study. If you insert gender, one begins to think more precisely about the science, and this is extremely important.

14. Be open to critiques of conclusions and theories drawn from observations differing from those drawn by the traditional male scientist from the same observations. Encourage uncovering of other biases such as those of race, class, and sexual orientation. I am sure everyone is familiar with what happened with the Tuskegee syphilis experiment.[16] It is certainly the case in Atlanta where about 70% of the population is African American. Although we have a large African-American population at Georgia Tech, the Tuskegee experiment is a deterrent for African American students to go into science. It always comes up that science has often been used very negatively in these communities, and these students are suspicious of it. This is something we really need to talk about. We need to talk about the biases, instead of pretending that it didn't happen or that it has nothing to do with science. It is sitting there in the classroom in the student's head, and if we pretend it didn't happen, to the extent that we want to attract them to science, that's a problem.

15. Encourage uncovering of other biases such as those of race, class, sexual orientation, and religious affiliation that may permeate theories and conclusions drawn from experimental observation.

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[16] The Tuskegee Syphilis Study is one of the most widely cited examples of research in which human subjects were not adequately protected. This study helped provide the impetus for federal regulations that now restrict the treatment of human subjects in research. The Tuskegee Syphilis Study was conducted from 1932-1972 to study 600 low-income African-American males, of whom 400 were infected with syphilis. The men were monitored for 40 years. The men with syphilis were led to believe they were being treated, but in fact, they were not treated even though a proven cure (penicillin) became available in 1947. The study continued until 1972; participants continued to be denied treatment. Perhaps as many as 100 died of syphilis during the study. This study violated a number of ethical principles that are now applied to human subjects research. First, the study used a group of people (disadvantaged, rural black men) to study the untreated course of a disease that is common among many other populations, placing all of the burden of risk on that population in order to benefit a broader population. Second, the study did not minimize risks to human subjects, but instead increased their risks. The subjects were deprived of known effective treatment in order not to interrupt the project. (The Belmont Report, Ethical Principles and Guidelines for the Protection of Human Subjects of Research. The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, April 18, 1979.)

Practice of Science

16. Use less competitive methods to practice science. This is a severe problem, particularly in certain areas such as physics. I have had many women say to me, "I don't like that confrontational, competitive style." That is why they quit physics. Some places have addressed this up front. Mills College, a college for women, has done things such as giving women untimed tests. Similar issues may arise for various ethnic groups. For example, asking people to go to the board and competitively work problems may go against certain cultural expectations. In certain ethnic groups it is not appropriate to stand out from the rest of the group and beat the rest of the group. A more collaborative interaction can be preferred.

17. Discuss the role of scientist as only one facet that must be smoothly integrated with other aspects of students' lives. This is a huge issue, not only for women students, but also for women faculty. In my survey of 400 women who had been awarded POWRE grants from the National Science Foundation and interviews with 50 women from that group, I asked an open-ended question, "What do you think is the biggest issue, opportunity, or challenge women are facing in their scientific careers?" I was stunned when over a four-year period, every year between 60 and 75% of the women answered that the biggest issue was "balancing career and family." That issue stood out more than anything else. For the women students, this is a really big issue. "Can I be a scientist and have a life?" Again, for many men this is no doubt an issue. I think a lot of men would like a life, also. This issue is in the student's head and, if we don't address it, it may influence the way they are learning or whether they choose to stay or go into science and engineering.

18. Put increased effort into strategies such as teaching and communicating with nonscientists to break down barriers between science and the layperson. Will increased efforts in teaching and communication with nonscientists break down barriers? We seem to be doing a little better with this, but we still are not terrific at it.

19. Discuss the practical uses to which scientific discoveries are put to help students to see science in a social context. This issue is very important for women students in particular.

Gender and Race in Group Work

The first issue in addressing group work in science is meshing group work with the course objectives. I find that in many places, faculty have found that group work is important and are pushing it. However, many faculty have not had the appropriate training in how to conduct group work, so they just decide to do the group work! Faculty take the course that they were teaching and decide to use groups. However, they don't consider whether group work is appropriate for this course or how to form groups in an introductory course compared to an advanced course. Does group work really fit with the course objective? In terms of gender, a typical approach to a physics class of 25 students, five women and 20 men is to think okay, five groups, one woman per group. That's gender equity, right? Well, in fact, that is one of the worst things you can do because if you isolate a woman or a person of color in a group in an area such as science or engineering, non-traditional for that person in terms of gender or race, the isolation will often lead to that person's dropping out. It would be better to make a group that has two women, another group that has three women, even though that means you will have three groups that are all men. That is definitely what I would recommend for an introductory course.

Would I recommend that for a senior course in engineering design? No, because by that time, those women are going to be going out into industry where often they will be the only woman in a group of all men. So, mesh it with a course objective. If the objective is to get people ready to go into the workplace, you better give her an experience where she is the only woman in a group of all men. I think it would be wrong to set up groups the way you would in the introductory course for that senior design situation. Think through what are you really trying to do in that particular group and situation.

How does this impinge on group leadership? Who do you make the leader of the group? Do you just let them choose their own leader? Who are they going to choose? Well, it depends on the situation. Sometimes they will choose the white male. Sometimes they will choose someone very vocal, or sometimes (I see this all the time in engineering) they choose the woman. Why? She is socially adept and she is very good at group dynamics. Typically these engineering classes have a man who really is much more comfortable with computers than with human beings. He cannot facilitate group work and could not be a group leader. He doesn't have those social skills. The class may have a woman who is less comfortable with the hardware, so she is pretty happy to be the group leader. She keeps everybody going and kind of plays "mom." Then there are the theoretical types in the group. The group may function well and even get A's on everything. However, if you do not force them to rotate roles, they do not learn what they are weak in, which is very bad. As they get out into industry, they will get fired unless they happen to be lucky enough to get the role that they played in the classroom, which is unlikely. The woman in that situation I just described will get fired because she has not learned to do the hardware part or theoretical part. The guy who could not socialize his way out of a paper bag if his life depended on it will get fired in industry because he has not learned how to interact well with the group. It is very important to rotate the roles within the group and for the faculty member to monitor that and make sure that is happening.

Appropriate assignments are also important. Some students really resent group work. When you start probing why that is, often these are situations where a faculty member has taken what the student has done before (where everybody solves their problems by themselves) and decided to do it in group work. What is the point of that? It takes about three or four times as long because you have to mesh everybody's schedules. There need to be appropriate assignments that can only be solved by groups or where you can really see the value of teamwork. Industry and large research science did not go to group work because it was easier. They went to group work because it was the only way to get the problem solved. That realism needs to be reflected in class assignments. There have to be appropriate assignments, not just the problems that students have previously worked individually.

Who resents it most if you do that? I have found in my experience that very talented African American women are really resentful of group work if there has been a situation where they see no need for a group. First of all, often they have very limited time. They have worked very hard to get where they are and are very bright. They do not particularly want to be bringing along and meshing their schedules with traditional aged college students who have a lot of time and are just fooling around. You can end up losing some of your best students that we are really trying to attract, if you have that kind of situation and do not have appropriate assignments.

Finally, mesh the assessment of group work with what the course objectives are. I have seen faculty say, "Group work is extremely important; I am going to really value it in this course." But when it comes to the grading, they base the grade on individual work. Students are really smart. They figure out in a flash when group work is not important. On the other hand, you may have a lot of anxiety and it may not be appropriate in an introductory course to have the whole grade be the same for the group. On the other hand, on the senior level, giving the same grade may be important, because if what you are trying to emphasize is team work, and if the team fails, then maybe the whole group needs to fail. These are very complex issues, and often there are gender dynamics here. Often the role of the woman in groups is underplayed in grading; the group does not appreciate women's social role in making the group functional.

Phase Theory for Integration of Curricular Content

In Female Friendly Science, I proposed a six-stage model for curriculum transformation to aid in including more information on women and men of color. Built on models developed by feminist

scholars working in other disciplines, the following model is specific for science and mathematics:

Stage 1. Absence of women not noted. I will use just one quick example concerning cardiovascular research, because I already introduced that. For many years, the absence of women in cardiovascular research was not noted. All the research was done on 40-45-year-old white middle class men. Very typically, if gender has been ignored, race also has been ignored and perhaps issues regarding social class as well. Those data collected on white, middle-aged, middle class men were inappropriately extrapolated to the rest of the population. They was taught as applying to everyone.

Stage 2. Recognition that most scientists are male and that science may reflect a masculine perspective on the physical, natural world. Pretty soon, people began to realize women are not included in research designs. Is there a problem with this? They took women and just added them to the research design used for men. Did that work well? No, not very well, because before menopause, estrogen provides women with some protection from cardiovascular disease. If you take 40-45-year-old women and simply add them into the research design for 40-45-year-old men, you are not going to get appropriate research data. These women die at the same rate from cardiovascular disease as men, but at a later age.

Stage 3. Women are recognized as a problem, anomaly, or absence from science and the curriculum. Women may be seen as victims, as protesters, or as deprived or defective variants, who deviate from the white middle- to upper-class norm of the male scientist. As suggested by Stage 2, women don't fit when you just add them to the way you were doing things before. This is what happens with history, with psychology, and with all the areas in the curriculum. This approach resulted in problems with women showing up at hospitals where the staff did not recognize that women were having heart attacks because they manifest differently in women than men. With angioplasty, the death rate for woman at one time was nine times the death rate for men. Was this a surprise? No, because the research was done only on men, so the kind of solution they came up with was designed for male vessels. Running that roto-router thing, the balloon, through a woman's vessels, which on the average are smaller than a man's vessels, kills more women than men. Initially, angioplasty also did not work very well for Asian men, who on the average were smaller than the population of white males on whom the norm was developed. This response raised the issue of women as a problem, anomaly or deviant. A similar problem occurred with bypass surgery, which initially had two to four times the death rate in women than men because the research and norm were male-based.

Stage 4. Search for women scientists and their unique contributions. The extent to which the role of women has been overlooked, misunderstood, or attributed to male colleagues throughout the history of science is explored to determine women's scientific achievements.

Stage 5. Science done by feminists/women. In this phase, new perspectives result when women become the focus. Topics chosen for study, methods used, and language in which data and theories are described may shift and expand, improving the quality of science. Now we are beginning to focus on women. We have programs like the Women's Health Initiative, where we get baseline data for women. We begin to do the research and understand the differences between men and women in terms of cardiovascular disease. Ultimately we want to develop a model of cardiovascular disease where all people are included. We are not hoping to ignore men to include women; this is not the point. We are not hoping to ignore half of the population. This is not what you want to do in cardiovascular research. This is why I like to use health examples: they clearly show that gender bias in research is a life or death issue. This gender stuff is not something that has no relevance or no basis. Some say, "Oh pronouns, what's the big deal?" Well, it's a big deal when people are dying. You cannot afford to ignore half of the population.

Stage 6. Science redefined and reconstructed to include us all. Ultimately, you want to get to a model that is inclusive, so that you really can talk about a model for human disease. Human means both men and women, not just half of the population.

Summary of Lessons Learned

In summary, my experience in doing this work indicates that it is easier to get faculty to change their pedagogical techniques than to change the content of the curriculum. Attempts to develop a female-friendly science classroom have a higher likelihood of success if faculty are first encouraged to consider using some new pedagogical techniques. Teaching pedagogical techniques, thinking about group work, and trying to correlate that with course objectives and levels are good places to start.

Second, changes in traditional approaches in pedagogy and curriculum are likely to encounter initial resistance from students and from faculty colleagues. Students sitting in the classroom come from other classrooms where gender isn't mentioned. Suddenly they are saying, "How come there is all this focus on gender?" Students will say this even when you have a syllabus in a literature course that contains maybe 25% women authors. They may even say, "All we are reading is women this semester." They never noticed that all they read before was men! In the original Norton anthology there were only two women, Emily Dickinson and Jane Austen, but that was not noticed. They have done experiments in elementary school classes where boys get much more attention than girls. Boys might receive up to two thirds of the teacher's attention. When teachers give half of their attention to the girls, as clocked by observers, untrained observers report that teachers are giving girls more attention than boys. Even the teachers think they are giving more attention to girls than boys when this is not objectively true. You often get this same kind of response from students if you treat women and men equally. Criticism of gender-fair treatment may show up in teaching evaluations. You have to be aware that including gender is a change, and anytime there is a change people notice it.

As I worked in projects and modified the stages to describe the way I saw curriculum transformation occurring in the sciences, especially biology, I recognized that the stages described earlier applied to more than curriculum. These stages describe steps of personal development through which individuals progress as they become aware of androcentric and ethnocentric biases in curriculum and pedagogy. For example, a faculty member cannot teach a Stage 6 course in which the primary focus shifts from the white male experience to include women, men of color, and disabled persons, if she or he is only at the "add women and stir" phase (Stage 2) in her or his own thinking. The syllabus and theoretical framework from which the course would be conceived undoubtedly would reflect the addition of a few famous women or a couple of examples of women's experiences to the course as she or he traditionally conceived and taught it.

A teacher cannot teach a class in a truly inclusive manner (Stage 6) without personally passing through the other stages of understanding. She must progress from the knowledge that the female is an exception, deviant, or anomaly when the male body or experience as a scientist is defined as the norm (Stage 3) to the stage of undertaking a concentrated study of how the subject, problem, or research might be conceived if women, the female experience, or the female body were the focus or norm (Stage 5).

The stages may also be applied to programs, departments, institutions, and/or agencies. As with individuals, even with a well-conceived (Stage 6) plan for diversity and inclusion and with the best of intentions on the part of all faculty, staff, and/or employees, an institution or agency cannot jump from Stage 1 to Stage 6 without going through the intermediate stages.

Last, unless the reward structure for promotion and tenure, as well as key administrators, support integration of gender and race into pedagogy and curriculum, the efforts are not likely to be successful. If administrators and the reward structures don't support it and recognize that there

may be some issues right away when someone tries new ideas, when people get dinged for it or have negative outcomes, the process will stop. That sends a very clear message, and people respond to the carrots and sticks rewards accordingly. They notice those sticks right away, so it is extremely important that they get support for making these changes. I am very pleased to see Colby's President and the upper administration of the College here and really listening at this workshop, because it really makes a huge difference to have them involved.

Questions and Answers

Question: Regarding structuring group discussion, with the teacher who has five women and 20 men, would it have been just as bad for all five women to be in the same group?

Dr. Rosser: You could try that. I had a grant in 1992-93 when I was in South Carolina as director for Women's Studies when I had access to a research institution, three four-year institutions and five two-year institutions. I did a lot of faculty development. One of the faculty on a four-year campus who was a physics professor played around with different arrangements in his physics classes over a four-semester period and actually rated how they did. He had all-women groups, all-men groups, and coed groups and found that all-women groups and coed groups performed equally well. The all-men groups performed the worst. Sometimes the all-women group performed a little better, but it was not statistically different. We published the results. The men were spending a lot of time jockeying for position, so they weren't getting the assignments done as well. The coed and all-women groups did equally well, so I would say from that point of view, it would be okay to have all five women in a group together. It depends on your course objective. In an introductory course you might want to do that. I will tell you that some women don't like that. Some women do not want to be singled out, so you may experience resistance by some.

What I think is most important about this is to discuss with students why you are doing group work. You should talk to the class about gender and race dynamics in the group. Say to them, "The reason you are doing it this way is because you want them to learn this information about group dynamics." We need to convey to them, that it is not just that we faculty members sit there and arrange things, so they understand. That is part of what they are learning, along with the science.

Question: If women would rather be in a group by themselves, is it appropriate to let them decide which way they want to work?

Dr. Rosser: You might want to consider the pitfalls. What the research showed was that if it is all men together, they probably will not perform as much. If it's all women together, there can be some real advantages, but you have to realize that when they go out into the workforce this is not going to be the situation women are in. Maybe this semester you want that and, on this assignment, will allow it, but next time, you change the group. So you need to talk through it so that the students understand these issues of comfort level versus what the reality is going to be in the workplace and understand that there is a reason for your use of groups.

Question: The evidence indicates women's performance in math is not as good as men's. How is that explained?

Dr. Rosser: All kinds of hypotheses have been proposed, such as there is a math gene, that has mostly been debunked; the X-chromosome explanation has been debunked. There is a very high correlation between playing video games and math performance. Video games are a very quick way to improve visual and spatial ability. Now you know — talk about a gendered area — to whom video games appeal in the way they are designed. Boys play these games over and over, so they have really been improving their visual and spatial skills. Girls, by and large, have not done that, and, in fact, many girls really like only the video games that have to do with relationships. I remember my own daughters really liked Pac Man because they were about relationships. Actually, the video games illustrate very well many of the points I was talking about. Their focus on the

military, the violence, and all that stuff which many girls really don't like. Women need experience working and manipulating the 3-D dimension. I recently saw some research indicating that as little as approximately ten hours of manipulating video games can significantly improve visual and spatial ability.

Gender Bias in Teaching Evaluations Workshop

Dr. Susan Basow
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Thank you very much for inviting me here. I really have been looking forward to talking with you about this topic, which I have been researching for about 20 years: the issue of how gender relates to student evaluations of faculty. I know that evaluations are a very hot topic on this campus and many others. I am going to discuss some of the general issues related to student evaluations and address the main question, "Is there gender bias in student evaluations?" We will then look at some of the explanations for different patterns of ratings that women and men sometimes get. I hope to end this with a checklist of risk factors.

Several questions come out of some statistics. Women are 42% of professors. However, as we heard here, only about 20% of professors in the sciences are women. Student evaluations are used at over 90% of all colleges and universities and they are especially important at liberal arts schools where teaching is one of the prime areas on which faculty are evaluated. They play a very significant role in many employment decisions, so it is really important to look at how biases may affect evaluations. In my presentation, we are going to focus on gender as one possible area of bias.

There are two general concerns regarding evaluations. The first concern is the question of validity. Let me just preface this by saying that there are no findings about student evaluations that are not hotly contested! The question is, "Do student evaluations affect teaching in a way that people would agree really measures a good teacher?" The best methodology for testing the question is, for example, to have a large group taking several introductory biology courses with different teachers, have all students take a common examination, and see if students who score highest also give their teachers higher evaluations. In the few studies of this type, the expected correlation occurs.

Another issue relating to student evaluations is reliability. Are they reliable over time? Are they reliable in that students within a classroom give similar evaluations? For those of you who know testing criteria, validity and reliability are the two benchmarks. Based on some of the literature people often say with some confidence, "Yes, student evaluations are a good measure of teaching effectiveness."

The problem is that there are also biasing factors. One that is frequently mentioned in the *Chronicle of Higher Education* is the grading leniency effect, sometimes called grade inflation. There is a significant correlation between statistical student evaluations and expected grades. It is important to recognize that it is expected grades, not actual grades, that are important. So it is the grade students think they are getting that correlates with how well they rate their instructor. Before you jump to the conclusion that this is based on how much the students like the professor or believe they are getting a decent grade, we would expect some correlation, because if you are a good teacher, then your students are hopefully learning the material really well, and they are going to get better grades. Having some correlation doesn't indicate there is a bias. But the fact that it's expected grades and not actual grades does lead to the conclusion that there may be some factors going on besides actual learning here.

As many people also suspect, personality variables seem to play a major role in student ratings, and indeed, those professors who get rated highly tend to be extroverts. I will talk about teaching style in a minute. An extrovert with a great personality does track very highly with student ratings. It sometimes is said that student evaluations are really personality contests. There is some support for that. We know little about how race, social class, sexual orientation, and national origin affect student evaluations of teaching,

especially when they vary from the dominant group. Anecdotal comments suggest these variables may be factors. These factors have not been studied because the number of faculty who are of these minority groups is small.

The factor that we are going to talk about is gender, for which there has been more research conducted than on other demographic variables. We are focusing on the role that gender plays in student evaluations. The traditional research design looks at all the ratings of male faculty, gets their average overall teaching effectiveness, and compares this to the average overall rating that female professors get on the same question. The general trend in the literature is to find no significant difference between those average ratings taken across the entire college and student population. That has been recorded as saying gender does not affect student ratings. Although that is a very reassuring finding, it is also a deceptive one. Women are not equally distributed among the faculty ranks. They are not equally distributed among disciplines. And we sometimes find that gender operates on student evaluations in interaction with these and other variables. So the question, "Is there a gender difference?," is really a simplistic one. It takes a very complex phenomenon that operates in specific contexts and reduces it down to simply whether you are checking a male or female box. We are going to look at some of the complexities.

There are at least two important variables in student evaluations with respect to gender. One has to do with gender of the rater. Another has to do with gender typing of the field, which is particularly relevant for women in the sciences. We had a discussion last night at dinner about the importance of women smiling, including where it is a required and mandatory behavior for women whereas it is optional for men. Also discussed were status cues; the fact that women are more likely to be in junior faculty positions matters. Students may not necessarily know the rank of their professor, but age and other forms of status do matter in ratings.

One of the chief findings that appears when we start breaking down the overall issue of gender and start looking at what variables may affect the way gender operates in the classroom concerns the interaction between teacher gender and student gender. Typically, when you look at the ratings of a male professor, male and female students rate him the same. Males are the norm and are not marked for gender in the way that women faculty are. In a parallel way, whites are the norm, they are not marked for race in a way that people of color are.

The picture is more complicated for women faculty. In many cases, they are rated lower by male students than by female students. This is especially true for male students with traditional attitudes, especially regarding gender. Such students are more likely to be found majoring in business and engineering. Male students also tend to pick courses with female professors less often than female students and, when students are asked to nominate their best professor, males pick female professors less often than expected. But the reassuring finding is that male students are not more likely to nominate her as the worst professor. It's not that she is the worst, but it's harder for her to be viewed as best by male students.

With women students there is often a different picture. Women students, especially on questions that deal with either classroom atmosphere or interpersonal interaction, often rate women faculty higher. Women students say especially about women faculty that they feel comfortable in the classroom. They perceive her as fair, and they are more likely to nominate a woman as their best professor than would be expected given the number of female faculty that they have had.

This same-sex preference by female students is more prominent in more recent studies. I think part of that has to do with the change in the way women feel about themselves and other women, as the result of social changes and the second wave of the women's movement. The result is that if female instructors are rated higher by their female students and lower by their male students, the average is going to fall very much in the

middle. For example, on a scale of one to five of teaching ability, with five being the highest, if female students give female professors a four and male students give them a three, the average would be 3.5, the same as the average ratings of male professors. This pattern is found typically. Just looking at the average difference between female and male professors hides this interaction with student gender. One other thing to note here is that we are talking about the upper range of the scale. Both male and female professors tend to be rated above three, and size of the differences is small.

Other things that affect student ratings are the academic field and the specific questions asked. Male students rate female professors lower and female students rate female professors somewhat higher predominately in the humanities and social sciences. The bad news is that in the natural sciences, some studies find that most students rate female professors lower, particularly on questions pertaining to "demonstrates knowledge." Sometimes this type of question is phrased as "the professor shows competence" or "demonstrates knowledge of the field" or "is an expert on scholarship in the field." How students are supposed to know that is another question. The male professors, especially in the sciences in the United States, tend to be rated higher than female professors on this type of question, even when controlling for rank and teaching experience. I think this really has a lot to do with stereotypes or with teaching styles, aspects we'll explore later.

Overall, natural science professors get the lowest evaluations; humanities professors get the highest evaluations. Patterns also occur by student year: first year students are actually most critical and seniors are less so. That may be because first year students are taking few if any classes of their choosing and instead are taking required courses or introductory courses.

Teaching style also matters. A series of studies that have looked at what is called the "Dr. Fox Effect." A male professor in one case presented material in a very humorous and dynamic style, and, in another case, presented the same material in a more controlled, restrained style. The material presented was either substantive or superficial. The results showed that style mattered more than substance when it came to student ratings. Even when they said basically nothing, the professor who was very expressive was rated much higher. I am interested in this effect, and whether it perhaps accounts for some of the gender findings. Women and men on average have a different of range voices, gestures, and other nonverbal behaviors. I think these differences may contribute to students' perceptions of faculty as good and effective teachers because ratings of dynamism and enthusiasm correlate highly with ratings of overall teaching effectiveness.

Another important factor is gendered personality traits. Best professors tend to combine traditionally masculine traits, such as being active, instrumental, and competent, with traditionally feminine traits, such as caring, showing an interest in students, and being expressive and nurturing. This combination seems particularly important for female professors. The expectations that they must meet are very high.

The pattern I presented is just a snapshot of several important variables. One possible explanation for gender bias in teaching evaluations is that gender stereotypes lead to perceptual biases. The picture is that we tend to have certain expectancies of how people should behave, and, when people don't behave that way, it makes us uncomfortable and discomfort can make us angry. We have expectations of how a professor should behave. Often, it is someone who is very competent and knowledgeable about their field, but that is often accompanied by an image of a man with a beard and elbow patches and pipe. Even though women are 40% of the professorate, students' expectations matter, especially in those fields like the sciences, in which women are still vastly under-represented.

Then you have expected behavior for women, which involves a lot of nurturing, caretaking, warmth, and expressive behavior. Women who violate expected female behavior are looked at negatively. As you can see, it is a very narrow area

of behavior. Women need to fit into this range to be seen as accessible and not disconfirm students' expectancies. Women professors are often in a double bind. They need to demonstrate all of the competence and agency that professors are held to, but they also need to have and demonstrate the kinds of expected behavior that women are held to. They are supposed to be more available, they are supposed to be nicer, they should be more understanding. Male professors do not have to deal with a whole range of things, simply by virtue of being male. There is a direct overlap between what is expected of men and what is expected of professors.

There are different expectations and perceptions of women faculty compared to male faculty. Women professors are expected to be more available, and indeed they are more available. If you look at the number of hours that women professors say that they spend with students, as well as the additional time they are available to students, it tends to be much higher than their male colleagues. During a conversation last night, it was noted that many times when a student comes to a female faculty member they expect her to be available to them, right there, right then. Even though the female professor may need to go to class or may have a meeting, the student's concern is really important and needs to be taken seriously. However, with a male professor, that student might understand that they have "important things to do." Women faculty are often said not to be as available as their male colleagues, when, in fact, they tend to be more available. But the norm of what is expected from women is greater availability; therefore, if it is not greater, it is less.

Women faculty are expected somehow to be warmer and more engaging. Indeed, if you have questions on your student evaluations forms that have to do with interest in students and concern about students, women often get rated higher on these particular questions, often by both male and female students. But this does not translate into higher evaluations for female faculty; it translates into similar evaluations for female faculty.

Therefore, in many ways women need to work harder at being more available, being warmer and nicer, to receive ratings comparable to those of male colleagues. A finding of no difference between male and female ratings tends to obscure the fact that women are actually working much harder and doing much more than their male colleagues, even though their ratings are similar.

Another component to this is that if women are only equally available and they are only similarly as warm as their male colleagues, they get lower evaluations. If women, for example, are very strict graders, their rating is lower than that of male colleagues who are similarly strict in their grading patterns. Part of the explanation for this goes back to the expectancy that women are supposed to be nicer. They are not supposed to be mean and give out "D" grades, or to be really tough and not accept late excuses or various forms of excuses. Because women are expected to be nurturing, students might also expect them to give easier grades or use less strict criteria.

Sue Rosser earlier mentioned that women faculty often do employ different styles in the classroom. They are more concerned about gender dynamics and often do employ different types of classroom techniques. In particular, female professors do seem to incorporate, even in science classes, more discussion and more group work than their male colleagues. If you ask professors to rate the percentage of time they spend lecturing, or even do classroom observations, they support the fact that male professors tend to lecture more than female professors do. Women are more likely to use other types of teaching techniques.

Lecturing is probably the most common technique in the sciences, because often there are large lecture classes. Students perceive this same behavior for male and female professors differently, because students tend to like male professors who lecture. They don't like female professors who lecture. This response is a combination of expectation and perceptual differences as well. In fact, women are less likely to lecture than men are. Female professors often tend to soften authority; male professors often tend

to assert authority. That comes out in different ways when student problems are dealt with or student challenges in class are dealt with. Female faculty members often find a way to bypass a direct confrontation with the student, to try get around it. They either ask the student's opinion or get other students to give feedback to the student that would avoid a head-on confrontation. Male faculty are more likely to do a head-on type of confrontation, which may be one reason why students perceive male professors as more knowledgeable. Males are more likely to drop these kinds of status cues than women professors are, because women may be less comfortable with it, or don't feel that that is a style that is appropriate for them. What we may find in this teacher/student interaction is that female students like the female style of teaching and male students may prefer the kind of style that is more typically found in male professors.

In sum, there seems to be a double set of contradictory expectations for women professors that men do not have to meet. There is a narrower range of behaviors that are considered appropriate for women professors. If they are too feminine, they might not be seen as knowledgeable or as a source of authority, or, if they are too professorial, they might not be seen as feminine enough.

When we talk about gender differences in student evaluations of teaching, we are talking about really small differences. Even if they are statistically significant, they can be dismissed as trivial. In student evaluation ratings, a 1%-4% difference is really negligible. But if you add up several of these risk factors you may indeed start getting a noticeable effect.

Several risk factors might bias student evaluations against women professors, as follows:

1. Predominantly male students.
2. Students who have traditional attitudes toward women, either because of the institution or because that's what they have been taught.
3. If the subject area is non-traditional for women, as certainly is the case in many of the sciences.
4. Teachers who have non-nurturing and non-expressive personality traits. Not everyone, even if they have a double X chromosome, is expressive and nurturing. Women faculty who have styles that may be more similar to male faculty may be at a disadvantage. Expressiveness and smiling behavior may be particularly important for women faculty in the sciences. Women with a no-nonsense kind of teaching style who stick to teaching the content might like to think that gender doesn't matter. However, although it may not matter to you, it does matter to the students, because they notice it. So students are reacting to gender, even if you would like them to be oblivious to it.
5. A lecture-based teaching style, as I mentioned before, works less well for women faculty than for males.
6. Women who are tough graders. They often are expected and required to be tough graders, but often are penalized for that as well.
7. Status. Being untenured and young looking is a double whammy. Although it may help students feel comfortable with you, like you, and feel a rapport with you, you may be seen as a buddy and less as a source of authority and credibility.
8. Teaching lower level courses. Teachers in lower level courses often get lower evaluations, often because they are required courses or survey courses. Because women tend to be in the lower ranks, they are more likely to teach the introductory level courses.
9. If they have a reputation as a feminist. That term can cause a lot of strong reactions, much of it being negative.
10. If a woman professor addresses issues of gender, students may say that gender is all you ever talk about. Women who deal with gender in a course are seen in a more

negative way than if the male brought up those same issues.

11. There are other minority faculty for whom these are risk factors as well, even though we have little research to back it up. Sexual orientation could be considered a risk factor, for example.

Not any one of these variables is likely to be of great importance in and of itself, but, if you start adding up the ones that may affect you, there can be a strong effect. For example, a fairly no-nonsense female professor who is teaching predominantly traditional male students in a non-traditional field, who is teaching lower level courses, and is a very tough grader, is at high risk for gender bias. It is likely she will be rated lower than a male professor with similar characteristics.

Balancing a Career and Personal Life Workshop

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Somebody asked right before the break, "Aren't all these kids coming up to college after having had a lot of women teachers?" Before I got into studying faculty, we spent about five years studying elementary school teachers and how they allocate their time between family and work. One of the striking realizations that hit me after a few years of working in the field, is that all of the high stakes testing, which the Bush administration through the "No Child Left Behind Act" has now extended to kindergarten, the high stakes testing of teachers is really an attack on women. Ninety percent of all elementary school teachers are women, and if we get 90% of all college faculty being women, I suspect we will have high stakes national testing at the college level as well!

Let me talk about the research we have been doing on faculty for the last three years for the Alfred T. Sloan Foundation. There is a project called the "Mapping Project" that involves web surveys that we did of over 5,000 faculty in chemistry and English in over 500 schools nationwide. It would have involved virtually all of the schools that are represented here. We followed up with case studies at ten schools.

I am going to give you some of the first results from a focus group. We have just finished the laborious process of coding it, which took us forever. We also did interviews with administrators, followed by shadowing. All those results will be coming out in a few years.

When we first looked at faculty with the little project that became big, I came to the conclusion quickly that the academy is about 10-20 years behind the corporate world in terms of dealing with work and family issues. It is not really a pretty picture. If you look at science and engineering, they may be another 10-20 years behind the rest of the academy.

Actually, in the sciences and engineering, family is not the issue that it is in the corporate world now, because we haven't quite gotten to the point where gender is made arguably, according to some studies, less important than motherhood, which is the way the corporate world has gone.

In part, I may be giving you a glimpse of the future. I remember that during one of the first interviews we did with faculty at Penn State, a woman professor told me, "I got a complaint about my teaching. The department head came to me and said, 'Your teaching evaluations are down. You just aren't warm and fuzzy with the kids, and they are complaining about that.'" The professor explained that, "Once I had my second child, the kids get that and the students don't." So, that may involve some of what we are talking about.

Balancing a career and personal life and other impossibilities are part of my research. Most of you who are here would already be very much aware of the constant pressures that are put on faculty from the worksite and employment site, and how difficult it is to have a personal life at all, and a family, particularly if you are the primary care giver, which a lot of women tend to be in most families.

One fine time in the 1950s, a feminist argued that women needed to push forward in the academy to achieve gender equality at all costs. In other words, women need to be like men. They have to do what men do to get ahead. One of the more striking quotes by faculty from the mid-80's was by Barbara Bergman, who was responding to Carol Gilligan's book, *In a Different Voice*. She said, "Forget Gilligan. Women need to get into the clubhouse. We are going to do that by being like men. We have to be tough, hardnosed, and very single-minded in our pursuit of a career if we are going to get to the top of the various career ladders."

In getting to the top of those career ladders, woman ran into a conflict between the gender clock and biological clock. The average woman in the United States gets her PhD at age 34. That means you are getting to the tenure point at age 40. Less than 1% of all live births of all women are to women age 40 or over. The biological clock does tend to run out. There are advances that allow you to extend it, but that basic conflict is there between tenure and the biological clock.

The response initially in the 1960s, was to minimize family. That is, women in the academy tended to marry less often. If they got married, they tended to have fewer children relative to men. The final answer was: if you want to have a family and have a career, just deal with it.

I was talking to one of the older second-wave feminist leaders in the academy, a woman I greatly admire and whose name I won't use because of the quotes that follow, who gave this great talk on gender in the academy. I asked her, "What about kids?" She turned to me and said in all seriousness, "We all make choices." So her response was, "If you want to have kids, you deal with it. I'm here to get my work done, and if you aren't serious, that's your business."

Now we have moved a long ways beyond that, particularly in America's corporate world, in terms of creating family responsive workplaces. The Working Mother Top 100 List, which I helped develop, lists all the corporations that are really doing great things in terms of creating flexible work arrangements, on-site childcare, and resource and referral services. The fastest growing program right now in the corporate world is backup childcare. Something I often here from faculty is, "Hey, that's what I really need. You know, when I have a sick kid and I have to teach, I really need backup childcare." Some schools are actually developing networks of students who will do backup childcare for a minimal fee. The university or the college can't take responsibility for the quality of any care given, but it can be done.

Finally, in what we think of as the progressive corporations, an effort is made to combine work and family commitment. "Take our daughters to work day" would be an example. It's now "take our daughters and sons to work day."

The question a lot of you may be asking is, "Are these women's issues?" The answer is, yes they are. The answer is, no they shouldn't be. Those are the two answers; there is no single right answer.

When we went into studying faculty about three years ago, we started with this notion from Joan Williams in a book called, *Unbending Gender*, which is very difficult to read, but is probably the best book in the field on gender and work/family issues. Joan argued that there is a bias against care-giving in the workplace, and it is gendered because women do most of the care-giving in our society, but it is un-gendered in the sense that if men do the same thing in the home that women do, then men are going to suffer the same career penalties. However, this actually isn't quite the case.

One of the things we found in the focus groups is something we call "daddy privilege." When mom does it, it is like, "Oh, she's not a good worker." When dad does it, it's, "Gee, he's a great dad!" So, it's not apparent that there really is gender equality there.

When we went in and checked for biases against care giving, we found that if you had children, they said, "Hey, what are you doing? Aren't you serious about your career?" Or, if you are in graduate school and you are thinking about having a child and you talk to your advisor, she or he might say, "Well, you really ought to think about waiting until you get tenure." But if they started a little late, that may not be an option.

We actually found a new phenomenon we called "bias avoidance." We developed this concept over the last couple of years, but it is not in print yet. We've submitted an article to *Gender and Society*, so it might be published soon. There are two forms of bias avoidance. One is the narrow form.

In *narrow form bias avoidance*, people with family commitments hide those commitments to appear committed to the job. For example, let's suppose there is an in-service day at the school that your children attend. It would be easier for you just to bring the child in to work with you, let him play on the computer, and get your work done. Or, let her go down and put her face on the Xerox machine! Or, even let them help out around the office, which has dubious gender role implications if you have daughters, like I do. In any case, there is really nothing going on in terms of increasing your productivity by hiding the kids. That's not a factor. It's just a matter of you hiding the kids because you think that you are going to get penalized for it.

For example, we ran into a case of a woman who had been bringing in her child very infrequently and sporadically, and leaving the child in the office where one of the secretaries or administrative assistants was taking care of the child. This happened maybe once a month. The department chair's recollection of that event was that this woman was abusing the secretary and using her as the main childcare provider. If you think forward about this possible consequence, you don't do that. You avoid the biases against care giving by hiding your kids. We run into this all the time. We run into it in Women's Studies. A lot of women in Women's Studies don't want to talk about their kids at work because they are afraid they won't be taken seriously if they do. The big advantage to my being a man who does family stuff is that when I talk about my kids, everybody says that's great. When a woman gets up and talks about her kids, then well, you know, is she really serious? So, that's bias avoidance, in the narrow sense.

Broad form bias avoidance has to do with maintaining or increasing your productivity at the expense of family commitment, such as not getting married when you want to, or not taking on a partner when you want to. Saying to yourself, "If I really want to be successful in this career, I won't do that." It's not having any children, or not having a second child, which was one of the more common things. Or not having as many kids as you wanted to because you thought, "I can't be as productive as I need to be if I do that." Or, what happens, and I guess this would happen to many of you who have had children in here, using lots and lots of childcare that you didn't really want to use, and juggling a lot of different care providers.

The context for all this in the academy - and this is what has put the academy so far behind in the corporate world - is that people hang around for a long time due to the tenure system. The people who are in charge in the academy are managers tend to have been around for 20 or 30 years. Those tend to be a bunch of white guys, because if you go back 30 years ago, that's who was being hired.

Now for those guys, they are now into their second transition. They weren't happy about the first one, and they are even less happy about the second. The first transition was that women came in to their department. They were told by their universities, "You have to go out and hire women." They were like, "Man, what are we going to do? We can't make these jokes at the department meeting." It was an awful, tough time to be a woman entering the academy. These men now said, "OK, we've got women in our department." After decades, they finally got some women tenured and they are really proud of themselves. Now, they have women coming in and saying, "I want to have kids." "Now, what do you mean? We went out and hired women, and now you want to have kids, and you want to take time off to spend with your kids. We didn't sign up for this. We signed up to hire women who were going to work like men. We didn't sign up to hire women who were going to be, you know, mom." For a lot of these guys you've got to realize that's the context for them. That's where they are coming from - from a world, when they started out, that was all men with wives at home. It was all predominantly white, middle-class men. So, the world has really changed for these guys, and you might at least take that into consideration.

I am convinced that we did the nationwide internet survey of faculty at the right time. The response rate was a little over 30%. We donated

$2.00 for each respondent to a charity. We started about two months after the September 11, 2001 bombing of the World Trade Center. Most of the charity money went to the Red Cross. That tapered off after everybody heard about what the Red Cross was doing with the money. Ultimately, the big winner in the donations was an organization that funded the Adult Literacy Campaign. I thought it was very cool that faculty wanted to improve adult literacy.

Here's what they told us they did in terms of broad form bias avoidance, that is, when we asked, "What sacrifices did you make to make your career go?" One response was, "Delayed my academic career and started with the family." This was very common ten or 15 years ago. Women have kids, the kids grow up a little, and then they say, "I'm going to have a career." That's much more common for women than men. Next was, "Staying single because I didn't have time for a family and a successful career." It really surprised us that 10% of men and 16% of women said this. The key here is not that they stayed single, but that they are telling us they did it for their career. The third response was, "Had fewer children than I wanted to have to achieve academic success." Surprisingly, 12% of men engaged in that behavior and about 25% of women who had one child delayed the decision to have another until after tenure. This is really common, that there are all these women out there waiting until after tenure, but those numbers aren't as large as those who say they had fewer children than they wanted to.

The biggest strategy was, "Trying to time new children to arrive during the summer break." We checked insurance records at Penn State to see what proportion of kids arriving during the summer. We had dates, because when a kid is born, you've got to insure them. We found that a fourth of all children were born during the summer – about what you'd expect by chance. People may be trying to have kids during the summer, but they aren't accurate in that effort! Actually, that turns out to be not true. People tend to be a little more accurate at liberal arts colleges! That's not a bad thing, that's actually a good thing.

Examples of avoiding narrow form bias focused on not drawing attention to one's family roles. "I didn't ask for a reduced teaching load when I needed it for family reasons because I was worried about what people would think. Was my career going to take a hit if I did that?" Almost one-third of women and one-fifth of men in the sample gave that response. Not asking for parental leave was another example. About one-third of both women and men who were parents wanted to use the law of the land, "The Family and Medical Leave Act," to take parental leave and felt like they couldn't.

Not stopping the tenure clock also was used to avoid narrow form bias. "I didn't ask to stop the tenure clock even though it would have helped me to take it." About a fifth of all men and women were fearful, and perhaps rightfully so, that if they stopped the tenure clock it would be held against them. Stopping the tenure clock means, of course, that you get an extra year to put together an equivalent record to what somebody would put together in the normal five to six years. But in fact, people felt, "Hey, if I do that, they are going to expect me to do more than the average record." The logic there, if you ask the senior guys, is that, "Hey, they had all that time! Why wouldn't they be producing more?" It's because of bias against care giving. That is, that they assume that care giving is in fact leisure. You know, when you are up at 3 a.m. breastfeeding, you can be sitting there with your laptop!

Another example was, "Missed children's events when they were young to appear committed to my job." This is the factor that got the biggest response across men and women. Well over one-third of the men and one-half of all the women endorsed this item. I use this as an entry point when talking to senior administrators who had stay-at-home wives and say, "Hey, didn't you have this problem when you were on the tenure track, when you were younger and had kids? Didn't you want to get to some of your kid's events? Don't you feel bad about that? Wouldn't

you like to change that?" That serves as kind of an entry point.

"Came back sooner to work than I would have liked in order to be taken seriously as an academic after having a new child." Over half of all women said this. I talked to women at schools all over the country who take only one to two days off after having a new child. The law says 12 weeks and we are looking at one to two days. That is not the norm nationwide. People tend to take off weeks!

"Did not bring kids to the office during school breaks because I was worried that other faculty would be bothered." This really varies by department and by school. Some departments were very easy to bring kids in; everybody kind of accepted it during school breaks. Then, there were others where people would be horrified, where they said, "Kids, oh my goodness! What are they doing here? I thought we just got rid of the students, and then the little kids show up!"

This is a quick summary until I explain some of the other results we got when we split up the sample. We did a comparison of half faculty in chemistry, and half in English. We wanted to get a gender split, which we did. There are more men in chemistry. English is more than half women. We found that an anti-care giving bias was slightly more prevalent in chemistry. Both women and men in chemistry felt that they had to hide their family, maybe not have kids.

Then we looked at the Carnegie rank to see, "Where is this myth out there? When you go to conferences to deal with the work-family in the academy, there is a myth that being at a Research I place is really, really hard, and being in a liberal arts school is really, really easy. I was really suspicious of this for one simple reason. The toughest times I have ever had dealing with the kids were when I had to teach and one of them got sick. You don't really want to take a sick kid into the classroom. That's not good for the kid, and the students worry "Am I going to get SARS or something?" People at liberal arts institutions tend to have much heavier teaching loads, so there is a lot less flexibility and a lot more demands from students in terms of office hours. In some schools, that might mean being at school in the evening so the students could come and talk to you after dinner.

We wanted to look at behaviors across the Carnegie rankings, and we found that people were more likely to delay career for family in bachelor's and associate's institutions. What that tells us is that there is a selection process going on according to family commitment. That is, women who initially have family and then say, "Now I'm ready. I'm going to get the PhD and start my career," then take jobs at the bachelor's/associate's institution thinking they can't make it at the research institution. Whether they can or not, we can't tell from this data. But that is certainly what they are thinking.

People deny having children more often in the research institution consistent with the argument that the research pressures are really severe. They tend to delay children until after tenure more often at the research institution, with people presumably telling them, "Don't even think about children until you get tenure here." And they tend to come back to work too soon after having a new child.

Another finding at liberal arts bachelor's and master's institutions was that people more often said they tried to time the arrival of new children during the summer. We originally had classified this behavior as bias avoidance, because at research institutions, summer is the time to get your research done. If you are having a kid during the summer, this is a recipe for not getting tenure. That is your only time to get research done. There is no teaching. You don't have any new preps or anything that that. It's the time to do research, and to get tenure. But at a liberal arts place, if there really is an emphasis on quality teaching, then that penalty is not there. Now, of course there is always some research emphasis at every school, right down to the associates' institutions.

If the focus of your work and rewards are on teaching, then having kids during the summer may be a pretty good idea for everyone involved. You may actually have some time to be with the kids

that may not interfere with teaching, but at research institutions people don't feel that way. A lot of the women say, "I really want to have a kid on January 5th. And then by summer I can actually be productive again."

We performed focus groups with faculty who are parents at nine institutions across the country and then transcribed the results. We looked for evidence of bias avoidance that would just bubble up in these groups from a series of questions about work and family. In terms of coding the results, you can either count the number of comments about a topic or the percentage of the total number of lines. I like using the percentage of lines because the sample size goes up by a huge factor! We have approximately 7,000 observations according to the number of lines, even though we only had nine focus groups.

We looked at bias avoidance, combined narrow and broad forms, and found about 20% of the comments from men concern bias avoidance. Over 12% of the women's comments concerned bias avoidance, which was less than we expected given how common bias avoidance was in the national survey results. If you add up all the bias avoidance behaviors among respondents, you find it affects over 80% of the women and over 50% of the men on our national survey. But when you come to the focus groups, bias avoidance is not the item that pops up. Instead, we found a new phenomenon we had not thought about, called "bias acceptance," where the participants just said, "Hey, people are going to biased against me, so what!" We also found a fair amount of evidence of the motherhood norm. The motherhood norm concerns the norm focusing on the idea, "It's women who do the mothering. It's not men who become mothers. It's women who do more nurturing."

Here are some examples. Bias against caregiving. One woman said, "I requested that I not have night classes, and a single male faculty pulled me aside and said, 'You know you are being difficult. You're asking for accommodations just because you have a child. You're high maintenance.'" That is just straightforward bias. Joan Williams in her recent work argues that this is actually illegal. Bias avoidance you couldn't go to court over.

Some situations are just awful. A woman who wasn't tenured (but who eventually got tenure) told us this story, "My baby is sick, my mother-in-law is dying, and I can't be at the faculty meeting. Actually, I did end up going to the meeting and leaving it in tears." So she really tried to hide all this horrible stuff that was going on in her family, and go to the meeting, and be tough, and she couldn't even make it through the meeting.

I can remember a focus group in the Midwest during which we were talking about bias avoidance, not using that word, but we were talking about the behavior. The group started talking about policies. Somebody says, "Oh, I think we have parental leave policies." Somebody says, "Well, I think it might be paid, but I don't really know. How can we get childcare? Maybe we have something about that." One person just pops up and says, "I don't discuss this stuff with anybody, you know what I mean?" How would they know? It is so hidden that they don't talk about even what policies they have around family leave or resource and referral, flexible hours, or any of those things. That's not part of the work. That is an extreme form of bias avoidance. Then, there are women who did eventually have kids who said, "I couldn't have had children while the tenure clock was ticking. It would have just sent me over the edge."

My favorite quote is the one that led to the development of this concept of bias acceptance. It was from a woman who basically had followed her husband's career. She was at her third school when she was in the focus group. "I stopped the tenure clock at the first school, when I had a child. Then I moved and lost some more years for tenure. Again, when I moved here, I knew I was going to lose a few more years of tenure. I knew I was going to have another child, so I thought, that's okay, because that's the only way it was going to work." She had been on the tenure track for 15 years, and she is still not tenured. So she said, "We're going to have another kid, so it's

okay." They were going to have a second kid, so it's okay that I'm not tenured.

The key here is where she says, "That's the only way it's going to work." She is clearly married. Hello! There is a guy, and this guy is obviously doing no childcare, but she says that's the only way it's going to work. She isn't going to ask her husband to do any more and is not going to ask her institution to do any more. She thinks that's the only way it's going to work, because my husband at home, and my institution at work aren't going to do anything. She is accepting that there is bias against care giving in the academy.

The motherhood norm concerning missing work comes out of a comment about daddy privilege. A guy misses work because of his child, and everybody says, "Oh, isn't that great! He's taking out time, he's a great dad!" But when a mom is doing that it's, "Oh, there she goes again. She is off doing the mom thing. She is not being a real academic, she's being a mom."

The real surprise in the focus groups was that the common theme did not revolve around bias against care giving or bias avoidance as we'd predicted. As scientists you always have the possibility the data may not confirm your hypothesis. Well, our data didn't. Among men, the two most common themes in terms of the measure using percentage of lines were workload and juggling. Among women, the two most common themes were juggling and workload.

Let me tell you what they means because sometimes they look similar. "Workload" was when they said things like, "I think that for a lot of the departments here, the philosophy is, 'As long as you work all the time, we don't care where you do it!'" How can you have kids when you are supposed to be working 60 or 70 hours a week? You are supposed to be working after dinner. You can work at home or at work, it doesn't matter. An untenured male said, "I pick up our child from the evening daycare (this is a child who has daytime daycare and then evening daycare separately so both parents can hold down a career) and after she gets to sleep, that's when the real work will start. So I probably sleep three or four hours a night." That's workload! These are obviously extreme stories. But just in terms of the percentage of comments, workload is most common.

For "juggling" - some of the people in the work/family area don't like the term "juggling" because the word makes it look like family and work are equal in terms of both creating conflict. An untenured male said, "I think there is a difference in my work week before child and after child. I think that before child, my work hours were approaching 60-70 hours a week. I would be willing to bet I consciously cut those hours in half." A lot of it is learning to say no, which is very hard for someone to do who is on the tenure track. You're supposed to say yes when asked to do things if you want to get tenure. He had obviously stepped forward and said, "No, I'm not going to do all that extra stuff. I've got a child. I'm going to cut back on the work, be very organized." That is where he wanted to head. A lot of the evidence we gathered is pretty negative. There is no other way to put it, and we need to hear it. We need to turn that into positives and figure out where to go.

I am going to talk about some of those "positives." First, you can use existing policies. Our project, which is mainly qualitative and faculty based (though we did some interviews with administrators), is coupled with a project at the University of Michigan. They are looking at policies across the same set of colleges and universities that we have studied. The policies tend to be very good. They get introduced with a fair amount of flurry and media hype on campus, and they say, "Look, we have on-site childcare!" It is much more common in the academic world than in the corporate world, that they have some sort of on-site childcare. Everybody can point to the center and say, "Look, we have kids. We are really trying to help the students, faculty, and the staff." They will have leave policies that are very generous. They will have tenure clock stopping policies that are generous. They will have reduced workload, and they may have flex load. It would go under different names. But a lot of these policies just aren't being used.

These policies are very easy to find now with the web. I can go to almost any of your schools and I could find some of these policies up there, so it's not like it's hard to find out, like it used to be. You used to have to go to these manuals, but you don't have to do that now. It's up on the web, you can find it, but you have to use it. The trick to doing that is to create on campus the sort of network that this conference is helping to create, presumably around the Colby campus and elsewhere. Let's use the policies. If enough people use the policies, you change the organizational culture. It's just a matter of using them. You think, okay, new child, parental leave, let's do it, or, for a child, let's stop the clock, that becomes the norm, let's do it, and then people deal with it. Guys have to do that too.

The really good news out in the general population is that between 43-46% of all childcare in the two parent heterosexual home is being done by men. There really is a change in men's behavior in the home that we have not seen say in the childcare industry. I always ask my students, "Would you think about hiring a male nanny?" Think about it in here, how many of you would think about hiring a male nanny? The answer is, "Whoa, I don't think so!" But when it comes to husband and wife, in the traditional heterosexual partnership, women ask for more from the men, and they are getting a lot more in the home. That in turn, is putting pressure on guys to go use parental leaves because they want to be good fathers. They now think being a good father is spending time with their kids, not just bringing home the money. That has really changed, and that you can use on campus.

The second thing I suggest is to take over departments. Departments in our colleges and universities have a lot of autonomy. They can kind of do what they want. We ran into a school where there was the most fantastic English department in terms of our survey results. We went to this little school where there were four babies in this department among 12 staff! So for work and family stuff this is ideal! The kids are there. One of the babies was actually in the focus group. The baby is there with the two parents in the same department. It was very cool, and the baby actually slept through most of the focus group. Departments can do things within universities where departments within corporations can't. You can have a lot of flexibility in terms of the course and meeting scheduling, of when people are expected to be present, and of the culture around what behaviors are acceptable.

That leads me to the final point which the President of Colby started with, which is to think about this as a diversity issue and to think about this in terms of inclusion. The metaphor I like to use concerns dogs. There are about 60 million children under the age of 16 in the United States. There are slightly over that number of domesticated dogs, that is, the number that are living in people's households. People have a need for dogs and cats (there are over 70 million domestic cats in the country) and need to take these pets to the vet, or, when it's a new puppy, they have to get home periodically. Or people may have other commitments. They may want to go on a pilgrimage to Mecca, they may want to go on a bike trek, or they may want to go climb a mountain, whatever. If you view family as part of the broader process of inclusion and of diverse needs and commitments, then you can start to make more headway because more people are affected. Because, as long as this is viewed as a white, middle-classed professional dual earner woman's issue, you are talking about 1.5% of the population. So to make this an issue that works, it

Recruitment, Retention, and Mentoring for Women in Science Workshop

Dr. Catherine J. Didion
Executive Director, The Association for Women in Science

Hello. I'm here to talk about some of the work we at the Association for Women in Science have done on mentoring and academic climate. The topics are huge, so I am going to give a couple snippets of things we have learned. I am also going to look at this particularly in terms of the issues that have been raised by the previous speakers. What is interesting is that when you look at current faculty members, they care about the issues of having children and not wanting to hide certain aspects of their life. We are seeing something similar in industry, from big pharmaceutical companies to smaller companies. There is the expectation that employees can be more explicit about their interests.

One issue I see percolating through all the previous talks is the idea of wanting a whole life, of not wanting to segment one's life into "this is my professional side and this is my personal side." Of not wanting to live an almost Jekyll and Hyde existence of, "I'm two different people." Of wanting to know, "How can I find a situation where all of me can be content and supported?"

As many of you may know, the Association for Women in Science has a network of 76 chapters across the U.S. Our chapters are predominantly in academia, but we also have some in industry and government labs. Our chapters generally focus their work on mentoring. We found, when we talked about mentoring with our members, that there was a lot of confusion. "What do you mean by mentoring?" was a question often asked. So we tried to define what mentoring was. We did some focus group work as well as some research and surveys on mentoring. I am going to share with you very briefly some of the things that we learned.

The work initially started with undergraduates, and we have been doing a little bit with faculty. We found that mentoring traditionally is seen as a situation where you have senior mentor with a more junior protege. That is a very important type of mentoring. But a lot of the work we have seen shows that peer mentoring is incredibly important. That is, at any level, whether you are talking about students or faculty, they need to have a supportive, peer mentoring arena to help address some issues and to provide a safe environment. Some of the things that junior faculty mention is that they may be interacting with senior faculty who have good will, but who have been one campus for years and never had to meet the standards that junior faculty face. That is where peer mentoring can be so important.

The other thing that we learned from undergraduate and graduate students in all fields of science is that certain topics came up again and again. The priorities may change, but the reality is that the experience of students in physics and chemistry is very similar to that of biology students. There may be differences in terms of the number of females they interact with, but all had similar issues in terms of current options and opportunities, a sense of "do I belong here?" and concerns about self-image, networking, and balancing work and personal life.

We learned from our work that it is important to have a mix of informal and formal activities if you or your institution wants to set up a mentoring program for faculty or students. We found that if you just have them gather, you will lose them unless you have some structure to provide a sense of security and belonging. But the activities shouldn't be too structured. You have to allow space for the mentoring to occur, since mentoring moments are so important.

Our assumption was that everyone wanted to be a mentor, and this actually happened. We would have women faculty coming up to us saying, "You know, I'm not a full professor, therefore I can't be a mentor." There was a sense of, "Can I be a mentor if I haven't been as successful as what I

had envisioned? Can I share my knowledge?" Our response was, "Yes, you can be a mentor, even if it is to say, 'Don't do what I did.'" You have values and knowledge to share. We had to affirm that much more than we thought. All levels of faculty have a lot to share.

There is a power equation within departments. Departments like to say they are collegial, but there is still a power differential within a department. It is important that they would then recognize and use that power to endorse and be an active sponsor.

A lot of mentoring programs did not recognize that faculty needed mentoring once they were hired into a tenured position or from a different institution. In many cases, that is when they needed it the most. If a department did have mentors for new faculty, it was often only within the department. However, some of the most successful mentoring programs we have seen have been cross-departmental, because then you have the ability to share information and knowledge about the campus or institution without necessarily being put in the position where your mentor also happens to be the person who is sitting on the committee making decisions about you, but you were having a really regressive day and shared your frustrations about some of the things that were happening in your department. Having cross-departmental mentors makes it a much more successful program.

We found from our program that students have perceptions that there were barriers to being a woman in science. Perceptions can be very difficult to surmount, and the fact that they thought that there was a barrier could be as effective as if there was a real barrier. The perception of barriers seems to increase as you move up the career pipeline from undergraduate student to graduate student to post doc to faculty. Many women feel that the climate becomes more difficult for them as they advance.

Some strategies we used in the mentoring project were not new. The first thing that we did was to clarify expectations. We found that both students and new faculty did not really have a road map in terms of the question, "What is going to happen when I get to that campus or department?" Just having the expectations clarified makes it much easier. For example, if I didn't have a map, I would be much less likely to know where to turn. There is a speed bump - how do I handle this? Having a better idea of what is expected can help.

The second mentoring strategy concerned the tendency of students and faculty to internalize negative experiences. The usual reaction was, "What's wrong with me? Why did this happen to me? Why was I the person who had this horrible experience?" (when, in fact, everyone who had been in that position had the identical experience). It was like an initiation rite at that campus. We tried to help them understand that these were experiences that people had in their positions.

The third skill was to focus on strategy. "How do you deal with this? How do we help you solve this problem? How do we help you address the strategy?" That is very important. If you have peers who have had that experience, they can help you by sharing their strategies. If someone had the exact same experience you had, you might not feel quite comfortable with how she handled it. You could say, "Well that is interesting, because that is what you did in that situation when you had that issue. Let me think about how I could strategize with you and resolve that." This approach emphasizes the solutions, rather than just feeling that the problem is you.

One issue that kept coming up through the work that we did is this very fine line that women are expected to walk as to what is considered to be appropriate behavior - the idea that "I am expected to be assertive, but not aggressive. At the same time, if I'm not responsive, I'll be penalized if I don't respond with the same force or the same level of interaction that some of my male colleagues do." (I hear this particularly from a lot of older women colleagues who often are less comfortable with verbal combat.) At the same time, if one responds with what is seen as more traditionally appropriate male behavior, this behavior may not be appropriate. This concern

occurs not only in the teaching environment, but also within departments themselves.

We also found that, among graduate students of mathematics, chemistry, and biology, about 85% of male graduate students said that within their department they are treated very much as a colleague by the other graduate students. Only 57% of the female graduate students felt that way. So there is a different climate for women and men in terms of collegiality.

The issue is how to create a supportive environment. The reality is that you often may have students coming from very different cultural experiences with very different expectations as to what is appropriate behavior. That also gets acted out on the female graduate students in the department. Many of you may only be from undergraduate institutions, but you still need to be aware of the fact that the students can have either a chilling or a positive impact on other students within the department.

Here are some interesting data. There has always been the assumption that if we were patient, enough women would get doctoral degrees and get through the ranks so that we would have a symmetric impact amongst faculty. In chemistry, in the last couple of decades, the number of women getting a PhD has almost quadrupled; but the number of chemistry faculty that are women has not quadrupled.

Donna Nelson of the University of Oklahoma has done some very interesting research which is posted on her web site looking at what she calls "Hiring to the Pool." The fact is that there is a pool of qualified women candidates. In many cases, however, new faculty hires do not resemble what is available in the pool in terms of number of women PhDs and postdocs. This is particularly true at the top 50 chemistry departments across the United States. For example, a couple of years ago, Stanford University looked at hires within their department. They specifically looked at recent hires, i.e., hired within the past five years. What they learned was that some departments had never hired a woman. Departments that had hired within the last five years still had not hired women. A reason given for not hiring women was that departments did not have the opportunity, or that faculty lines had been cut. The evidence showed both that there were women in the pool to hire and that hires had been made. Obviously, the behavior [of hiring only men] is very hard to change and to turn around.

The other issue is that institutions tend not to like to hire their own graduates. You will often find institutions that have produced PhDs, but then will not turn around and hire them into their own faculties.

In terms of addressing some of the things that were just mentioned by a previous speaker in terms of using policies, one of the reasons why we don't have women using these policies is that we do not have senior women in a position to endorse that this is appropriate behavior – to show that you can utilize these policies and still become senior women faculty.

Sometimes, women have the sense of being the sole representative of other women or of a minority group on various committees. In many cases it is impossible, if not extremely difficult, for that woman to say no. What she needs, and what we encourage through our mentoring program, is for her to have a champion, for her to have someone who is in a secure position who can say no for her. Someone who could help her make decisions in terms of, "What are the requests that you need to do? What are the assignments and opportunities important for your career, and what are the ones that need to be deflected by someone else other than you?"

It is important to just recognize that in many cases, if you are in a tenure-track position, as much as you want to do some service work or to do some mentoring outreach, the time may not be appropriate for doing it. You may need to wait until you have tenure to do some of that.

The American Physical Society has site visit teams. They were looking at the climate in physics departments across the United States. We then

took that and expanded it to biology, chemistry and mathematics and worked with the National Science Foundation to develop some surveys, which are now on our web site. You could download the survey and use it to get a sense of what the climate was at a particular place and then try to address what some of these issues were.

These were some of the issues that emerged in all departments. The number one issue that kept coming up regardless of type of department or institution was the lack of communication in many of the departments. That was by far the issue that kept being resurrected in terms of why some faculty did not have a sense of success or know what to expect, or felt a lack of community in their department. This lack of communication was perceived most strongly by the junior faculty. No mechanisms were available to help them capture a sense of the department's culture.

One department we visited had approximately 30 to 40 faculty in the department. We interacted with the chair, who was wonderful and was really trying to make some changes within the department. His department had gotten the reputation of being pretty rough on junior faculty, both male and female. He shared with us that the junior faculty really did not know what was going on. We then met with junior faculty, and there was actually a male junior faculty who had his third year review and did not have any of the information about the third year review process until after the fact. He wasn't asked to prepare. The senior faculty didn't share any information; there was no interaction. When we got the junior faculty together, they said there were mixed messages about what was important. Women faculty were being told to spend more time on service and on writing grants, whereas the male faculty were being told to spend more time on research. There was a tremendous lack of clarity and consistency in what they were supposed to be doing.

When we met with the department as a whole, it was interesting to find that the senior faculty had no regular interaction with the junior faculty. There was no written acknowledgement of what was to happen. There was an idea of an oral tradition to communicate what was expected and a belief that somehow junior faculty would understand it. The senior faculty were not responsive to the discussion until one of our site visit faculty members from a competing institution shared what her institution was doing within their department to help recent hires. They had been successful both in terms of hiring and retaining faculty and doing things well. Suddenly, the faculty we were visiting realized that they could also probably do that!

In terms of recruitment, unfortunately, we often have experienced that a department has expectations when they start looking at hires. I actually worked with one department where the chair told me, "We hired a woman once and it didn't work." We had a long discussion about this. We asked him if he would ever say that about a male colleague. It may not have worked out for many reasons. He said that since they had done that, they could basically check that box and move on. Part of my role was to help the department understand why it was in their interest to get the best hire, whoever that might be, and how their process affected the outcome. The recruitment process may be flawed.

For example, we did a lot of work with the National Institutes of Health. They were having a terrible time at hiring senior women. They vet you against a perfect candidate, so this perfect candidate has all these attributes, and you were say 87% of this perfection. That is literally how they decided whom they wanted to hire. No one had ever sat down and said, "Do we have the appropriate attributes for this perfect candidate? Has anyone ever reviewed what's listed?" When we actually got them to review what was listed, they had attributes that were wonderful, but were not really critical for the position they were trying to fill. As you actually looked at what attributes and experiences were needed for a particular hire, that dramatically changed the number of women that they could hire. Often processes are kept in place because, "That's how we always have done it here." There isn't necessarily an opportunity to review the process to see if it really works.

We compared large public research universities, small liberal arts colleges, and historically black colleges and universities. There is a tremendous difference of gender representation in science departments depending on the type of institution. In recent years, we see more and more women going to smaller liberal arts colleges rather than choosing to be interviewed, much less try for, positions at large research universities. There is a large debate as to why that is, but there is somehow the assumption that small liberal arts colleges are more female friendly. That has been promulgated widely enough that I hear it from graduate students now.

What is interesting is that among historical black colleges and universities, there is a better representation of women faculty. This groups is a very small slice of the pie, but it's interesting that those also tend to be institutions that have had more of an interest in teaching than in research. This is just to say that the type of institution has a tremendous impact on gender representation among faculty.

We also asked faculty, "To what extent do senior faculty measure junior faculty in terms of obtaining grants?" Again, you can see a difference between the male and female faculty. Obviously, if you want to talk about being successful these days in terms of establishing an academic career, the ability to have research funding - to obtain grants - is a critical component in many cases. Funding also gives you external validation. Having that external validation can change how your department views you.

The issue of dual careers also is very relevant. In fact, in many cases, women scientists are more like captive spouses. In physics or botany, you have a huge percentage of women in those disciplines who have partners in the same discipline. In the American Physical Society, something like 87-90% of the female members have a partner who is in the same discipline. I asked one of my colleagues once who was in a discipline with a high number of couples in the same field why this is the case, and she said, "Oh, Kitty, we're just lazy."

Dual career couples are becoming more of a problem because they tend to want to interview as a couple. I did some work with a man at Harvard who shared a story with me. He was counseling two chemists who were applying for two tenure track jobs, and he said, "Do not tell them that you are a couple, because they are going to assume, for better or worse, that one of you is pulling the other one behind." His advice to them, which they followed, was not to mention that they were a couple (they didn't have the same last name). What happened was, of course, that when they were among the top three finalists, they could now tell.

There is a tremendous amount of e-mail on this topic. When do you broach this subject? I think institutions have taken a hands-off approach of "we'll deal with it on a case-by-case basis." What this approach usually does is leave it at the departmental level. The institutions that appear to be the most successful are those that have an institutional policy and mechanisms in place for hiring couples, rather than doing it on an ad hoc basis. This issue is only going to get more and more attention. The Sloan Foundation is now going to be looking at part-time tenure as a solution, as well as trying to codify a non-tenured track career for academia.

Another problem is a tremendous lack of recognition for women faculty in science. We were at one physics department at a school that had a wonderful reputation in terms of students and teaching. It is a great campus, a great university, and we were meeting with all the faculty in physics. It turned out there was one person who wasn't on our list to interview or meet. She had been there for 18 years. She had won all their teaching awards, and she taught all the basic courses, but she didn't have tenure. So as far as the chair was concerned we didn't need to see her. That was the view the department had towards this person. What happens in reality in terms of how we treat everyone in the department shows a lot about the policy we have in terms of academic careers.

There are many ways that we could end this. One is to develop a policy about joint positions before searching for candidates. Being able to share information and use it in a constructive fashion and having multiple policies and examples is very important. In terms of retention, what we are finding, unfortunately, is that many women science faculty are approaching the age of retirement. There are interesting data showing that we don't have faculty in the pipeline to replace them.

I can give you one example I know well. The American University in Washington D.C. for a while had the reputation of having many women full professors. They had over a dozen women full professors in science. All those women are over 65. A professor in chemistry unfortunately died of breast cancer. The figures we have can distort what is happening. We are not retaining women. Even at the associate professor level, we are finding women choosing to leave after they get tenure. Why women might leave a tenure track slot has been greatly discussed. Do you leave if you are not happy? We are bringing women into these positions, but they are not staying and they are not advancing.

We need to be more creative about how we do this. A large debate now current is about whether new lines should be created particularly for women, when in fact women do not want to be hired in those lines. We need to figure out how we do that. Some campuses have been very effective in using special lines to recruit and have addressed it in such a way it that it doesn't reduce the value of the women faculty they bring in. If I could have one wish, it would be to have more senior women. If we had more senior women faculty, instead of emphasizing bringing in recent graduates or junior faculty, which we have been doing for the last two decades, we would see more change.

Question (off mike): Concerning the National Science Foundation's POWRE program for women being discontinued.

Dr. Didion: There was a huge debate about that issue. Some people, such as Mary Clutter, the Biological Lifelines Director, are adamant that POWRE should have been passed. A lot of debate is still going on. There still is a small component of these NSF grants for individual faculty to apply for funding. If anyone is interested, if you e-mail me I can send you to the web site where it is located. It was a strategic decision to emphasize institutional reform. A lot of the debate involves what happens to the women faculty in the pipeline, and what are institutions are doing in terms of support.

Interestingly, professional science societies are increasingly interested in this issue. I know that the American Chemical Society and others are trying to address how you can demonstrate that an institutional intervention is having an impact on how women are reviewed at that site.

The other important thing is to have good mentoring in terms of grant writing. Support is so critical. Some of us are arguing that there needs to be more emphasis on developing skills and providing opportunities rather than just hoping for good luck. There was an amendment attached to the NSF in December of this year that specifically requires NSF to look at what is happening in terms of women faculty and funding at NSF. NSF did add to all its funding what is now being called "Criteria 2," which is specifically designed to address this issue. No matter what type of funding you are seeking, you are supposed to address how you are helping in terms of women and underrepresented minorities. That has just been put in place by the National Science Board. However, this will only have an impact if is really truly required and if there is some accountability.

***Question*:** One of the difficulties in chemistry is that the majority of American graduate programs in chemistry have a majority of students who are international students. These programs are about 70-80% or more made up of international students. One issue for women is that those programs are dominated by men from other cultures. Do we have any information at all about graduates from American colleges going onto graduate school in chemistry?

Dr. Didion: The data clearly show that there has been a growth of U.S.-born women in chemistry. A current perception is that industry is a little bit more female friendly for chemists than academia. There has been growth in the number of women in chemistry, but they just haven't moved onto the academic career path.

Question: What about the geological sciences? The geosciences are generally neglected.

Dr. Didion: Actually, we worked with the Association for Women Geoscientists. Marilyn Sutter of NSF and I have done a lot of work on this, too. The data I see from geoscience depend on the sector of employment they are in. If you examine the sectors of science, many oil companies and similar companies were not perceived as being as female friendly as some of the big pharmaceutical companies were for chemistry. We tended to have women in geoscience entering into a lot of U.S. government facilities or into more non-traditional placements. In terms of academia and faculty, I cannot say the numbers off the top of my head. It would depend upon how the numbers are broken up, because geoscience sometimes falls under earth, atmospheric and oceanographic sciences in NSF data. It's comparable with physics, it is pretty low, about 12%.

Successful Strategies for Advancement

Dr. Emily Toth
Robert Penn Warren Professor of English, Louisiana State University

I am glad to see a lot of old friends here. I also want to thank the planners of this conference. As women, we are always looking for role models, and women who do administrative things ought to be honored and cherished and cheered.

I don't know if any of the planners are moms. One doesn't ask. Peggy Wilson was one of the first women to be elected to City Council in New Orleans, where I live. In a recent interview, Peggy Wilson commented that politics was easy after family life. She said especially because a lot of behavior was the same. There was sulking, corruption, and grasping (like getting your hand caught in the cookie jar). The boys and men in the city council were calling her the same names she got called at home, such as "mean cat" and "doo-doo head," so why should the world of science be different?

I am not a scientist by background, though I have lived with a chemist for most of my adult life. But my first book, published in 1976, was one of the few at that time on the subject of menstruation. My first department head couldn't mention it without blushing. My two co-authors were also literature scholars, and our book is called, *The Curse: A Cultural History About Menstruation*. It is not about medical, but cultural aspects, of what we call, "the friendly monthly nuisance." Among other chapters, we had a chapter on the menstrual products industry, which we called "From Rags to Riches." And we had one on menstruation jokes - "Red Humor" - and we had one on famous menstruators in history, which we called "The Menstrual Hall of Fame."

Now, I wouldn't call these famous menstruators the role models that women need, because one of them was Lizzie Borden, who was probably the most famous New England menstruator of the 19th century. She killed her parents during PMS. She was our first known menstrual murderess. Lizzie Borden was, however, useful in other ways. We were looking for examples of the power of women, and the ability of women to make choices and be resourceful. In that case, Lizzie Borden was a role model. When Lizzie Borden went on trial in the 1890's in Fall River Massachusetts, everyone in town knew she had killed her parents. The jury was all male, and the judges and lawyers were all men, so when they asked Lizzie Borden why there was blood on her skirt, she said, "I have fleas," which is an expression meaning, "I have my period." The men were so embarrassed that they acquitted her. She spent the rest of her life living in Fall River, Massachusetts, trying to give candy to little kids who ran away screaming in horror.

That is an example of my subject, sort of, a successful strategy for advancement or for survival. I look at role models and cautionary tales. My personal cautionary tale explains why I am sitting down. Several months ago I was practicing my imitation of Britney Spears, and it went awry, and I threw my knee out. So, I will never make fun of Britney Spears again. I will be sisterly towards her, as we should be to all women. Britney is great, Britney is good. Britney has also succeeded at advancing in her profession, and has done other thought-provoking things—as I discovered when I began going to medical people for my knee injury, and the doctors recommended knee surgery. But I live in South Louisiana, where Britney Spears grew up, and I heard about what happened when Britney Spears went into the hospital for a knee operation a few years ago. That is when she came out of the hospital with - I hope you forgive my use of a technical term here - huge boobs. That made me very nervous about knee surgery, and whether for me it would be a successful strategy for advancement.

On a more academic note, I was thrown into the subject of successful strategies for advancement, that is, "How do you make it as a woman and as

an academic in a man's world?" through my own experiences. In the early 1970s, I was the first self-proclaimed feminist to be a grad student at John Hopkins University, where I also taught the first women's studies course ever offered. And I was thrown out of two graduate seminars for arguing with the professors about women. Clearly, I was onto something, but I had not learned to be tactful or quiet—something that I now recognize as one of the themes in the lives of successful women. Sometimes we have to learn to be quiet and tactful. It's a subject my Ms. Mentor covers in her columns called "When Should You Grab a Sword?" and "When Should You Tattle?" among others. It took me a long time to figure that out, and I still don't like knowing it.

I began as an academic woman in a very different time. All of my graduate school professors were white men, and most of my undergraduate ones. When I began teaching on the college level, I imitated what I had seen. I did know the concept of role model. I was 23 years old, and must have looked really bizarre to my students, standing up at the lectern like one of those tweedy men with a pipe. They were what my vision of what a professor should be. I realize now some of the students in the back were laughing. Oh, well. Meanwhile, that was my public persona.

But I had a secret other life, which every academic woman should have. Every academic woman needs friends or connections outside academia. They will give you a reality check. For instance, they will give you an honest answer to the question, "Am I really being dumped upon?" Your friends outside academia will laugh at the pomposities that your colleagues often take seriously. My best friend's mother once said, "Why are such smart people fighting viciously over whether a course gets 3 or 4 credits?" The answer to that, of course, is the old standard—that the fights in academia are so intense because the stakes are so small.

With your secret outside friends, you can ventilate all your frustration, and you can give your colleagues satirical nicknames. Your non-academic friends will not run to tattle on you to your dean, and you can be as ugly as you want to be. But be careful what you put in e-mails, and keep in mind that there are no secrets within academia.

A month or so ago, an academic wrote to Ms. Mentor, my alter ego (http://www.careernetwork.com), asking advice, "If I tell my office mate about secret affairs, kidney stones or other spicy problems, will my office mate keep the secret?" Ms. Mentor's response was succinct, "Ha ha."

When I was a grad student, my secret life consisted of the women's movement in Baltimore, which, I discovered much later, was infiltrated by the police and the FBI. In fact, years later, I got to see my FBI file, in which a spy reported on having gone to my consciousness-raising group, which consisted of about ten women, mostly grad students, who met regularly to talk about our lives and what political lessons we could learn from them. I should say that that group was extraordinarily important to me career-wise, because it started me thinking about women's lives, and studying women's lives, and that has been the focus of almost all of my research and writing. It started me on the path to looking at biography, and it gave me a methodology: we find out about women's lives by talking to women. We now in academia call it oral history; we used to call it gossip. Oral history is really gathering stories.

The best stories also have the three things that are needed to interest people: gossip, humor, and new information. That's what the best teaching involves—or as many of the three as you can manage—and that was what we did in my consciousness-raising group. We also kept asking, "What about women in the subjects we're studying in grad school?" We nudged each other to ask impertinent questions in class.

Meanwhile, somebody, and I don't know who, was reporting to the FBI about us. Years later, I got to see my FBI file, in which it was stated that my CR group consisted of "a bunch of white middle class whiners who were no threat to anybody." That was disheartening, and I am glad I

didn't see that report until 30 years later. I can also say the FBI was wrong. Of course we didn't overthrow the United States government, which is what they were infiltrating us for, I guess. What the women in my group did, and what I've done, is that we overthrew much of which was characteristic of academia 30 years ago. Encouragement from that group did a lot for us. The women in that group have published over 20 books. In fact, one of us has a daughter who has published three books, mostly on subjects about women. We have organized unions. We have run healthcare organizations. One of the directors of The National Women's Health Network was in that group with me. We have become lawyers and judges, we have run feminist bookstores, and we have taught thousands of students, corrupting all their minds. We've brought our ideals wherever we've been.

We also transformed the world we encountered. For instance, when I began as a grad student in the early 1970s, there had never been a woman faculty member in the English department at John Hopkins University, and that was in more than 100 years. At that time, most colleges and universities still had quotas: in 1965, Harvard Medical School announced that only three women would be accepted. Two of the women were my classmates. In the early 1970's, women were 3% of the engineers in the U.S., 7% of the doctors, and there were only three countries that had a smaller percentage of women doctors: South Africa, Madagascar, and South Vietnam.

Now all that has changed; we're more than half of everything (except sperm donors), and we are also piercing the glass ceiling. Women with scientific backgrounds have become particularly successful in university administration—perhaps because they're task-oriented and extremely well-organized. We've made great gains because we are smart and tough and know how to advance successfully. As our mothers might have said, we've figured out the recipe, and we've cooked it up right.

One of our achievements may be that a lot of us don't cook very well. An anthropologist friend of mine said that among her students, only the men know how to cook. We know that if you are spending huge amounts of time in the kitchen, you're not spending it in the lab, the library, or on the computer. Most academic women I know have messy houses. Does anybody here have a clean house? How many of you know how to run a microwave? Most of the women I know go out to dinner with friends rather than planning dinner parties, because a successful strategy is a matter of time management. Time spent in the kitchen means less time for the things that matter—including gossip, or networking.

I am now going to survey a few of the things we (that is, academic women) have learned in the last 30 years about what works. I know that there are men in the audience, so I'll make them honorary women for the moment, so I can say "we" rather than "we" and "you." When I speak of strategies that work, I mean what gets us tenure and promotion, and sometimes, good raises. I also believe personally that we should work for a better world. That work should include service learning, daycare, stopping the tenure clock for child and elder care, diverse faculties and student bodies, and other choices that make us whole people. In the meantime, there are ways to get hired, tenured, and promoted, as well as ways to fail or opt out of the whole business.

I made lots of mistakes on my way to an academic career, and I probably made the most that anybody could make. But the one mistake I didn't make is that I never stopped publishing. When I came up for tenure, I was working on my third book. Many academics hate to write, and I do wonder why they're in this profession—that's not a strategic decision.

In any case, when I finally got to be a full professor, when I was hired at Louisiana State University in 1988, I thought I had figured out how to succeed in academia. I also had a raging desire to mentor newer women, but they wouldn't listen to me. The reaction I got was along the lines of, "Please, Mother, I'd rather do it myself," and then things would go wrong. So I figured, I'd

write a book. If they won't listen to me, they will read a book. They will have to read a book.

When you go on a book tour, you're always told to hold your book in your left hand, so here's my *Ms. Mentor's Impeccable Advice for Women in Academia*. You should all buy it because I get 10% of the cover price: for each copy sold I get $1.60, so I'll get very rich. (I do believe women should discuss money, because knowledge is power.) Ms. Mentor's book was published by the University of Pennsylvania Press in 1997, and I am working on a second volume which will be for all genders, so I always welcome new questions and problems. Ms. Mentor is a character I created, who talks like Miss Manners. She never leaves her ivory tower, from which she dispenses her perfect wisdom and channels it through me, though we are not exactly the same. She is taller and has a deeper voice.

Ms. Mentor is a careful observer and a listener, who notices that much of academic (male) fighting is really about "Whose Is Bigger." They give it away with their language. They talk about the thrust of an argument, whose idea is seminal or penetrating. Anthropologists particularly favor "thick description," and Ms. Mentor describes some particular and peculiar roadblocks set up for academic women. There is "peacocking," for instance, which is what happens in the question period after a woman gives a public presentation. The first question is almost always from a man, and it often is not a question at all, but an opportunity for self-display. It is long, thick, and it extends until completion, whereupon, if the peacocking continues, other men join in. They make it a kind of "Whose-is-bigger?" tournament, in which the original woman's speech is lost, and her insights and discoveries are forgotten. So what to do? Ms. Mentor tells women to hold their ground, to ask, "What is your question?," and to resist the temptation to say, "Oh, I see you have a penis." Women need to be firm and polite, and smile only if we must.

Ms. Mentor also recommended in her book (this was really a fantasy sequence) that women go to public lectures where they think peacocking is going to take place, and bring peacock feathers with them, and then when it starts, start waving the feathers, like amber waves of grain. At my university, one administrator's long-enduring wife, who knew her husband was taking for another job, attended a public lecture and brought a feather. When the peacocking began, she bravely began waving her feather. That was a sublime moment, and a month or so later, they left town.

There's still a double standard about aggression in academia, and women are expected to smile more. Often, too often, what a man does is considered forthright, but if a woman does the same thing, she's a bitch. He's assertive, but she's a bitch. He's a smart deep thinker, but she's a shallow, though hardworking bitch. I sometimes think that a lot of the animosity toward Hillary Rodham Clinton is simply because she doesn't smile much. She doesn't smile or flirt enough to fit into a standard feminine role. That's an example of what was said this morning about intersecting roles, and Hillary Rodham Clinton's professional role and feminine role don't overlap very much. She chooses to have a professional role, and she's her own person.

That leads to what's been most controversial about Ms. Mentor's work—not her discussion of phallic language, nor her making fun of peacocking, but her discussion of academic fashion. In the humanities world a few years ago, especially, what to wear was a major issue for women because our image of a successful professional academic was still a middle class white man. In professional settings, men have some leeway about wearing a sports jacket or suit, and they can have some color in their ties. There has always been a uniform for professional men.

Consider job interviews. A man who wants to be taken seriously as a professional knows how to look and what to wear, and to wear black, brown, grey or blue (maybe a little green). It's much more complicated for academic women. Some of us like to be fashionable in spite of it all. Some of us like to wear colors. Being fashionable sometimes means showing parts of your body (although Britney's midriff is definitely out of style). In

warmer parts of the country, professional women are still supposed to wear dresses or skirts, especially in the courtroom. Our judges frown on women in pants, and so did a department head of mine a few years ago. We were interviewing candidates at the Modern Language Association, and he told me that he would never hire a woman who appeared for an interview in pants, and he never did. He's dead now.

Ms. Mentor wrote in her book that a wise woman goes to a job interview in a skirt or a dress, because you don't want to be screened out on the basis of your clothes. If she is going to an interview in a skirt or a dress and she is not used to them, she should practice walking and sitting. When I said all this in a panel at the Modern Language Association convention, a huge fight ensued. Eventually there was a write-up on academic fashion in *Vogue*, a magazine I never thought I would appear in, although Ms. Mentor did appear as the enemy, supporting being frumpy on the grounds that a woman who is dressed more frumpily is taken more seriously. (It all goes back to grade school, when girls are designated as having either beauty or brains, and rarely permitted to have both.) That article in *Vogue* inspired the *Chronicle of Higher Education* to do a piece on fashion, and they sent a photographer to capture my sloppy, broken-down loafers, which wound up on the front page of the *Chronicle* in January of 1998. That led to the *Chronicle*'s hiring me as a columnist for their Career Network site, which started later that year. So you could call it networking or fancy footwork—but I'm not proud of those shoes.

Which brings up another strategy for successful advancement, and that is networking. Women often do it well, because we've grown up chatting easily with each other. We talk to each other in bathroom lines, in stores, beauty parlors, restaurants. It is accepted that women talk to each other everywhere and share information, but that's not something that men do. It's one of the reasons that by age 30 or so, women know much more than men do about life and relationships, because we are constantly in a hidden curriculum, learning from each other. We are in an ongoing seminar, sharing our knowledge, unbeknownst to men, who mostly don't know that the hidden curriculum exists.

Women's wisdom gives us new angles, new openings, for women teach us the questions to ask. For example, I have published five books on the author of *The Awakening*, Kate Chopin, who was widowed in her early 30s. She lived another 20 years and wrote a lot of stories about women who were interested in men other than their husbands. The first two biographers of Kate Chopin, the two before me, were both men who declared that, while Kate Chopin did write about adultery, it wasn't from real life, that after her husband died, she never looked at another man. The first biographer was a priest; the second was a Norwegian man, with a very formal manner, not someone you'd confide in with your gossip, your oral history.

Then I came along, an American woman. I knew that the people who would know the real information about Kate Chopin's life were women, the descendants of people who'd known her in the small Louisiana town where she'd lived in the 1880s. Unlike the two men before me, I could hang out in kitchens. Women hang out in kitchens; that's where the information is really told.

I was sitting at the kitchen table in one woman's kitchen, looking hungry while she was cooking. She plunked a taco down in front of me and said, "This was Kate Chopin's table," right in her kitchen, in a small Louisiana town. She told me to pick up the cover. I found a pool table. It turned out that when Kate Chopin left that town in 1884, exactly a century earlier, she sold or gave that table to her secret lover. He was the grandfather of the woman in whose kitchen I was sitting. You've got to look hungry, and then they tell you stuff.

It also helps to think like a woman. Kate Chopin left two diaries, one of them from her honeymoon in 1870. In it she mentions that she had terrible headaches. The two biographers before me speculated that she had migraines, but I came along, a woman, and I counted. The headaches

came every 28 days, and I knew, even if she may not have, when she became pregnant. That's a core bit of knowledge from the women's curriculum.

I want to turn now to the curriculum on how a woman gets ahead in academia. When I began writing Ms. Mentor, I wanted to drag out into the light those truths that academic women know, but don't tell or don't talk about—the hidden academic curriculum and what really works, not what people say will work. I've touched on networking, but good conversational skills and good manners are a great help. When we've interviewed job candidates in my department, for instance, women almost invariably write a thank-you or follow-up note afterwards. Men sometimes do, sometimes not. Somebody who writes a follow-up note has a leg up, which is a courtesy that women learn. We're also more apt to be friendly with secretaries and assistants, because we share the bathrooms. We may talk about fashion—but we also share information.

So many things can go awry. When I first came up for tenure in the English department at Penn State, I was warned by my department chair that I might have trouble because I published too much. Those were his words. I was embarrassing the men in my department because I was doing so much more than they were. I was finishing my third book, and a man coming up at the same time had published just four short stories. His tenure sailed through, but mine was held up until the last minute. I would like to think such a thing doesn't happen anymore, but last week at West Chester University in Pennsylvania, I met a woman in the sciences who had just been told that she published too much and was making the men look bad. She wound up deciding not to publish some of her good research until after she got tenure.

When my tenure was at risk because I had published too much, I needed to know what was going on, but the process at Penn State, as everywhere, was confidential. However, I had made friends with my department's secretaries, and one day, lo and behold, there appeared in my mailbox my confidential dossier with all the materials I was never supposed to see. I don't know to this day who put it there, but I quickly photocopied everything, then put it in the mailbox of the man who was the head of the committee. He never knew I'd seen it, but I knew who my enemies were. I went to their offices, asked their advice, and smiled. They liked me, and I got tenure, and I've outlived some of them.

This is what a woman has to do to advance successfully in academia. No matter what the overt criteria are, you have to be liked, you have to be "collegial." Some of Ms. Mentor's correspondents want to believe that getting a job in academia is solely a matter of academic "merit," but it isn't. By the time we get our PhD's, we are all smart; we are all certified as knowledgeable. If we have been properly socialized in grad school, we are also full of anxieties and self-doubts, and we're sure that we'll never know enough (that's what grad school is supposed to do to you). We know we're going to be found out and humiliated, and that's why, the minute you pass your dissertation defense, you think, "I got by again."

Nevertheless, we've all completed a serious research project and demonstrated our intelligence and perseverance by getting our PhDs. What is going to separate the goats from the iguanas is people skills, which is where women have a distinct advantage. Even if we have been geeks, nerds, and lab rats our whole lives, we have learned more or less how to make conversation.

We have also learned the trick the Kate Chopin used in 1868. She said, "All you have to do to be thought of as a good conversationalist is to look into the other person's eyes, and say, 'What do you think?' and 'What did you do?'" and, twenty to one, you'll be reported as the most intelligent person around." Being an engaged listener, especially for women, is what makes for a good interview. People who interview well get the jobs.

That means not only looking a person in the eyes, but being able to describe your research precisely in a small package. It means being able to talk about what you've taught and what you'd like to

teach. It means providing some kind of sound bite or distinctive flare, something that makes you memorable. It can be a joke, a story, a reference, even a colorful scarf. When a person is hired it should be a matter of merit, but what often sells is really charm. If the interviewers like you, they'll hire you, and women are good at being likeable.

And then, in the first year on the job, we are all being tested—and not only on the on-paper criteria for tenure: scholarship, teaching, and service. In most cases, service or committee work isn't valued very much, unless your colleagues like you and you have a weak record in the other areas. Then they'll use your service work to promote you for tenure. Otherwise, committee work does not help you, and it uses up a lot of time.

As for teaching—most departments give lip service to teaching, and many require elaborate documentation. Good teaching is rarely rewarded: in top research universities, a teaching award is often a tip-off that you're not going to get tenure. Teaching can be construed any way those in power choose to construe it. Bad teaching, meanwhile, is punished only if the people in power really dislike you for some other reason. Then bad teaching is a convenient kiss of death.

It's another case, really, of beauty vs. brains: women are perceived as being incapable of doing it all. If you are a great teacher, they may assume that you are not a great researcher. I know a young woman engineer who has won 12 teaching awards, including several national ones, but she barely got tenure. Some of her colleagues said that she is too invested in her teaching, although her research record is also better than most of the senior faculty in her department. She was construed in a certain box as a teacher, and that box was looked at instead of the reality, which is that she is super in everything.

She is handling all this the way you have to handle it. She is documenting, documenting, documenting. She writes brilliant memos about what she has done, how it fits with her goals, and the department goals. In an ideal world she wouldn't have to spend time doing that.

What if teaching does count? As my contribution to those great teachers who may not get tenure, Ms. Mentor a few months ago decided to write what has been her most cynical column yet, called "The Torment of Teaching Evaluations." The column is not on how to be a good teacher, but how to get good teaching evaluations. Purely Machiavellian, but based on research. If you smile for the first 30 seconds of a course, if you're dramatic and walk around, if you give out wine and cheese, and if you're good-looking, you'll get high evaluations. I even got an e-mail from a man who said, "I get great teaching evaluations because I'm so handsome." I looked him up on his Web site, and he's not bad. He's kind of arrogant, but for him that works.

I did think that when Ms. Mentor wrote so pragmatically about how to get good teaching evaluations, she'd get brickbats in the mail, "You are so cynical! Why don't you value education, wisdom and knowledge, etc?" What I got instead was the biggest slew of fan mail I've ever had.

Meanwhile, there's one woman who writes to Ms. Mentor just about every month. No matter what Ms. Mentor's column is about, this woman says, "You are still full of shit!" If I ever start to think that I'm doing well, "You are still full of shit!"

Service can be un-rewarded, and teaching mis-rewarded. Then there's the other on-paper criterion for tenure: research and publishing. That is the one that is quantifiable, documentable, and memorable. No matter where you are, if they tell you that you don't have to publish, don't listen to them. Publication is what people look at, publication is the way you become nationally known, and it's the only way to move if you want to change jobs. No matter what people think, you must publish, and if you are a woman you have to publish more than the men, and let them know that you have published.

This brings us to criterion number four, after service, teaching, and research—that is collegiality. Some schools now say openly in their tenure and promotion policies that collegiality is a

factor, but they hardly ever define it. What they mean is whether you fit in, which sometimes can mean whether you are the right gender, nationality, or sexual orientation. It always means, "Do they like you?"

I used to think that using collegiality as a criterion was evil, that you should be judged on your teaching and research. But I've grown older and when I've seen an occasional young colleague who was a pain in the butt, I have asked myself, "Do we want to tenure this person and have them around telling us what's wrong with us for the next 30 years?" For there are young hotheads who rail against the entrenched faculty for the low salaries, the disintegration of the library, the leaky roof . . .not knowing that such things come about not because we are incompetent, but because the legislature is starving us. New people should bring in new ideas and ask questions, but they shouldn't willfully annoy the old farts.

Collegiality doesn't mean sucking up to people, although you never do go wrong when you flatter somebody. They're flattered that you made the attempt, even if it's so transparent. Also, if you can't bring yourself to flatter people you find loathsome, invite them to lunch anyhow. Make nice lunches, as it's a good time to be collegial. But one caution: when I was a young faculty person and invited senior professors to have lunch with me, somehow they would never bring their money, so I had to pay for their lunch. Bring your credit card, bring your money.

This hits only some of the surfaces of what a successful career involves, and there is one problem that is the overriding, overwhelming subject that people write to Ms. Mentor about. That is the two body problem: how do you and your significant other find jobs in the same place? That often shades into geographical bigotry, that is, people who hate the South or who hate cold weather. I have never spoken with anybody who hates New England, but some do hate small towns, as was the case in Ms. Mentor's column a few months ago, about a faculty husband (a "sullen spouse") who hates the Midwest.

The assistant professor writing to Ms. Mentor said she loves her academic job in the rural Midwest, but her husband hates the town and is pouting and demanding. Ms. Mentor suggested they try a commuter marriage, but also think deeply about their choices, since the average marriage last six years, but the average career lasts 30. Ms. Mentor did include a cold-blooded economic calculation: if you're applying for a job in the humanities, you're competing with anywhere from 50 to 1,000 people. If you're looking for another spouse, the odds are much better. Those were Ms. Mentor's observations, but her actual advice was to try a commuter marriage. She got hate mail. Ms. Mentor normally receives five or ten letters per column; for that one, she got 75. Most of them were from men who consider Ms. Mentor an "enemy of civilization." One called Ms. Mentor a sociopath. Most women who wrote in agreed with Ms. Mentor, however, and one said, "You took too many words to say something really simple, 'Dump the grump!'"

This brings me now to the last strategy for successful advancement, and that is that you have to have a thick skin. Ms. Mentor has one correspondent who writes every month, "You are still full of shit," and it took me six months to think that was funny. But you can't really grow a thick skin, a healthy indifference, until you get tenure. That's when you start growing that skin.

For a lot of academic quarrels really are trivial, and a lot of the behavior is childish and hilarious. If you have a thick skin and you smile and don't take it personally, you can have a great time in our profession, because it's almost the only one that really pays you to think. When you are in front of a class, you get to express your opinions, and mostly you get to express them freely because if they don't listen to you, you can give them bad grades. This is a heady feeling.

Ms. Mentor has come to enjoy rants and hecklings, by mail and in person. One time when I was talking about peacocking, a young man way in the back of the room jumped out of his seat and announced, "I have a penis!" Everyone cheered.

Thank you for letting me think in front of you. I hope everyone will think about the fact that an academic career requires planning and scheming. We are very well suited as women to a profession that requires schedules, because we are the planners in life. We are the ones who keep track of the birthdays, who keep the lists, who know when the toilet paper runs out. We are the responsible parties. I am going to turn things over to you now as the responsible parties, and your responsibility first of all is to applaud, and then to ask a few quick questions.

Question: I was wondering why you suggested that a thick skin was only a luxury that you got after tenure, instead of pre-tenure?

Dr. Toth: Maybe I should say a medium skin pre-tenure, because when you get as old as I am, sometimes you can ignore things that you ought to pay attention to. When you are untenured, you really do have to pay attention to everything that is going around you, to who is saying what and what they might mean. So maybe thick skin may not be quite right. Something like radar may be a better metaphor. You can let your radar down a bit, and not hear the warning signals quite as much after you get tenure. But you are right, before tenure, if you take everything to heart, you will be a blubbering mass.

I remember before I had tenure, I had a class that met Friday afternoons, and the class hated me. Sometimes you have a bad class and you just know they hate you. When you get old enough you figure, well it's their problem. When you are young and untenured, you're sure it is something you did wrong. Like you didn't smile for the first 30 seconds. So, I had this terrible class that met on Friday afternoons, and after class was over, there were a couple of students who would always come up to my desk and argue with me: why didn't they get an A instead of A minus? or they'd harangue me about something trivial. It was so painful to have these arguments, because I didn't know how to deflect them, and they would ruin my weekend. I guess I am agreeing with you in a way. You need a thick skin so it doesn't ruin your weekend, but a thin enough skin so that you can still hear what they are saying. Now I realize that they had other problems, family and personal problems that they were taking out on me, but I was too young to know that then.

Question: (Off mike)

Dr. Toth: Women have the ability to learn the communication style to communicate with men. If we have to, we do learn it. An advantage we have is that we also get information and communication from other sources, such as the secretaries. Women can be, what can I say, bi-communicative. Where it comes to any kind of people or relationship information, women are way ahead. Where it comes to power situations, I agree with you to the extent that men often don't seem to have to tell each other what the power situation is. They understand hierarchy. Women have to be told, or sometimes we can't believe it. There are different styles of communication. I happen to think that women's style is more effective because it is more global; as one of our other speakers stated, it is more holistic. We look at the whole picture, and not just the academic or status picture.

Summary Remarks

Dr. Edward H. Yeterian
Vice President for Academic Affairs and Dean of Faculty, Colby College

In terms of opening this session, I would like to add my thanks the organizers of the workshop, and also to the speakers who have come to Colby to share their expertise on gender issues. As an administrator, it is important for me to be aware of as many factors as possible that can affect the teaching of one's students, as well as the hiring, evaluation, retention, and advancement of women faculty in the sciences. As a teacher of psychology and of neuroscience in particular, my students are predominantly women and have been ever since I came to Colby. It is important to be aware of all the factors that can impact their education. I realize that no one workshop or symposium can capture all relevant issues. Frankly, I realize how much I don't know. I have talked to a few of the women faculty at this workshop, and a few have said, "This workshop simply validates a lot of things I already know." I silently said to myself in my own head, "Oh, I think I learned a lot." But I kept from blurting that out! One of the things you learn as an administrator is what not to do, as well as what to do, and I have learned the value of silence! In any case, I would like to mention some of the things that seem particularly relevant to me personally, and, in advance, apologizing for my ignorance on these issues. But I am viewing the information both as a teacher and as an administrator, since my life involves doing both things. Dr. Rosser made several points regarding gender issues and teaching in the sciences that resonate with my own experience, and has provided a context in which I can interpret what I do or don't do well in terms of teaching my women students.

In my time in graduate school - and maybe it has changed - we were taught very little about how to teach at all. To the best of my recollection we were taught nothing. This was during the years of 1970-75. We were put in a classroom, but we were taught nothing about teaching, and certainly, we were taught nothing about gender as it pertains to teaching. I mean zero! I can remember nothing on gender from my five years of graduate studies. I can remember nothing during my three years of a post doc at Harvard from 1975-78 when I was as an instructor in neurology and neuroanatomy. No one taught me a thing about teaching or mentioned anything about gender. So whatever I have learned, I've learned on my own, and it probably isn't very much.

I have tried to observe some information that is relevant. Certainly Dr. Rosser's talk was helpful in this regard. Dr. Rosser's three points are touchstones for assessing one's own teaching, and my own teaching of women students, including the importance of the social context in which scientific information is presented, the importance of holistic global approaches, and the traditional reductionistic methods in addressing scientific problems. One of the things I realize I do now is that I talk to my classes (which are 80-90%, sometimes 100%, women students) about why they are doing what they are doing over the course of the semester. We actually spend the first day not going over course content, but going over the structure of the course, why they are taking the course, why this material is in the psychology department, what it has to do with human behavior, and what applications of it there are in the real world. By the way, no one sent me to a seminar to learn this. I learned this all on the fly, albeit, slowly. I just kind of drifted into this.

Another thing I realized yesterday in regard to my own teaching, is that in 1978, I started teaching using the straight lecture format which I had been trained in at Harvard Medical School - where you go up and talk and everyone diligently takes notes, or their paid note taker takes notes, you fill the time, you show the slides, and you talk to the wall. That's good teaching. I realized very quickly that my students did not want that from me. I tried straight lecturing for the first few weeks I was at Colby, where classes were almost 100% women in the psychology department, and that wasn't what

they wanted. So I started talking about things, asking them thought-provoking questions. I did talk to the board for a while, but I got away from that rather quickly. I realized yesterday that this makes sense. That the straight lecture method of dumping information, not contextualizing it, is not a good way to teach women students. But I had to learn this the hard way through trial-and-error. No one told me these things, and I wish they had.

For those of you who do graduate education, is it better in graduate school now? Are you teaching students about pedagogy and about gender in pedagogy? I don't see a lot of resounding yes's! Despite the fact that I was entering a department in a major where the students were predominantly women, it just never dawned on me that gender made any difference. I am just sharing this with you for whatever it is worth. In any case, Dr. Rosser spoke yesterday about the full incorporation of gender into pedagogy and into curricular content as a goal for individual faculty. This is very important. I also think it is important to note that this won't happen unless administrators support it. It has to be very clear that this is the part of what is expected.

Dr. Basow's work on gender bias in course evaluations was also highly informative. Her major points that female professors are marked for gender in ways that male professors are not, and that male and female students react differently to male and female faculty, are reasons to approach the interpretation of course evaluations even more cautiously than I usually do. Dr. Basow's enumeration of the many risk factors associated with gender and course evaluations illustrated that no one factor in its own right makes or breaks the evaluation, but when they are aggregated, they can be really problematic. This information is critical to all the contexts in which evaluations are used in settings like ours at Colby, where teaching is the paramount criterion for reappointment, tenure, and promotion.

The contextualizing of the evaluations is very important. The types of variables Dr. Basow talked about are discussed all the time in our promotion and tenure committee. We talk about the composition of the classes, whether they were at the 100 level, whether they were required, and the population that is in there. Is it laid back students just finding something out about science, or is it premed, with students walking over one another to get to medical school? Who is the population? It does make a difference. We talk about it. I am not saying we do it perfectly, but we are at least aware. I was pleased to see that Dr. Basow's list of variables coincides with our own list of variables, that in a sense we learned on the fly.

Dr. Drago made several important points yesterday about balancing career and personal life that are well-known to those of us at Colby with administrative duties. Frankly, it is well-known to those of us who personally grapple and continue to grapple with family issues and the balance between having a life (as my wife reminds me quite often I should have) and not having a life - that is, being married to one's career first, foremost, and on certain days, exclusively.

The points on daddy privilege were well-taken, as well as the discussion of the mommy track and the concepts of broad form and narrow form bias avoidance. It is important to be conscious of these issues in working with individual faculty, particularly in the context of departments and programs (and we have 35 of them) that differ widely in their viewpoints on the balance between career and family. There is not one Colby view on this. I find that each department has its own view, and, for administrators, it makes it really challenging to try to give individual faculty "the right advice" because there is no right advice. It depends on the particular situation.

Another point from Dr. Drago that is well-taken was the emphasis on working creatively to reduce the disconnect between work and home life for women and for men. I do not think this is simply a women's issue. My wife worked full-time when we had our two children. She is a nurse, so she was able to take on a different shift at work, but I would teach all my classes in the morning and early afternoon, and then she would go to work from 3-11 p.m., and the kids would be handed off.

We used very little daycare. This was just our personal choice, and I am not advocating it as a position, but it is just what we wanted to do. It was interesting that the kids were well cared for, but we really had no relationship for several years. I do understand the juggling act, and you don't forget it, just as you don't forget your untenured years. You don't forget your early years of juggling very needy and completely dependent kids with the rest of your life. This is the kind of thing psychologists call "flash bulb memory." You don't forget, it's burned into your cortex. I had to get in one neuroscience reference. I can't help it.

Dr. Drago's talk reminded me that our students watch not only what we do in the classroom, but they also watch the way we conduct our lives overall. I am very mindful of this. If we hope to inspire our students, and particular more of our women students to choose fields like ours, we need to present them with some semblance of an attractive, healthy balance between the personal and professional aspects of our lives. I sometimes think of certain years in my life when I would be hoping my women students weren't looking too closely at me as a neuroscientist with a young family and saying, "I can't do that. I can't live the way Professor Yeterian lives because it's not worth the price he is paying."

Dr. Didion's points on recruitment, retention, and mentoring are central to any institution that is trying to diversify its science faculty, as well as its science majors. Here I think that Colby's own Forum for Women in Science is a great example of the kind of peer mentoring that Dr. Didion indicated is important to retention and to professional development. The observation that women perceive the barriers to their success becoming greater as they move from undergraduate to graduate to professional level, I find troubling. Also troubling is her point concerning the conflicting messages that women receive in a society where the touchstone quite frankly remains white, middle-class, male, and heterosexual. There is no denying that is still the norm. There is clearly much more work to be done in this regard. To me, it's not enough to have a large number of women science majors as undergrads if they don't feel that advancing their careers in the areas in which they are majoring is feasible. We can all brag about how many majors we have. We have well over 100 in psychology, there are nearly 200 in biology, but if the women among those majors do not feel that it is feasible for them to advance in that field, we have done a nice job here at Colby and can congratulate ourselves as long as we don't look too far into the future. If we do, I think we can be less self-congratulatory.

Finally, Dr. Toth's point on the importance of reality checks provided by friends outside of academia - that one hits home very much for me! Points about the importance of networking and planning are very good ones. I have to say that I resonated with her examples of peacocking. I hope not as a peacock, but I have to say I had a flashback to my doctoral defense 28 years ago when mutual peacocking between a couple of alpha male faculty on the examination committee gave me much needed breaks during the oral examination to formulate my next answer. Some of these were quite lengthy breaks, as I recall. I also take to heart Dr. Toth's point regarding the fourth factor in our nominal three-factor evaluation triad [teaching, research, and service], with the fourth factor being collegiality. Do people like you? In fact, this year in talking to my son and sounding very parental, probably painfully so to him, I said "Bob, there are only two things important for you to know as you are graduating from college with regard to a career. What can you do and what are you like? That's all people are going to care about. Forget all your engineering honor societies, all the accolades. We are all proud of you. That's wonderful! But what can you do and what you are like are what's going to matter from here on out." Fortunately, he is employed, and I think he got the job he did because he went in as an intern, and was well-liked by the people he was working with and was offered an engineering position after that internship finished. So he had a two-day break between semesters and a job!

With regard to that fourth factor [collegiality], one of the things I remembered yesterday, was that when I was untenured, I virtually never turned down any invitation from any colleague or friends or relatives of colleagues to attend any event at all! At these events, I was given all manner of advice on how to succeed at Colby, and some of it was useful. Frankly, I have seen colleagues hired more recently, women and men, behaving not all that differently in their early years at Colby. If nothing else, these social occasions are opportunities to practice collegiality and networking, and to develop what Dr. Toth calls the "optimal medium skin" to get through the early stages of one's career. I think this is particularly important for women, but I also think it's important for men. I think it's a message for us all.

At Colby, I believe that one of the most important functions of this kind of workshop is to make us consciously aware of factors that affect our lives in the scientific academic setting. Only by being consciously aware of gender variables in terms of how they affect both faculty and students can we begin to formulate pedagogy, academic requirements, personnel policies, evaluation procedures, and modes of communication that address these variables in ways that help to ensure that all faculty and all students can develop and function optimally in their respective settings.

Again, I want to thank the organizers, speakers, and all of the participants that made this workshop possible. Thank you.

TRANSCRIPTS OF SUMMARIES OF THE DISCUSSION GROUPS

Gender Issues in Teaching Science: Summary of Discussion Groups

Dr. Sue V. Rosser

I want to again thank all the folks here at Colby. It really has been a wonderful couple of days; so wonderful that I am going to extend my time here in Maine and go up to Quebec for the weekend. I also admire what you are doing in terms of this conference and the commitment to women in science. As Dr. Yeterian said, we say all of these excellent things, and I am a very good example of "Do what I say, not what I do." My students have often said, "You are so interested in attracting all these women to science and engineering, but your life looks kind of frantic, so I'm not sure if I want to do it!" I think we need to remember how we come across. Sometimes it's not very appealing to students.

Yesterday we had two very interesting sessions about gender issues in teaching science. The first group had about 17 or 18 people, and the second group had about 20 or 21, so there were a large number of folks who participated. I just summarized our discussion under three categories. First, there were some general issues, then, a focus on group work in teaching, and last, the impact women's studies has had on science teaching. I would just like to talk through those a little bit and then open the floor for discussion.

First, a general issue that arose was, "Is this really a problem that we are inheriting from K-12?" Certainly, there are issues in kindergarten through 12th grade. This came up in response to the "draw a scientist" test that I described. It was originally done in the 1980s. About 3,000 students were asked to draw a scientist and approximately 2,921 of them drew a male scientist. About 79 drew a female scientist, and no little boy drew a female scientist. This has been replicated in an entirely different environment with different age groups, and the results turn out substantially the same. The results were the same even when I worked at the National Science Foundation. Many of my women colleagues had their own kids draw a scientist and most drew male scientists despite the fact that the mother was a scientist, and the child knew this. The mother would ask, "What about me?" The kid replied that "Well, I know, but women can't be scientists." This peer group influence and the general cultural influences certainly are severe. However, although we need to work on the K-12, one issue is that all K-12 teachers go through undergraduate education. So guess who is helping to reinforce many of those attitudes? The teachers. I think we have a real responsibility as college faculty to change that.

Secondly, about 40% of women college students who were committed science majors end up switching majors. They enter college saying they want to major in science and engineering and switch to something else in the first or second year. We are not doing a terrific job.

That leads into the second point of who stays and why, and who leaves and why? Exit interviews are one way to find out what's happening. There is some good research out there. The University of Colorado surveyed seven institutions, and they called their study "Talking About Leaving." There were definitely some gender issues. Both men and women ranked good or bad teaching high on the list of why they stayed or why they left, but good teaching is very important for women students in particular. They really pay attention to what goes on in the classroom. The research overwhelmingly shows that for both undergraduates and students in K-12 that a good teacher is often the most important factor in choosing a career in science. Most scientists can point back to somebody who really made a difference. Now there is a group of folks who will become scientists no matter what. Sheila Tobias brings out this point: about 5% of the population, no matter what happens, will become a scientist. They can have the worst teachers in the world, the worst textbooks, the worst everything else, and they are kind of

impervious. They are in love with science. The rest of the world is not that way. What each of us does every day in the classroom makes a really big difference. As for the gender issue, because women are socialized to be a bit more in tune with relationships, environment, all that sort of thing, it probably matters much, much more for women.

That leads to the third issue: fitting in. It probably matters more for women, for men of color, for anybody who is asking the question, "Do I fit with this profession?" Dr. Yeterian mentioned that for a white male, the issue is not "Do I fit?," because scientists always have been white males, so that issue is solved. For women, men of color, for people from different backgrounds, that is a major issue they try to evaluate as they choose careers. They are perhaps more susceptible to messages that suggest, "This is not for you." The examples may come from realms often used in teaching that are outside their experience, such as rockets, bombs, and sports. Some women may be thinking, "I don't really know football" or "I'm not interested in rocket science." The examples used in teaching make a big difference, particularly to those populations.

We also had some discussion of bias versus discrimination. One person raised the issue that if we talk about these issues in terms of bias it is perhaps more helpful than using the term discrimination. Nobody wants to be seen as a person who discriminates which implies a moral defect or purposeful action. However, biases are something that people have and are working to overcome – that is why we are having this kind of workshop. Folks are aware that biases are subtle. We are hoping to uncover them so we can become aware of them and change them.

We discussed group work in both groups. The take home message was also one I tried to emphasize in my talk, that is, however you approach this, there is not necessarily one right answer. The way you formulate, assess, and assign the groups is very important. Your decision should mesh with the objectives for the course and there are going to be different strategies for different courses. There was a lot of discussion about letting students self-select groups versus instructor selection. Some people said, "Well, it's much better to give the students a little leeway." The problem is that if students get to choose their group, it might be like elementary school. If you recall choosing sports teams in elementary school, some kids were left behind. The situation is similar in college, only now it is often the women, the men of color, the non-traditional aged student, or the student who you are most trying to retain who doesn't get chosen because that individual is not part of the mainstream group. So most people felt there were some real issues about self-selection.

We had a lengthy discussion about heterogeneous versus homogeneous ability groupings. At the K-12 level, the literature is pretty strong on so-called heterogeneous grouping. The premise behind this is that the stronger student will pull along the weaker student. The research is not so clear at the undergraduate level, and, in fact, it probably is in the other direction, toward homogeneous grouping. We had interesting discussions about that. People at different institutions have tried different things in different kinds of courses. I would say on the whole, homogeneous grouping has more advantages. Middle ability students, in particular, performed better if they were with other middle ability students. Otherwise, they waited for the strongest person to pull them along.

This morning, we discussed introductory physics courses where sometimes there is a mixture of pre-med, physics majors, and other sorts of folks. One professor mentioned that when she uses groups, she tries to put the potential physics majors together because they have very different objectives than the pre-meds do, particularly if they are working on certain long-term projects. We are not suggesting that you say, "We're putting you together because you are all low ability," or anything like that. But there are different levels of skills in this course and there are ways to handle that. Often the students will understand that and self-select.

Another issue that arose is that sometimes it is not a great idea to just randomly assign people to groups, especially if they are going to be groups

that work outside of class. There are geography issues, especially if most students are on campus but some are commuters or non-traditional aged students. There may also be scheduling problems. A lot of traditional undergraduates think a great time to meet is at 10-11 p.m., which doesn't fit well for a woman with two or three kids who is commuting 50 miles to come to class. In some cases, there might be reasons for assigning a homogeneous group. One person brought up that when she lived on the west coast and had students working on a tradesman's project, she decided to form social identity groups of African American students, because she particularly wanted those folks together.

Assignments also generated a lot of interest. Self-guided design is very popular in science teaching now. One faculty member noted that over time, instructors seem to provide more and more detailed information to self-guided groups, so it gets away from being self-guided. It's a push/pull situation because self-guided groups are quite a lot of work for the instructor. You have to give little tidbits orally to the students, but not too much. So people start writing out the instructions just to avoid that. Using self-guided methods was thought to be particularly useful for women students.

Evaluation and assessment also were discussed. To what extent should you consider peer evaluation of what is going on in the group versus instructor evaluation? Again, there was no correct answer, but choosing the option that meshed with course objectives is extremely important.

Finally, a third area of discussion was: what impact has Women's Studies and consideration of gender issues in science had on science itself and science teaching during the last two to three decades? A very good book by Londa Schiebinger on the first topic is Has Feminism Changed Science? Her conclusion was that it has made a big impact in anthropology, particularly on primatology, and in biology, especially medical research. You can really see where a consideration of gender in science has made a difference. In anthropology and biology things are gendered, so it is much more evident how to bring in an analysis of gender. She concluded that it has had less impact in areas such as physics, engineering, and computer science. However, I feel that it is starting to have an impact in those areas as well.

I am now at a technological institution and have focused my research much more toward women and technology. If you look at the area of computer information design, there is a lot of research suggesting that most of the hardware design is done and built by men. Then you have the users, who are both men and women, perhaps even more women, and the male-designed computers and women users don't mesh particularly well. There have been a couple of responses to this. First, we have a whole profession now in the College of Computing called, "Human-Computer Interface." One suggestion is that if you started from the needs of the users, you would not need to interface. The hardware would actually be meeting the needs of the users. It's nice that people are getting jobs from this, but maybe this isn't the best way to have things develop. As an example of some of the new approaches, at Xerox Park the work of Lucy Suchman et al., as well as some work being done in Europe, particularly in the Scandinavian countries, starts from the user and builds the hardware and software design around the user. This also is being done in more applied areas.

It's interesting that although we have been concerned about these issues in science for 20 or 30 years, these ideas came rather later to medicine and even later to engineering. Now, suddenly, those areas are leap-frogging over others and have gone quite far ahead. You start to see that it is very important to change things. Leadership, of course, plays a role. Bill Wulf, President of the National Academy of Engineering, said this is an issue. We need to get more women in engineering. You know engineers - you define a problem, they solve it! It has now been defined as a problem, and they are out there solving it. It is quite interesting! They are actually moving quite far ahead on stuff we have been talking about now for years in science, literally decades. I find that amazing!

That is what happened with medicine, too. They were later to the table than science, but then bingo! They got with the program because of the applications to populations. They could see there were flaws. There were people dying, and that wasn't good! There was a lot going on, and so they responded. Without that immediacy, things don't happen quickly. The same is true of engineering. If a woman had been on the airbag design team, perhaps there would not have been that fiasco in the American auto industry.

We also can see responses to policy changes. I brought that up yesterday, in the example of the Secretary of Defense who mandated that there would be many, many more women pilots. The anthropometric standards originally used to design cockpits fit about 90-95% of the male population, but only 30% of the female population. They were therefore having trouble recruiting women. There were going to have to find awfully tall women, and persuade every tall woman to become a pilot. At first, the engineers said they couldn't change the design of the cockpits, that this was the only way they can be designed. But they finally realized they could be designed another way so that approximately 70% of women could fit. That gave them a much larger pool of women. I suspect we will begin to see many more applications. Now that the population is aging, there will be some designs for disabled people, older people, this kind of thing, because there is going to be a population push for it.

Science also has changed on the teaching level. I wrote my third book, Female Friendly Science in 1990, and in 1997, I wrote my seventh book, Re-engineering Female Friendly Science. The 1997 book was about the fact that a lot of these ideas actually had been picked up by mainstream science reform. On one hand, this was quite nice. On the other hand, of course some ideas got distorted. This was partly my fault and that of other people propagating them; sometimes we downplayed the gender and racial component in order to get the ideas adopted.

Of course, we were then shocked when people didn't get it. They got the point that we pushed group work, but they didn't get the gender and racial component in terms of group dynamics. That was partly our fault because we downplayed it because people didn't want to hear words like gender and race. Certainly they didn't want to hear words like feminism and racism. Or they got the point of including social context when teaching the history of science, but they would then use examples of white men. That sometimes further alienated precisely the groups we were trying to attract. These people thought, "Gosh, there has never been anybody like me in this field that was famous, so could I make it?" Or faculty got the point about the environment being important to students, but would forget to put it in the social context of women's lives. For instance, they might talk about water in Africa, but not realize that women would have to do the carrying of all the water. We had to go back and really start talking about these issues, which is one of the things we have tried to do in this workshop.

I think the answer to the question, "Has women's studies had an impact on science?" is "Yes." There has been considerable impact but it has been uneven across the disciplines. It is getting to be much more prominent in the physical sciences, engineering, and technology. It certainly began in anthropology and biology, but it could go further in these areas. In terms of the classroom, I think there is considerable interest in issues concerning gender and science. Not surprisingly, the impact on the disciplines is correlated partially and very significantly with the number of women in the discipline doing research. So that is another argument for getting more women in science because it brings about new theories and new ideas.

Question: Has there been an impact on technology?

Dr. Rosser: *Women's Studies Quarterly* did a whole issue on women and technology. I organized a whole issue for them on building inclusive science, which is loaded with syllabi and bibliographies. Just this month I am bringing out a whole issue on women's health. I thought those would be more useful because if you get a hold of

those special issues, you have access to all these bibliographies and syllabi. That will be forthcoming.

Question: Is there a way to keep women in the sciences at the undergraduate level?

Dr. Rosser: Exit interviews provide a lot of insight. These are students who are not dropping out of college, but are dropping out of science into another major. Talk to them about what's going on. Hewitt and Seymour suggest, based on other studies, that a relationship with a teacher is very important. Barbara Whitten from Colorado College has been doing the sort of site visit model that Kitty [Didion] referred to. She has been doing this for undergraduate institutions, and also some historically black colleges. One of the preliminary findings from her research is that physics departments that do very well in producing majors, particularly female majors, get them involved right away in some kind of physics club or social activity so they are engaged in a belonging activity. There is this issue of: "Do I fit in?" Something that connects them is important. She looked at some schools that were doing very well. All of these are small liberal arts colleges, so I think her work is particularly relevant for many of the folks at this workshop who are from small liberal arts colleges. The other important connector, of course, is good teaching.

At Georgia Tech, another technique that I used that has been successful was to start a women in science and engineering dorm. Many institutions have found that it helps women students to have some kind of live-in situation. We have a grad assistant who lives there who can help. We have a lot of programming in the dorm. Alumni come at night to talk about their careers. Each woman in the dorm is paired with a woman faculty member as a mentor. I always have them to lunch every semester and talk about my career path and my research. Other women do that as well, so there is a sort of solidarity. Although it was not particularly aimed at women of color, it has been a very powerful experience for them. We have an over-representation of women of color in that dorm, and they seem to really like it. We did it at the sophomore year, because in the first year we have a freshman year experience that we didn't want to interfere with. But that is a very good technique for keeping women in science and engineering. There is some advantage if the science and engineering majors are mixed. These are all ways of saying, "I have a group that I can belong to." Again, we have a big society of black engineers. Creating a sense of belonging is very important. Thank you.

Gender Bias in Teaching Evaluations: Summary of Discussion Groups

Dr. Susan Basow

Women are 41% of today's faculty, but are unequally distributed in rank (more junior than senior), department (more in the humanities than in science and engineering), and type of institution (more in two- and four-year colleges than in major research universities and elite liberal arts colleges). A major factor in many employment-related decisions is student ratings of instruction, in use in more than 90% of colleges and universities today. The main question we examined is whether student evaluations reflect gender biases. The general answer is "sometimes."

There are many concerns about student evaluations, especially whether they are a valid measure of teaching excellence. Research suggests that they can be valid in some circumstances, especially used with other indicators, and they generally are reliable (consistent across students and time). Still, non-teaching factors do appear to impact ratings as well. Grading leniency plays a role, with there being a 0.40 correlation between ratings and expected grade. Do instructor personality traits such as extroversion and likeability. Less studied are the effects of race, sexual orientation, and national origin.

Many research studies have examined whether faculty gender affects student ratings and generally conclude "no." Women faculty do not get lower evaluations than do male faculty across the board. This seemingly reassuring result, however, is as deceptive as it is simplistic. For some women faculty, gender does seem to affect ratings. This is because gender appears to operate in interaction with other variables, such as the gender of the rater, the gender-typing of the field in which one teaches, one's gender-typed characteristics, and status cues.

The most frequent finding is that teacher gender interacts with student gender. Whereas male faculty tend to be rated similarly by their male and female students, female faculty tend to be rated lower by their male students and sometimes higher by their female students. The picture of similar overall ratings of male and female faculty hides the more complicated picture of differential ratings of female faculty. The male students who are most likely to devalue their female professors tend to be business and engineering majors, students who tend to hold the most traditional attitudes toward women. Although male students are more likely to rate their female professors lower than their male professors and are less likely to consider them one of their "best" professors, they are not more likely to consider them their "worst" professor, a somewhat reassuring finding. In contrast, female students often do choose women faculty as "best" and rate them higher than male faculty, especially on qualities related to "fairness" and "providing a comfortable classroom environment."

The subject matter that a professor teaches also plays a role in student ratings. Overall, humanities professors tend to get higher ratings and natural science and engineering professors get the lowest ratings. Teacher gender tends to interact with student gender in the humanities and social sciences, with differential ratings of female faculty by their male and female students. But, in the natural sciences, students tend to rate female faculty lower than male faculty, especially on questions such as "demonstrates knowledge." This result is likely due to the fact that the sciences are considered traditionally masculine fields.

Teaching style also matters, sometimes more than content. The best predictors of high student evaluations are ratings of faculty dynamism and enthusiasm. In fact, just 30 seconds of viewing a faculty member's nonverbal behaviors predicts end-of-term evaluations. In general, male faculty are rated higher in dynamism and enthusiasm than their female colleagues. In terms of personality traits, highest-rated professors tend to combine strong active and instrumental qualities (traditionally "masculine") with strong nurturant and expressive qualities (traditionally "feminine"). This androgynous combination appears to be

particularly important for women faculty, who have a finer line to walk with respect to appropriate behavior.

In general, women faculty bear the burden of higher expectations. They must retain their expected "feminine" qualities of warmth and nurturance as well as display expected "professor" qualities of knowledge, competence, and assertiveness. Women faculty are expected to be more available and more nurturing than men faculty and typically are. But these qualities only result in comparable evaluations, not higher ones. If, however, female professors are not *more* available and nurturing than their male counterparts, such as by having more office hours or requiring less work, they will be rated *lower* than similar male colleagues. Thus, comparable ratings of male and female faculty may mask a differential set of student expectations and faculty behavior.

The reasons for these gendered patterns are two-fold. First, gender stereotypes lead to perceptual biases such that similar behavior may be perceived differently depending on the gender of the professor. For example, lecturing appears to be rated more negatively when done by a female professor than when done by a male professor, perhaps because it's seen as "less feminine."

A second reason for gender effects in student ratings is because male and female professors may in fact have somewhat different teaching styles. Women professors tend to be more student-oriented, more frequently using group work and discussion, whereas men professors tend to be more teacher-oriented, more frequently using lectures. Women faculty also tend to soften authority when challenged by students while male faculty tend more to assert authority in the same situation. These different behaviors may be preferred differently by male and female students, with each group showing a same-sex preference.

In summary, female professors appear to be marked for gender in a way male professors are not. There appear to be more stringent expectations for female faculty and they tend to be rated differentially by their male and female students. The gender-appropriateness of their behavior and personality, as well as their subject area, also seems to matter. Although the individual effect size of these variables is very small, accounting for only 1-4% of the variance in overall ratings, for specific faculty members, these small effects can add up. Thus for some women faculty, gender variables can have a negative impact on their student evaluations.

Risk Factors for Bias against Women Professors

- Students: male
- Students: traditional gender role attitudes
- Subject area: nontraditional
- Teacher: non-nurturant, non-expressive personality traits
- Lecture-based teaching style
- "Tough" grader
- Status cues: untenured, young-looking
- Lower-level course
- Feminist reputation
- Additional minority cues (race, ethnicity, sexual orientation).

Balancing a Career and Personal Life: Summary of Discussion Groups

Dr. Robert W. Drago

Relative to the other discussion groups at the conference, this group provides a cautionary note, i.e., be careful about adding to existing workloads. For example, mentoring programs, improvements in evaluations, and even the development of more gender-neutral examples for classroom use, are all likely to increase faculty workload. That increase is not necessarily conducive to a healthy personal life.

Problems confronting women faculty in science:

1. Sleep deprivation and guilt. Many parents feel bad about the kids when at work, and feel bad about work when they are with their kids.
2. Guys (and also women without kids) "have no idea" how tough it is to be a good parent. As a result, many faculty hide commitments to children, or minimize the number of children.
3. For many of the women, there were no role models for successfully balancing work and family life, particularly at the Research I institutions where most faculty are trained.
4. For parents and non-parents, the tenure system loads too much pressure on at the wrong time. It might be better if the pressure were spread out.
5. For parents and non-parents, there is often too little personal time due to extreme demands from their colleges and universities, including students.
6. The settings for these problems are diverse. Departments differ markedly, even across an individual campus. Disciplines have distinct demands in terms of the timing of research. And personal and family circumstances run from dual career couples in the same or related fields, to individuals with multiple children, younger or teen children, and elder care commitments.
7. For individuals who have contemplated getting off of the tenure track, there is no job security and little prestige in following that path.
8. For parents, there is inadequate access to information on childcare, a need for on-site childcare, for back-up childcare in emergencies, and for sick child childcare when kids cannot go to school due to illness.
9. Many scientific conferences are blatantly anti-child, limiting the ability of parents to bring children to conferences, and not offering childcare facilities either.
10. As children grow, parents need more flexibility from their institutions to cart teens around, so the teens can engage in learning outside of school hours, and not become latchkey children.

Broad Answers to these problems:

1. Parents and non-parents need to start saying "no" to extra work. As more and more committees are formed, individuals need to clamp down on work demands in response.
2. Our institutions need to improve the climate on campus so that time spent on activities external to the academy is viewed as healthy and positive.
3. Faculty, particularly those who are tenured, need to act as role models in terms of balancing their own lives.
4. Improve funding of course releases during parental leave. Most institutions depend on colleague coverage to fund parental leave, while many departments have few resources for coverage, and others rely on tenured faculty to cover courses for tenure-track faculty. Funds to hire faculty to cover leave would resolve these problems.
5. Implement back-up and sick child childcare systems. These are typically very cheap systems because individual faculty are willing to pay a premium for these occasional services.
6. View individuals as "whole people," and not just as professionals. Because people are diverse, there is no one right model for handling people. Programs to help with balance need to be inclusive of faculty, staff, administrators and students to confront life and family and disciplinary diversity.

Quick Wins or Little Answers to these problems:

1. Colleges are resources for youngsters (particularly middle and high school students) as well as for students; find ways to make them welcome on campus.
2. Try to coordinate spring breaks across the institution and local school systems.
3. Involve faculty, students and staff in obtaining work/family benefits at the institution, such as childcare.
4. Introduce resource and referral services for child and elder care. Such services are very inexpensive, but can be very helpful. If possible, provide contact information for those who have used local services as a quality check.
5. Develop cooperative childcare arrangements in neighborhoods.
6. Press for flexibility and understanding of diverse circumstances around the scheduling of courses, meetings and events.
7. Have a little courage. For example, many women would find life with an infant easier if breastfeeding in public became acceptable. However, someone has to take the initiative.
8. For institutions, join the College and University Work/Family Association (see www.cuwfa.org) to find out what other institutions are doing.

Recruitment, Retention, and Mentoring: Summary of Discussion Groups

Dr. Catherine J. Didion

A. Student Issues

In terms of recruiting women students into science, professors at some colleges have realized that many students, particularly women, develop an interest in the sciences through an introductory course in math, chemistry or physics, rather than arriving on campus with a fully developed interest in one of those areas. Women who are performing well in an introductory course often are looking to be invited to join. Many departments could double the number of women students if they encouraged women more at this level, but unfortunately, many professors do not take that extra step.

A good model for encouraging women students was described by the Chair of a physics department who explained the he gets the names of all the B+, A- and A students in class, and then e-mails them saying, "Congratulations, you did a really good job in this course!" First semester students love to hear that sort of thing. He invites them to stop in and talk about what it is like to be a physics major. That invitation is more necessary for women students than for men students. Many women see it as being asked to join a club, and they need that validation. The other thing he does is to offer them free tutoring if they are a physics major and run into problems with the course. Being able to do that for students says, "We really want you to stay. We recognize that you are having trouble." If you can do that, it helps that student.

Another professor gave an example of how informal groups can be used to encourage students. Space was made available in the department so students could hang out at tables and do problems together. The demand was such that they keep a room open at night for women. There is a student there to make sure the computers are all there and working, but there is no faculty.

Women students often want to know what career opportunities exist for females before choosing science as a major. Some colleges and universities have a career panel every year where they invite alumni of various ages, genders, and backgrounds who have gone on, not just to graduate school, but also to industry and other careers. In doing this, it's important to represent a broad spectrum and to bring in alumni from all disciplines.

Formalized informational sessions might also work. For example, male students are more likely to be hanging out in the male faculty member's office than women students, where the topic of summer internships or graduate opportunities come up. Just to make sure that everybody is hearing about those things, one college started running regular meetings at the appropriate times each year to show students the folders on summer internship for physics undergraduates. Students who have done those internships talk about their experiences for 3-4 minutes. That can really increased the number of our students who apply for those opportunities. Knowing that the people you see in the classes and in the halls have done these things makes them seem attainable.

Also, women students more so than men are likely to want to enjoy the work they are doing and not just persist because it's "good medicine." In addition, women often want to do something that will make a difference in society or provide an opportunity to give back to the community. This is particularly true for minority women who often may not have enough other role models. Knowing how to address these issues through course content or giving women students a chance to discuss them is important.

Women students in the sciences tend to have higher standards for themselves than men. They may believe that if they don't have a 3.8 or 4.0 average, that they can't cut it and decide to leave. If they don't do well in a class, they may be more likely than men to bag it. Women students may need to be reassured that everyone has that

experience, but it doesn't mean that you don't belong here.

B. Faculty Issues

In terms of faculty recruitment, it is interesting to consider the issue from the standpoint of, "Are there any PhD women who have not been able to find a suitable position?" Often search committees concentrate on competing for a few well-qualified women from a narrow range of schools. It is very difficult to attract the few that remain in academe for many reasons. A broader search strategy is to look at the PhD production of women scientists and recruit from this larger pool.

There is a big gap between people's perception of the number of women out there and their availability and what the real situation is. There actually is a slightly higher employment rate for women than men who are looking for the assistant professor positions and slightly lower starting salaries for women. There may be a few women way at the top who everybody is bidding for, but the vast majority of women are still struggling to overcome large barriers and perceptions just to get that first job. I would just like to encourage people to keep trying to use these networks because there are very good women out there.

At some institutions, the search committee works with the affirmative action office to set up the criteria. You can put things in the criteria that will guide you in the direction that you want to go. One college was very successful in hiring women in their department by setting the criteria so that it favored hiring women. Diversity is one of the institutional criteria that in the sciences includes women. Within the departmental criteria, some areas are probably more likely to draw women than others. For example, molecular biology is one area where there are a lot of new women graduates so defining the position as being in molecular biology will attract some women candidates.

A good question for search committees to ask is: "What are some things that we can take a risk on if we are really serious about getting women into positions?" Maybe post-doctoral experience or teaching experience can be waived so that a strong candidate can come on board early in her career. She may require more mentoring if she isn't as seasoned, but the institution might be willing to assume more responsibility to help her mature in order to retain her. Or, if there are three people who are qualified, committees can go back and look more closely at what they are actually looking for - is it just the number of publications or the post-doctoral experience?

Dual career issues are a major issue in recruiting women in science. Some schools have explicitly developed a reputation for going after dual career couples. They know that in order to retain women scientists they are going to have to recruit in such a way that they can keep both of them for a while. They are much more explicit in how they go about it. It has lead to some very interesting positions and hires, and those schools have done very well in neuroscience, biology, and several other sciences as well.

When interviewing women candidates, it helps to give them an opportunity to meet with faculty in some of the other departments, and other opportunities to spend some time with them and to share any pertinent issues. Give them the latitude to come in and address some of the things that will help meet other colleagues that they can feel comfortable with.

Departmental and institutional climate plays a key role in both recruitment and retention of women faculty. For example, one college had had two finalists for a junior faculty position. Both finalists gave seminars. The department was very happy with the woman candidate. But they got poor student feedback on the woman candidate, and therefore chose not to hire her. When the site team was brought in to review the department, they were outraged that the department allowed the students' leverage in the hiring. This department had no women faculty. And they basically didn't hire someone because students said they didn't like her.

Successful Strategies for Advancement: Wrap Up and Summary of Discussion Groups

Dr. Emily Toth

The first topic in our discussion group was new faculty's need to learn the procedures and policies for getting tenure. How you are going to be evaluated, who is going to evaluate you, what is the timetable, what do you need to know? These things are almost always spelled out in faculty handbooks. But I find that at my university, and many other schools, new faculty aren't given this information, and somehow it doesn't occur to them to look in the faculty handbook, which is really a list of your rights.

You should also be keeping a tenure track diary listing your goals, what you've done toward those goals, and your plans. It's important to keep copies of any kind of communication you get about your professional life—such as letters of praise, letters of damnation, or anything that is professionally related. Keep copies of your contract as well. This seems rather obvious, but many people don't keep track of their papers.

You have to document everything. If your department chair tells you that you fit into the department in certain ways, and that they have particular plans for you, this is oral information, but it's part of your career. You need to write down what your chair said to you and send an e-mail, saying, "I enjoyed talking with you today. I was pleased that we set these guidelines for my career." You now have documentation.

Documentation is essential, but keep your documentation or your "tenure diary" at home, or keep a separate copy in your office, but don't keep it solely in your office. This is because if things work out badly in your career or if you have an exceptionally diligent maintenance staff, items can disappear. There have been some ugly cases - tenure denials - where key documents had somehow disappeared from people's offices. So keep the documents at home. Keep multiple copies and keep everything documented. One of the first things we talked about was that senior faculty need to tell newer faculty to do all this.

We senior folk also need to welcome you. We need to have good manners. We need to offer hospitality; as Kitty Didion's group said, we don't do, and it's true, we don't. We need to invite people to lunch, even though it's onerous to make them come. What Bob Drago said is very true. Going out to lunch with your colleagues takes more time than grabbing a sandwich at your desk. It does pay off later if you can do it and gives the sense that you are part of the unit. It gets you information, and friends if you're lucky. I would add that I think we have particular responsibilities as senior faculty to a new hire who is single, because if you are youngish and single in a new town, you are lonely.

Be in the business of getting people socially connected with each other. Perhaps have a dinner party, or if you can't cook, have it at a restaurant and invite everybody. Treat the new faculty. Senior faculty also need to give newer ones advice about student culture, about student expectations. These vary a lot from institution to institution. Students at Colby, for instance, expect more from their faculty than my students do at Louisiana State University. Some of it has to do with private versus public or how much tuition they are paying, or what else is in their lives. My students tend to be adults who live at home and work full time, or they have kids. They have many other responsibilities. I understand that students at Colby are mostly traditionally aged, 18-22, so they have more time to focus on their schoolwork. They expect faculty to be surrogate parents sometimes. We mostly don't do that. In fact, I have gone a whole semester without having a single student come to my office hours, and that is not uncommon now because of e-mail. I don't think that happens here at Colby.

Student culture, student expectations, and student interests need to be considered. At some campuses, students are not interested in anything in the fall except football. If that's the case, you have to be aware of that. I have heard of schools

where students will not attend classes on Friday afternoons, because they're getting ready for the Saturday football game. Some schools have a tradition of students getting drunk Wednesday night, and if that's the case and you have a class Thursday morning, you need to be aware that some people are going to be tired, or just not there. The level of concentration on sex, drugs, and rock & roll, food and family does make an impact on students' presence or absence or participation. All those things do matter.

The rules for students are sometimes not known to new faculty. For instance, we have a rule at LSU that we are not allowed to give major assignments, such as major final papers, during the last week of classes, so that students have time to finish their general work. Our last week of classes is called "dead week," and new faculty coming in need to know about it when they are setting up their syllabi. Students have rights, and if faculty violate the "dead week" rule, there are always sharp-eyed students who'll file grievances or complaints. Our faculty handbook also contains the rules about "dead week."

New faculty also need to be told about daily logistics and little things. For example, on my campus, faculty get a 10% discount at our book store. The only way you find out about that is if somebody happens to tell you. It is not written down anywhere. So that is one of the things we have to tell each other, along with other small procedures: how to get things duplicated, how to get a library card, how to put books on reserve in the library. These are new and time-consuming when you first arrive, as are other daily life matters. Childcare is important. You didn't mention, Bob, in your presentation, that people can be hired to run errands. Some busy professionals do hire a factotum, someone who runs errands, takes stuff to the cleaner's, etc. These are all pieces of information and suggestions that new faculty need when they come to a new town.

Information about what really counts in a career also needs to be communicated, not only the three or four factors (research, teaching, service, and collegiality), but also decisions about committees and which to be on. We talked about this in my group. Be aware of what is valuable and what counts. If you are relatively new, you shouldn't get on a powerful committee where you'll make enemies, but you should always try to get on a visible committee so it looks like you are doing a lot. The ideal committee is one that gets talked about a lot, but never meets.

When I was at the University of North Dakota, for instance, there was a committee that was very important, although I don't remember what it was. However, no one wanted to be on it because it looked like it was going to be very time consuming. So the individuals who were appointed to it somehow spread the word they were on this important and powerful committee. They then secretly got together and conspired to decide that they would disband, because they could not find a convenient meeting time. This was really underhanded, but they got the publicity for being on the committee, while not having to do any work at all.

Committee work generally takes time away from what is really significant, which is research, teaching, and collegiality. This is something that particularly impinges on women if there are very few women, because colleges and universities like to have a woman on every committee. If there is only one woman, she may get appointed to 12 or 18 committees, which is something that actually happened to me early in my career. Because women were rare, I became so involved in being a token that I didn't get to have lunch with anybody. That was not a good thing.

If you are in a position where you see your token faculty member, token woman, or token African American being overwhelmed with demands to be on committees, it is good for you to step in. If you are not in a position to make a difference, it would be a great service if you talk to your department chair. Mention that you noticed so-and-so is being overwhelmed with committees. Can you help this person? Your department chair has the power to say, "These are the things that are important, and I excuse

you from these other things." If you're new, use your department chair as your mentor and your champion.

We also talked in our group about protection and support in front of hostile students, if you have them. You need the help of your senior faculty in such situations. You may not always be right, but your senior faculty should never be saying to you in front of a student, "You were wrong." That undermines your authority and that kind of public putdown undermines all of us. Also, our group wants to discourage generic whining by the students. We want specific whines. If they have a complaint, we want them to complain about something specific.

I don't think anybody here has been in a situation where they were faced with really disruptive students, although that can happen. Some schools do have rules about calling campus security if a student really acts up in class. Students have been thrown out of classes for being threatening. If you get a call from a student who seems threatening or disruptive, find out immediately what the rules are. Find out if you have the right to throw a student out of class. Probably you are better off calling the campus police than doing it yourself. That is a case where you have to document, document, document. Write down everything the student did and said and save all memos and e-mails. Terrible things have happened, and we need to protect ourselves.

We also looked briefly at some of the questions directed to Ms. Mentor. I wanted to share them, so you'd have a sense of what your peers are worrying about elsewhere. There was one question, for instance, about what to do with very talkative people, usually colleagues, who consume your office time. We had a brilliant suggestion from our group: you pretend to be on the phone. I wish I had heard that a long time ago. The cell phone is even easier. You just put it up to your head and signal, "Sorry, I'm busy."

Occasionally, Ms. Mentor receives questions about social relationships. They are important, and they're cases where senior faculty can pay some attention to what's going on within a department. In one university where I worked, there was a department chair who came into an all-male department at about the same time that the first faculty woman was hired. The all-male department, before she was hired, had a poker club that they all attended, and they bragged about their "testosterone-drenched gatherings." When the woman was hired, they invited her to join the poker club, because they thought that was the right thing to do. She didn't go, because she just didn't want to deal with that kind of atmosphere in her leisure time. The department chair, recognizing that the poker club was exclusionary, asked the men to disband it, and they did. I think that gives testimony to a chair who recognized the informal social networks, their power, and their impact on excluding diverse hires.

I've also known chairs who've created or encouraged the creation of writing groups within departments. This has worked for science, as well as for the humanities. The groups meet every week or every month to announce what they have been working on or discuss what research they have done. We all respond well to the structure of deadlines and the possibility of public humiliation, so writing groups are very useful. I am in two right now and I am about to be in a third one. Deadlines, even if imposed by a group of friend-colleagues, will get us to produce.

If you have trouble getting started writing, you need to allocate certain hours that are devoted solely to your writing. One of my colleagues sets aside 3-5 p.m. every afternoon for writing. You can set aside any time; it doesn't really matter when. But you have to designate the time, make an appointment, and write it in your book or palm pilot or to-do list. Make it as sacred as going to the dentist, picking up the kids, or any other fixed obligation.

Otherwise, you may not do it. The deadlines for everything else seem so pressing, that you need to make your scholarly writing as pressing as anything else. With people who are in the humanities, if you write one page a day, you'll have the first draft of a book done by the end of

the year. There is a whole literature, in my field, on writing the first draft. The essence is to write that first draft, no matter how bad it is, because then you have something to work on. So write one page a day. I had a colleague who wrote four short stories in twelve years, but would have done much better if he'd committed to a page a day.

More recently, someone wrote to Ms. Mentor, asking for dating and romance tips for academics. Now, I would love to have you send me those. You can e-mail me about how you met your spouse/partner, or how you dumped him/her. I really don't know how academics meet and mate anymore, but one faculty wife did send a tip to Ms. Mentor: "This is what I would say to academics as a dating and romance tip. Shut up and listen!"

We should be looking at dual-career couples and how they interact, for there are so many of us. Do we lecture at each other? How do we know when the other one has stopped? There are all kinds of questions not yet answered, but if you have answers, thoughts or opinions, give them to Ms. Mentor. In all cases, anonymity is guaranteed.

Another controversial question: Are academics more rude, more demanding or sillier than we used to be? How many think so? How many of you think we are less rude, demanding or silly than we used to be? (Two people voted.) All right, most people have no opinion they're willing to express.

Sometimes there's a halo, or old fogy, effect for those of us who are older, when we look back at our beginnings in the profession. My professors really knew everything, I thought, and they were rational people, but, of course, I didn't see their other side. I am sure they did petty power plays just like anyone else. My undergraduate school, I learned years later, gave hiring preference to married men, who would be less predatory toward the women undergraduates. But of course, my school also hired very few women faculty, then.

Here is one question for Ms. Mentor that may relate particularly to women in science. Someone wrote in to claim that 99.9% of successful female academics have a nice, low voice. The writer said, "I can count on one finger the number of successful professional women I have met who speak in a high, piping voice." Heaven forbid that we should sound shrill! Yet my female students have voices all over the range. Do we tacitly discourage the high voiced women from going on in our profession? Or, do the men who still dominate most academic fields weed out the high pipers and reward those of us who could almost sound like guys?" This is something I had not thought about at all, and that's the kind of question that Ms. Mentor especially appreciates. I've since learned that one of my colleagues did recommend that a high-voiced woman take lessons to lower her speaking voice. It was purely self-serving on his part; he couldn't hear her, because middle-aged men tend to lose some hearing at the high ranges.

The voice is a powerful instrument, and yet it's not talked about. Our graduate students do get a lot of training in teaching first-year English composition, but matters like voice and movement are not discussed. If you take a theatre course, you become a better teacher. In fact, I've been trying to for several semesters to enroll in a course on stand-up comedy. I've been doing it for years, in classes, and like a good academic, I want to get credit for it. The final examination requires everyone to perform a three-minute routine. I can't wait.

Anyway, I again want to encourage you to write letters to Ms. Mentor about subjects that she or I never thought about or ideas or anecdotes that you want to share. Ms. Mentor's column appears in the *Chronicle [of Higher Education]* Web Site on the third or fourth Monday of the month, and this Monday's column is called, "Should I Trust Him?" One week after the column is posted on the net is the deadline for the next one. So if you want to respond to a column or tell your friends to respond, respond quickly.

(The column now also appears in the print edition of *The Chronicle of Higher Education*.) I do have some sense of what academics are concerned

about, because Ms. Mentor gets some 50 letters a month, and over 150 in the month that she hinted that a woman might choose a career over a spouse. She also got more responses to a column called, "Can Liars Get Tenure?"

Overall, Ms. Mentor's column on site gets 15-20,000 hits a month, so people are reading it. The letters are most often about three things: the two-body problem [academic couples], bad bosses, and hating being in the region where you are. One very popular one had the headline "The New Faculty Wife," but the column that has gotten the most hits of all is the one with this headline: "Dr. Pelvic Practices His Thrusts."

One other question that people ask, and have asked me here is this: "Does the *Chronicle of Higher Education* print Ms. Mentor's column exactly as she writes it?" The answer is no. On the net it is complete, but it is cut in the paper version. The editors have cut a couple of anti-war references that I put in, and they've also questioned some of my anecdotes. The *Chronicle* editor, who is a journalist and not an academic, once said, "I can't believe smart people are doing those things!" There are also two words that I have never been able to get in: the word "feces" and the word "booger." But I am still trying.

Finally, I would like to have everybody think about things they didn't know in grad school, but wish they had known. How we can communicate this information, and these pieces of advice to each other? How we can pass on what we know to younger and newer people?

Ours is a great profession. It is the only one devoted to the life of the mind. We are the only profession that is totally devoted to the future. Potentially, our profession is the only one devoted to changing and improving the world. I would therefore like to think we are going to do it with grace and humor, and satire and malice when need be. We should also support and cheer each other on. I will now give the forum to the organizers again.

Suzanna Rose (Moderator): I would like to remark that the way this whole conference has been put together is an excellent model for other colleges and universities to use. I have been very impressed. Even though I work in this area, I have never heard all these issues addressed in one day or two days. I learned a lot in a comprehensive package. The other thing that is so great about this conference is that there were a lot of practical suggestions. I myself am quite interested in this area because I felt like I got through it badly, and I didn't know what I was doing when I got my first job.

Since I took a new job two years ago, it was the first time in my career that someone who had hired me asked me a year later, "How do you like it here?" and said, "We want you stay. Is there anything we can do for you?" That is pretty important in my career to have that sort of thing happen! So, some very simple things can help improve the situation.

I would now like to open up the floor so that if you have other questions to ask the invited speakers or general comments you would like to make, here is your opportunity. The ideas to think about are: What would be a good next step for your institution, or for this institution to do? Also, what would you like to see in terms of resources that we can provide on the web site?

Question: What I would like to hear from the audience, and particularly senior faculty are what do you see you need that would help you be retained in your institution?

Comment: I have found that everybody needs to vent some of the time, but the continual negatives about all the things that aren't happening and are difficultÉ.. I think we all need to be reminded to put positive spins on things. Motivating people by fear all the time is terrifically counter productive. The "smile more" approach is not just smile more so your public face is welcoming, but to really celebrate the joy of what you do. That fits into the idea that you are a whole person with a whole life, you are a whole and happy person, I hope. Until the people who are here are actually happy, we are

not going to recruit more people. We are not going to convince more people to join us. So make choices that optimize your happiness, but then regularly tell people that you have done it - made yourself happy - not once a year, sort of begrudgingly after you have finished your list of complaints. This could make a huge difference!

Comment: In our department we have a mentoring program. One of the junior faculty suggested that the department pay for lunch, and I am now getting all these luncheon bills, so I think it is working pretty well. It is such a simple thing, but it is good to provide these opportunities.

Rose: A lot of times I get calls when a person is up for tenure and got denied tenure, and they want to find out more information. Sometimes if you get involved in something like that early, you can find out how the policies apply in that department, and that somebody in English got paid incorrectly because they didn't negotiate with that chair. You are in physics and they are telling you that you aren't going to get anything, you then have contradictory information which you can take to the dean. When you disagree with the policy's manual, it doesn't really tell you how the policies are applied, but you can get information from people in other departments. A lot of time, scientists stay in their own building most of the time and they don't get to know other people.

Comment: Adding to that, I have often recommended to a dean or a department chair, especially if there is a sole woman in a department, to encourage her to do that. This is especially necessary in large institutions or departments. The chairs and senior administrators and colleagues need education regarding this issue.

Rose: This just came up at our program. Some people were asking personal questions on the department list serve, such as "Who is your dentist?" Other people were offended by that. So a separate list serve was formed for personal questions, and that seemed to work better.

Comment: In our school the administration assigned the job to the university relations staff to make a list of those things so it doesn't take faculty time.

Comment: I think the Wheaton Model is a good example. By developing relationships with a number of different people, you get strength from these people.

Rose: I would like to reinforce that idea. I have had people who said they are told by one senior member of the department not apply for certain kinds of grant. However, a scientist should know that you wouldn't take only one observation and draw a conclusion. But this woman was not applying for certain grants because she was told by a senior faculty member that she should apply for contract work instead of research grants, But that wasn't what was valued by the Dean. So you should always broaden your base and your database in order to obtain accurate information. You need to be proactive, and it would be really great if we had a warm and welcoming environment when we go someplace, but sometimes that isn't the case. When we are anxious, we tend not to ask for feedback, and that is when we need most to ask for feedback. Sometimes it is good to just go around to everybody, and even though you may not want to hear the feedback, do it early and often. Ask them how they think you are doing, any suggestions? You may not follow their advice, but you have asked their advice, and now they are a helper to you, and they are more invested in you. This is especially important for women, and if you are the only woman in the department, you are probably going to have to work harder to establish a bond. It is worth it to do this early. The same for your teaching - ask for the feedback early.