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*The Changing Culture of Science:
Bringing It Into Balance*

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July 21 - 23, 1992
Berkeley, California
U. of CA., Berkeley

Conference Report
and
Call To Action
N00014-92-J-1511

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Preface

Welcome to an experiment.

The first stage culminated in a conference on *The Changing Culture of Science: Bringing it into Balance*, held June 21–23, 1992, in Berkeley, California. A broad spectrum of people dedicated to science assembled to explore attitudes, practices and policies long woven into the fabric of our working culture of science. This discussion confronted three fears: the fear that many people who want to become scientists are being thwarted by the scientific community's current expectations of what paths must be followed, what choices must be made, as they progress; the fear that the scientific community is not interacting with the rest of society in a positive way; and the fear that the scientific community cannot accommodate people who do not fit the traditional picture of a scientist without lowering the quality of science.

Undergraduates, graduate students, postdocs, senior scientists, and administrators—all from the country's forefront scientific institutions—together identified aspects of the current scientific culture in which these fears are rooted. Personal experiences, both encouraging and painful, were eloquently exchanged. Presentations on bringing about change in other communities sparked new awareness. Possibilities began to take shape. The next step was to forge strategies for changing the culture of science to better nurture all members of the community, without compromising the standards of good science.

In our own institutions—NSF Science and Technology Centers founded to foster the exchange of ideas across disciplines—we have experienced the heady results of bringing together talented people who traditionally would not have interacted. We believe that this conference, and the ideas that flow from it, represent an equally exciting synergy. The conference confirmed that whatever we are now, we can be better: we can each tap into the imagination, the dedication, and the intellectual capabilities that we draw on to do our science and use them to make our scientific community richer, more stimulating, more enjoyable.

This report presents some of the ideas for bringing about change that emerged from the conference. Staff, students and professors, department chairs and division leaders, university presidents and chief executive officers—we can all take part in bringing out the best in our colleagues and ourselves. We want to thank our sponsors (Appendix I) and hope you will seize this chance, rejoice in it, and help to make this experiment a success.

Bernard Sadoulet
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Center for Particle Astrophysics, University of California, Berkeley

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The Need for Change

"This meeting could prove to be a watershed event in how we begin to address the issue of broadening the base of science."

- Walter Massey, Director, National Science Foundation

A young Taiwanese graduate student is taunted daily by the professor he assists as a teaching fellow. "Hey, Chinaman," the professor calls out to him during class. The professor blames him when undergraduates break the lab equipment. One day, there is a problem in the laboratory. The professor orders his TA to climb a ladder to make an adjustment. On his way down, the student slips and grabs a pipe to support himself. The pipe carries steam and is probably between 300 and 400 degrees Fahrenheit. It instantly burns the skin off the student's hand. Nearly fainting, he shoves his hand inside his pocket and says nothing, waiting another twenty minutes for class to end before rushing off to the health center. The raw, burned hand is more bearable than having his psyche flayed once more by the professor.

A young African-American man, a first-year graduate student at Stanford, articulates a metaphor. Scientific culture is like particle physics. In the middle of the system is the nucleus of senior scientists and top administrators. They constitute less than one percent of the volume, but they carry most of the weight. Orbiting the protons, doing all the work, are the electrons of scientific culture, the graduate students and postdocs. But that's not quite all. There are known to be massless or nearly massless particles, called neutrinos, which can pass through miles of matter without ever interacting. They zip through our bodies, through the Earth, through the solar system, not even slightly disturbing the protons and electrons. "I," say the young black man, "am a neutrino." He is not sure whether he is a neutrino because he did his undergraduate work at Tugaloo College, while the rest of his classmates come from places like Harvard and MIT, or because of his race. "I'll never know," he says.

A young graduate student in mathematics feels her labels precede her. "I have one goal in life. That goal is to be an excellent mathematician. But, in the eyes of everybody, I'm a woman. I'm Mexican-American." The question that she reads in everyone's eyes is, "How good a mathematician is she? How did she get here?"

A young graduate student in physics who had planned to major in chemistry switched fields when a physics professor took the trouble to tell her that she was talented. "I found out later that the chemistry department was really sorry that I'd left, but they didn't say it at the time." She did well as an undergraduate and a graduate student, but then began to be aware "that there was a conspicuous absence of women other than students among the physicists. This started me wondering whether my goal of being a university professor was realistic. What became of the women graduate students?"

An MIT undergraduate who is a Native American reports that she no longer feels that she can "relax and let down her defenses when all the people of color come together. I realized that minorities tend to treat other minority groups the way they have been treated."

A Rice University mathematics professor sponsors a program for minority students from colleges around the country in which they spend the summer working with a Rice professor. This year, three out of the seventeen juniors and seniors majoring in science and engineering report that the most advanced mathematics class they have had is trigonometry. "They do not even know that they will not be competitive when it comes to going to graduate school or entering the work force."

These are a few of the windows into the lives of aspiring scientists that were opened by participants at the Berkeley conference. There were many more stories, told formally or informally, of wrestling with the existing culture of science. People spoke of the compromises and sacrifices they had made for science, and of those they could not make without ceasing to become themselves. They spoke of the strength they had forged within, and of the strength they had found in the support of others. The pivotal moments in their lives are also pivotal moments for science and for society.

Their experiences, and the experiences of the conference coordinators at their Science and Technology Centers, shaped the issues that the conference addressed. Working groups, comprising as wide a range of the participants as possible, including the conference speakers, remained consistent throughout the meeting so that each everyone would hear new perspectives and opinions. Over 100 members of the scientific community exchanged views in a spirit of positive regard for differences and worked to reach consensus on their group recommendations about the following topics:

- **How to build an inclusive, heterogeneous scientific community without compromising scientific excellence**
- **How the scientific culture can affirm that child raising, elder care, and mentoring of students and colleagues are valued and respected activities**
- **How to address the underrepresentation of women and minorities in administrative and management positions in the scientific community**
- **How to make the first year in the scientific community more supportive and welcoming to people from all backgrounds**
- **How to increase interest in and understanding of science among the general population and among all students**

The issues that concern your community may be similar or different, but the goal will be the same: strengthening the relationships of each member of the scientific community to each other, to their families, and to society. The eventual outcome will be an environment more conducive to good science, and a scientific community that is a stronger, more vital model for and tributary to society.

A note of caution: people who have left science because the culture did not offer sufficient support did not have a voice at this conference, and may not be represented at your discussions. All the conference participants, despite some cases of profound pain, appeared to be succeeding. The Taiwanese graduate student is now the Chancellor of the University of California, Berkeley. A social Darwinist of the most pernicious variety might take this as support for the position that nothing needs changing. The way may be hard, goes this argument, but it weeds out all but the very brightest and the most persevering, the only kind of people who belong in science. This view is more than blind; it is indefensible. A powerful intellect may turn away from an environment that does not treat individuals on their merit, regardless of racial or economic or religious background, regardless of gender. A creative mind may be deadened by the tacit view that family life is, at best, irrelevant. No one can say what might have been discovered or understood by now if the culture of science were different.

Strategies for Change

BUILDING A WORKING RELATIONSHIP

The organizers of the conference at Berkeley created a collaborative atmosphere in which each person felt of equal worth by taking steps to;

- remove hierarchical cues (all participants wore name tags listing only their names and affiliations—no titles appeared)
- offer equal involvement in decision making to all members of the group
- foster interconnectedness among different members of the group
- avoid adversarial framing of the issues

Differences in interests, perceptions, and values vary among individuals and affect the way people interact. However, these differences need not be barriers to understanding and change. The success of an interchange is significantly determined by the extent to which participants in a discussion feel free to express themselves candidly, feel listened to, and sense an atmosphere that is collaborative rather than hostile or competitive.

"If I start treating you as a worthy individual, equally entitled to your opinions, I am likely to learn that there are areas where your knowledge and skills are superior to mine and that some of your opinions are clearly worthy of respect. If I try to understand how you see things, I am almost certain to learn that my perceptions are more subject to bias than I had previously thought. If I behave as if I were more reliable, I am likely to become more conscious of my commitments and more committed to them. If I listen more actively and behave as if I were open to persuasion, I may find, to my surprise, that I am persuaded more often than I would have expected. If I treat you as someone who matters, you will begin to matter to me."

—Getting Together, p.167
Fisher, R & Brown S. 1988

Bringing the scientific culture into better balance is a process, not an event. The best results will be achieved only when all the people involved feel that their concerns have been voiced, listened to, and respected. In addressing substantive issues, you will be dealing with people you already know and with people you will meet again: peers, supervisors, administrative and secretarial staff, your students or your professors or your employees. The outcome of your work depends upon not only on your commitment and your negotiating skills, but also upon the kind of relationship you have with the others involved. So, it makes sense to build good working relationships—in which the process of working together is rationally based, understanding, communicative, reliable, and constructive—with the same care you devote to matters of substance.

Some general principles for nurturing relationships that are able to address differences successfully include these, drawn from *Getting Together* and *Getting To Yes* (Fisher R. & Ury W., 1981).

- Frame each issue as a collaborative search for a better approach. Separate the people from the problem. Try to see yourselves as working side by side, attacking the problem, not each other.
- Work to satisfy people's underlying interests, rather than specific positions they bring to the discussion. This means learning how others see things, even if you don't agree with them.
- Express a desire to understand better how they came to be who and where they are. Check your assumptions about their concerns and motivations—and be open to surprises. Recognize the legitimacy of other points of view. Keep a sharp eye out for shared or dovetailing
- Before trying to agree on a solution, invent options that offer gains for everyone. Be creative; don't assume there is only one right answer. The better every concern is addressed, the more likely everyone is to be happy with the agreement and work to live up to it.

CHANGING YOUR ENVIRONMENT

What can you do to help create a culture better suited to a more diverse group of people, and therefore richer, more stimulating, more creative—one in which the best science can flourish as never before?

The following suggestions grew out of the *Changing Culture in Science* conference. There are two important things to remember about them.

First, what they are: only a beginning. As you observe and reflect and discuss, you will find other ways to help the scientific culture shed its destructive biases about what a scientist is and how a scientist behaves.

Second, what they are not: answers to the question, "How do we get more people from underrepresented groups into the system?" The premise here is that scientific culture is not a pre-ordained, immutable system, but a living organism made up of interdependent individuals whose attitudes and values shape institutions, styles of teaching and learning, approaches to solving problems. It is changeable. And every individual in the culture is a trustee.

"I've been to a number of conferences in my career on how to increase participation in science and engineering. Most start with the thesis that we need to figure out how to get more underrepresented groups into the system, as if the system itself were some pre-existing entity ordained by God. This conference is saying, let's look at it in a broader way..let's look at what the system is and how it needs to change and adapt to who the people are."

- Walter Massey

Two speakers **Beverly Holmes**, from the U. S. Forest Service and **Shirley McBay**, from the Quality Education for Minorities (QEM) Network, spoke about their participation in the change process: Holmes in a federal agency and McBay in an academic institution with a strong research record. They both emphasized the need to collect information about existing strengths and weaknesses and to involve as many members as possible in recognizing concerns and generating new ideas. Mechanisms to monitor and publicize the results are also important. They gave personal examples related to the following stages:

ORGANIZATIONAL SUPPORT FOR CHANGE

Commit administrators to articulating a vision of change. Senior personnel should know the issues, be convinced that change is going to benefit the organization and *walk the talk*.

Involve all employees in recognizing that contributions to positive change will be a key factor in all personnel decisions.

Seek allies. Create working groups and survey opportunities for candid discussion about working conditions. It is as hard for senior personnel to change the system because they are expected to be a part of it, as it is hard for us to challenge the system because we are not.

Arrange for personal contact between managers, researchers and new recruits. Provide follow up support and incentives.

Monitor performance by consulting those who are affected. Make sure that members of underrepresented groups attend all meetings where decisions that affect them are made.

Hire for future performance. Most jobs require technical skill or professional training but few applicants have done precisely the job as described and a lot of talent may be overlooked if you stick to a narrow view of eligibility.

Create and publicize opportunities through temporary assignments for individuals who have a special interest in leadership positions.

Focus on retention. Create formal and informal support systems and regular, active, personal consultation with employees to find out what is working and what is not.

PERSONAL SUPPORT FOR CHANGE

"If we were to develop successful programs that attracted people to science, what would happen once they arrived and found a culture that they experienced as unwelcoming, aggressive, with limited opportunities for advancement and a lack of support for family life.

- Rose Sergeant, Center for Particle Astrophysics

While the organizational support described above will provide more openings for individual contributions, one of the themes of discussion in the working groups was that every staff member, student, faculty or administrator in a scientific community can take the initiative:

Reach out. Seek allies, not only among people of similar backgrounds or circumstances. Give others sufficient information and opportunity to be empathetic.

Assume a need to learn more. Although you have the best intentions and can honestly evaluate your environment as healthy, there may be issues to which you are not yet sensitive. Be open to persuasion.

Avoid factionalism. Frame the issues in terms of making the whole culture better, rather than improving conditions for one identifiable group.

Recognize the interests and concerns of everyone in your group as legitimate, and help create the sense that all members have both the opportunity and the responsibility to make their points of view understood.

Take responsibility for seeing that concerns about the culture of science are discussed, formally and informally.

Take responsibility for initiating constructive discussions when you have an ambivalent or negative response to the culture of your science or institution.

Welcome and take an interest in new members of your scientific community.

STRATEGIES FOR LEADERS

"There is no doubt that change is inevitable. The question that we have to ask ourselves; are we just supporting the change or are we leading the change?"

- Barnard Sadoulet, Center for Particle Astrophysics

Establish a clear, visible process that fosters a candid exchange of views in order to assess the climate in your community or institution. Acting before there is a crisis may prevent or mitigate one.

Involve all the employees in assessing the current climate and inventing strategies for improving it. Include recruiters and admissions staff.

Document and distribute widely evidence of problems within your community or institution.

Articulate your vision of the changes that you believe will benefit everyone in your field or institution.

"Walk the talk" (personally). Show by personal example that you consider improving the culture of science a high priority. Make it clear that you want your contributions to bringing about a better balance to be the criteria by which your own performance is measured.

"Walk the talk" (institutionally). The way an organization allocates its resources clearly states its priorities. So do the factors that are explicitly weighed in such key personnel decisions as re-appointment, promotion, tenure, and salary increases.

Talk with other leaders. Find out what changes have been made at other places and what the results have been. You may learn something valuable from others' mistakes—and from their successes.

Incorporate funding for education and mentoring of underrepresented groups into existing academic/research programs, rather than setting up peripheral organizations.

Set explicit goals and accountability for senior personnel (e.g. if quality of teaching is to be taken seriously, it must count significantly toward advancement).

Hold open discussions on what constitutes good teaching/advising. Encourage departments/divisions to develop effective techniques for evaluating teaching/advising.

Use regular surveys and exit interviews to gain a better picture of which issues are being satisfactorily addressed and which are cause for concern.

Make a concerted effort to increase the number of members of underrepresented groups holding positions of power. Identify and counsel potential leaders. Make explicit the steps in the process of promotion that may now be implicit.

Establish the principle that having a family is not a handicap to advancement and career satisfaction.

Promote understanding of personal priorities. Encourage communication and negotiation when personal and professional commitments threaten to conflict, e.g. create the possibility of flexible timetables for tenure decisions involving faculty members with family commitments.

Provide on-site day care at your institution for the children of faculty, students, and staff. Extend it to the children of visitors who participate in workshops and conferences.

Organize social occasions that include all members of the family.

Don't impose rigid quotas—but do reward departments that succeed in creating a more balanced environment.

Provide opportunities for pre-college teachers to participate in research.

Increase support fellowships for scientists returning to the field after spending time away (e.g. to raise families) and for people who wish to transfer to a new field or subfield.

Host public lectures and forums on topical scientific issues.

Inform the local public about the science your own institution is pursuing.

Hire, from within your ranks if possible, an expert in communication and education to help coordinate change.

Let everyone in your organization know what they can do to help bring the culture into better balance, both within your institution and in the larger social context.

STRATEGIES FOR PEOPLE MAKING ADMISSIONS/HIRING DECISIONS

"No first world country can maintain its economic or technological strength with such a large percentage of its population outside of all science and mathematics activity."

- Richard Tapia, Department of Mathematics, Rice University

Reach out to underrepresented groups. Explore potential as well as reviewing accomplishments. Establish apprenticeship programs.

Make a concerted effort to increase the number of underrepresented groups in leadership positions by identifying and training potential leaders. Make explicit the implicit expectations about what it takes to become a leader.

Don't penalize time spent raising a family.

Monitor performance and give feedback.

Include the judgment of people with similar life experiences in reviews.

Enlist the help of others as advisors to and advocates for newer people.

Focus on retention. Help establish formal/informal support groups and access to resources and counseling. .

STRATEGIES FOR DEPARTMENT CHAIRS AND FACULTY

"Science as an enterprise is a lot bigger than just academia, but nevertheless, in order to get things done, I think it's appropriate to create a focus just so that people can concentrate their efforts. I think it's perfectly appropriate... because we all pass through academia and what happens there plays a very strong role in shaping our cultural expectations as scientists."

- Sandra Faber, Department of Astrophysics, UC Santa Cruz

Make salary and tenure decisions based on the quality of work, e.g. require each tenure candidate to submit a fixed number of papers to the committee and weigh their significance, rather than the number of papers a candidate has produced.

Ensure that faculty and students from underrepresented groups participate on graduate admission committees, faculty hiring committees, and other key committees.

Reward time devoted to helping make the department better, e.g. reduce teaching load for professors whose sensitivities and experience make them especially important on hiring and admissions committees, or who want to develop a new course.

Help the department members to communicate better with each other. Promote access to workshops on communication, teaching, advising.

Use regular surveys and exit interviews to identify issues of concern among all members of the department. Invite formal presentations of concerns at a department meeting where attendance is mandatory.

Encourage informal communication in a nonhierarchical setting, e.g. establish a daily or weekly tea for the entire department or group, including graduate students, postdocs, staff, and faculty.

Establish access to research activities as early in the undergraduate program as feasible to expose students to the joys (and frustrations) of actually doing science as opposed to studying science.

Openly discuss what constitutes good teaching and advising to establish criteria for evaluating members of the department.

Make it clear that the standards of acceptable teaching are uniformly high. Establish rewards for excellence in teaching. Promote pride in teaching, especially the introductory classes. Establish peer review of teaching as part of promotion decisions.

Promote opportunities for improving teaching skills. Help your institution organize a short course for graduate students and new members of the faculty.

Help to ease students' transition between taking classes and doing original research. Sponsor an annual faculty forum on the roles of advisors and the purpose of a thesis.

Establish opportunities for faculty members to welcome entering students personally. Let your students know that you care about and take pride in them before they graduate or leave.

Recruit graduate students from a broader, less traditional range of schools.

Make sure new students learn that critical evaluations of one's research are vital to science, and that probing the assumptions, design, construction, and interpretation of someone else's experiment or result is not a personal attack but an essential element of good science.

Set up provisions for family leave for both women and men within graduate fellowships.

Organize social activities that include family members.

Be as open to hiring the spouse of someone who is being hired elsewhere in the institution as to hiring anyone else.

Encourage members of your department to convey their excitement about their work to the community and reward those who do. Consider rotating appointments of scientists who are available to give talks in schools, answer questions from the outside community, give public lectures.

STRATEGIES FOR MAINTAINING A NETWORK

"Forming a relationship is not adopting a resolution, where we can draft appropriate language, vote on it, and then all but forget it. A relationship is more like a garden: it is constantly changing. It needs regular attention or it will go to seed. Demonstrating acceptance of the other is both an initial act and a continuing requirement. Each time an incident in a relationship comes up, it provides an occasion for either judging and rejecting others or for demonstrating our interest in them as people who count."

- Getting Together, p.169

All conference participants and especially the members of the Integration Team (see Appendix II) recognized that the enthusiasm that had been captured at this meeting was infectious. Many scientist had gained new insight into the experiences of colleagues and students. Despite differences in perspective there was substantial agreement about the strategies outlined in this report. Of course, there was also recognition that many of them imply more work for people who already seem to grapple with too many demands on their time. But there was evident energy for trying to make a difference once back at our respective home institutions.

How can you pursue the next stage of the experiment?

Make a point of reporting your attendance at or interest in this conference to your colleagues and leading administrators on your campus.

Discuss the strategies in this handbook with colleagues and administrators.

Encourage your peers and colleagues to assess the working climate in your center or department.

Find out what other initiatives for underrepresented groups are organized at your campus. Consider whether it would be valuable to be involved in them.

Keep in touch. Join and subscribe to the e-mail bulletin board which serves as a network for conference participants

For details contact by e-mail: fmgkidd.engrhub.ucsb.edu



The Changing Culture in Science

Bringing It into Balance June 21–23 Berkeley, California

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*The Changing Culture in Science-
Bringing It into Balance
June 21-23*

Marina Marriott Hotel
200 Marina Boulevard, Berkeley

Sunday, June 21

5:00 p.m. **Social Hour** Quarter Deck Room
Hosted by Conference Sponsors
Wine & Buffet

Objective: *To introduce participants to others in their Issue Groups*

6:00 p.m. **Opening Session: The Quality of Culture: How It Affects Us - How It is Created**

Objective: *To set conference tone and structure*

Conference Overview Bernard Sadoulet

6:30 p.m. Interconnectedness Chang-Lin Tien

6:45 p.m. **Introduction**

Objective: *To re-frame elements of reality and see from different cultural perspectives*

7:10 p.m. Invocation Arvol Looking Horse

Honoring Different Ways of Knowing

Introduction : Rose Sergeant

The Stories of Creation

Lakota Arvol Looking Horse/Carol Anne Heart

Mayan Margarita Melville

Hindu Jigna Desai

African Dee Orr

Hebrew Rachel Winheld

The Big Bang Sandra Faber

8:00 p.m. Social Hour

9:00 p.m. Adjourn

Monday, June 22

7:30 a.m.	Breakfast	California Room Lobby
8:30 a.m.	Morning Session: Articulating a Context for Change	California Room 4th Floor Conference Ctr.
	Bernard Sadoulet, Chair Rose Sergeant, Co-Chair	Overview of Morning Session
<i>Objective:</i>	<i>To view change as necessary and possible</i>	
8:35 a.m.	Envisioning the Changing Culture in Science	Rose Sergeant
8:50	Overview of the Issues	Leon Lederman
9:10	The Ability to Influence	Shirley McBay
9:30	A System for Change	Beverly Holmes
9:45 a.m.	Break and Informal Discussion of Presentations	
<i>Objective:</i>	<i>To open up communication</i>	
10:15 a.m.	The Dynamics of Exclusion	Richard Tapia
10:30 a.m.	Living in the Culture	Martha Contreras James Plummer Sarah Durston Olivia Scott
<i>Objective:</i>	<i>To recognize commonality through the differences</i>	
11:00 a.m.	Relating to the Culture: An exercise in identifying self limiting behavior	
	•stereotyping •cultural norms	
12:00	Working Lunch (with group)	Clarification of the Issues Poolside Patio
1:20 p.m.	Free time	

2:00 p.m.	Afternoon Session: Developing Strategies for Change	California Room 4th Floor Conference Ctr.
	James Merz, Chair Fiona Goodchild, Co-Chair	Overview of Session
<i>Objective:</i>	<i>To strategize in ways that strengthen commonality rather than factions</i>	
2:05 p.m.	The Changing Role	James Merz
2:20 p.m.	Reframing: Developing Viable Strategies	Sheila Tobias
2:35 p.m.	Defining Strategies	Color Code
	Group 1	Blue San Francisco Room 4th Floor Conference Ctr.
	Group 2	Green Los Angeles Room 4th Floor Conference Ctr.
	Group 3	Rose San Diego Room 4th Floor Conference Ctr.
	Group 4	Yellow Sacramento Room 2nd Floor Conference Ctr.
	Group 5	Salmon Berkeley Room 2nd Floor Conference Ctr.
6:00 p.m.	Adjourn	
6:30 p.m.	Boarding of the Empress Hornblower	Berkeley Marina Adjacent to Marriott
7:00 p.m.	Departure Dinner Cruise on SF Bay	

Tuesday, June 23

7:30 a.m.	Breakfast	California Room Lobby
8:15 a.m.	Morning Session: Empowerment & Implementation	California Room 4th Floor Conference Ctr.
	Ken Kennedy, Chair Richard Tapia, Co-Chair	Overview of Session
<i>Objective:</i>	<i>To empower conference participants to influence change</i>	
8:20 a.m.	Preliminary Reports of Working Groups and Feedback	
9:30 a.m.	Working Groups	
	A) Finalize Report for Presentation B) Plan Follow-up	
10:45 a.m.	Break	
11:15 a.m.	Presentation of Reports	California Room 4th Floor Conference Ctr.
<i>Objective:</i>	<i>To provide response and advice for implementing change</i>	
12:30 p.m.	Integration Team: Conference Participants:	Working Lunch Picnic Lunch
2:00 p.m.	Report & Feedback from Integration Team	California Room 4th Floor Conference Ctr.
3:00 p.m.	Concluding Address	Walter Massey
3:30 p.m.	Conference Closing	
3:35 p.m.	Adjourn	

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13. ABSTRACT (Maximum 200 words) The Conference <i>Changing Culture of Science: Bringing it into Balance</i> , held June 21-23, 1992 in Berkeley, California assembled a broad spectrum of people dedicated to science to explore attitudes, practices and policies long woven into the fabric of our working culture of science. This discussion confronted three fears: the fear that many people who want to become scientists are being thwarted by the scientific community's current expectations of what paths must be followed, what choices must be made, as they progress; the fear that the scientific community is not interacting with the rest of society in a positive way; and the fear that the scientific community cannot accommodate people who do not fit the traditional picture of a scientist without lowering the quality of science. Recommendations were made on: how to build an inclusive, heterogeneous scientific community without compromising scientific excellence; how the scientific culture can affirm that child raising, elder care, and mentoring of students and colleagues are valued and respected activities; how to address the underrepresentation of women and minorities in administrative and management positions in the scientific community; how to make the first year in the scientific community more supportive and welcoming to people from all backgrounds; and how to increase interest in and understanding of science among the general population and among all students.				
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