***NEWSLETTER for the Section on Statistical Education
of the American Statistical Association***

# EDITORS' NOTE

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

When the creation of this newsletter was approved by the executive committee of the Section on Statistical Education, it was decided that an evaluation of the newsletter should be conducted along with the second issue. We would like to ask the Section membership to complete the enclosed evaluation form and return it to Tom Moore (his address is already printed on the evaluation form). Please return the form by July 31, 1995, if possible. If you are not able to return the form by July 31,1995, please return it at your earliest convenience. We realize that because of the post office regulations that allow each post office to hold bulk rate mailings for extended periods of time, some of you may not receive this news letter until close to July 31.

Besides asking the question of whether the members want the newsletter continued, we have asked several other questions. All of these questions are meant to help us serve our diverse readership better. We promise that all responses will be strictly confidential and that results will be aggregated and broken down, as appropriate, so that no one can be personally identified. As with all evaluations, the higher the response rate we get, the better we can serve our members' needs in the future.

As always, if you have any questions, comments, etc. on the newsletter that you wish to give personally to any of the editors, please feel free to contact any of us. WE LOOK FORWARD TO HEARING FROM YOU!

Carol, Joan, and Tom

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# STATISTICAL EDUCATION PROGRAM AT ORLANDO

Robin Lock
1995 Section Program Chair
St. Lawrence University

Newsletter for the Section on Statistical Education
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Going to Orlando this summer? If so, plan on going early and staying late. The statistical Education Section is sponsoring a full range of sessions at the 1995 Joint Statistical Meetings. We are starting earlier than usual with a contributed paper session on "Applying Statistics to Study Statistics Teaching" at 4:00 p.m. on Sunday, August 13 and running through an invited paper session featuring Bob Hogg, Alexander Kugashev, R.J. McKay, and Wayne Olford discussing "Whither the Undergraduate Math Stat Course?" at 10:00 a.m. on Thursday, August 17. In between we have six more contributed paper sessions, a poster session, a second invited paper session, and several options from which to choose a roundtable luncheon.

Monday's activities begin with contributed papers in the 8:30 a.m. time slot "Connecting Statistics to the Real World". Be sure to sign up for a roundtable luncheon session moderated by Joan Garfield, Thomas Short, Rosemary Roberts, Christine McLaren, Frederick Morgan, Jack Shepler, Anne Sevin, or Carol Blumberg at 12:30 on Monday. These are an excellent opportunity to talk with an "expert" on a given topic and meet other participants with similar interests. But don't linger too long over lunch or you'll miss the contributed papers giving you lots of hints for doing "Projects, Demonstrations, Experiments, and Activities" at 2:00.

More contributed papers are set for 8:30 a.m. on Tuesday, focusing on "Approaches for Teaching Particular Topics". These are followed by twelve exhibits on various aspects of statistical education in the poster session at noon. Tuesday afternoon is computer time, with Mike Meyer and Paul Marsh showing us some "Internet Resources for Teaching Statistics" in an invited session at 2:00, followed by a session of contributed papers on "Using Computers in Teaching Statistics" at 4:00.

Since you'll already have made it to two 8:30 sessions, you might sleep in a bit on Wednesday, but get going in time to find out about "Issues in the Teaching of Statistics to Minority Students" at a session organized by Martha Aliaga at 10:30. "New Approaches for Teaching Special Audiences" will round out our contributed paper sessions at 2:00 on Wednesday.

In addition to the sixty-five papers and presentations directly sponsored by the Section on Statistical Education, a number of other sessions have important connections to statistics teaching and will be co-sponsored by our section.

In particular, you should consider attending the Continuing Education Workshop "Classroom Activities for Promoting Quantitative Literacy" from 1 -- 5 p.m. on Sunday, August 13. Shail Butani of the Bureau of Labor Statistics who is also the Quantitative Literacy coordinator for the Washington Statistical Society has put together an instructional team of statisticians and teachers, all of whom have been involved in QL in the DC area. They will show us how we can get involved in schools in our own locales and give us practical examples of what activities work at the various levels of K-12.

Toss in the ASA mixers, the Stat Ed Section's Business Meeting, visiting the book exhibits, and you may find that you need to schedule a couple of extra days before or after the meetings if you want to get a chance to say hello to Mickey. Details on all sessions can be found in the preliminary schedule published by ASA.

For further information please contact

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# PREVIEW OF THE SECTION ON STATISTICAL EDUCATION PROGRAM FOR 1996

Allan Rossman
Dickinson College

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

Even though the 1995 Joint Statistical Meetings in Orlando are a month away, planning has begun for the 1996 Joint Statistical Meetings to be held in Chicago. The Section on Statistical Education will hold three invited paper sessions, several contributed paper sessions, and a number of roundtable luncheon discussions at the Chicago meetings.

We especially want the invited paper sessions to cover topics of interest to our membership, so we invite you to offer suggestions both for topics and for possible speakers. Ideas that are being considered so far include:

\* Authentic Assessments of Students' Learning in Statistics

\* Software for Learning (and not just for Doing) Statistics

\* Teaching Bayesian Statistics for Undergraduates

\* Statistics Programs at Four-Year Colleges

\* Evaluating Statistics Education Reform Projects

Feel free to comment on these ideas as well as to suggest additional topics and possible speakers. The topics for the invited paper sessions must be chosen by August, so please share your ideas with Allan Rossman, 1996 Program Chair (address below) as soon as possible.

We also urge you to begin thinking about contributed paper presentations that you might give or encourage colleagues to propose.

Thanks in advance for whatever suggestions you might share. For further information please contact

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# ISOLATED STATISTICIANS

Jeff Witmer
Oberlin College

Newsletter for the Section on Statistical Education
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Being the only statistician at Oberlin College, I often miss the interaction I had with other statisticians when I was in graduate school and when I taught within a statistics department at a large university. There are many isolated statisticians in academia, often within mathematics departments. Some of us have formed a group--the Isolated Statisticians--that meets each year at the Joint Statistics Meetings to discuss common problems and to provide moral support to each other.

We call our annual meeting the "department meeting" of isolated statisticians, because we discuss many of the things that are discussed in meetings of academic departments, such as "What are reasonable criteria for tenure or for annual salary increases?" and "What computer software are people using in their teaching?" We also discuss matters that are more specific to the role of the isolated statistician, such as "How do you get your Dean to recognize the importance of statistical consulting to the career of a statistician, the value of this consulting to the rest of the campus, and the time that consulting takes, if your college has never before employed a statistician?" and "How might we convince the Mathematical Association of America that their guidelines for programs in undergraduate mathematical sciences should give more emphasis to statistics?"

In addition to meeting each August, we have an e-mail list in which people can share questions and ideas throughout the year. Messages sent to the list, which is not moderated, are broadcast to the list, which currently has 54 members. (There are other members of the Isolated Statisticians who do not have e-mail accounts.)

"Membership" in the Isolated Statisticians group is open to everyone. As we say, if you feel isolated then you probably are. Most of us teach at small colleges, but there are a few statisticians from large universities among us. The only official function we have each year is the meeting in August, after which we go out to dinner together. We have requested 6:00 p.m. on Sunday, 13 August, as the time for this year's meeting in Orlando. The location has yet to be determined, but it will be listed in the program people get when they register for the meetings.

If you would like to be added to the group, you can contact

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We'd love to hear from you.

# UNDERGRADUATE DATA ANALYSIS CONTEST

David Robinson
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Newsletter for the Section on Statistical Education
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In the spring of 1996, the second Data Analysis Contest for undergraduate students will be held. The purpose of the contest is to bring together groups of people with a common interest, the statistical analysis of data. Undergraduate students may participate by submitting a written summary of a data analysis project, and by making a 15 minute presentation before a group of statistics professionals.

For this contest, three regional competitions are being planned. The sites have now been determined:

East: University of Tennessee (Knoxville)

Midwest: Winona State University (Minnesota)

West: Brigham Young University (Utah).

At each regional competition, the presentations and written papers will be judged by a panel of statisticians from industry and academia, chosen to represent a broad spectrum of statistical expertise. The student entries may be individual or team entries. Prizes will be awarded to the top participants in each region, with the winners being given travel awards to the 1996 Joint Statistical Meetings for a national competition.

The data for the contest will be the same across all regions. Advanced levels of statistical expertise are not required, but creativity is expected in the exploration or analysis of the data. Further information may be obtained by contacting:

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*Editors' Note: The first Data Analysis Contest was held in October, 1994. The winners of that contest will be giving their presentations at the Joint Statistical Meetings on Tuesday, August 15 from 4:00-5:50 p.m.*

# STATS MAGAZINE

Jeff Witmer, Editor
Oberlin College

Newsletter for the Section on Statistical Education
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STATS is the student magazine of ASA. All student members of ASA and many statistics teachers (and others) get STATS which is intended to generate interest and enthusiasm for statistics, to attract students to the profession, and to foster a sense of professional identity among student members of ASA. Feature articles in STATS are non-technical and cover a wide variety of areas of application. They showcase the contributions of statisticians by presenting a scientific problem and the nature of interaction between the statistician and others working on the problem.

For example, recent issues of STATS have included feature articles on the following topics: Applying statistics to human genetics; How to choose a graduate school; Statistics and the California lottery; What to do at the annual meetings; Using statistics to predict outcomes of college hockey games; and Statistical evaluation of Renaissance art objects.

In addition to feature articles, STATS has several departments. The department "On the Job" gives an hour-by-hour account of a day in the life of a statistician, with a different statistician profiled in each issue. "Ask Dr. STATS" is an advice column, while "Student Voices" presents student accounts of internship and consulting experiences. In each issue we describe the career path of a famous statistician in the department "Life and Hard Times of a Statistician." We have recently added the department "Featured Project," in which we publish a report from students who completed a project as part of a statistics class. We also have a humor section called "Outlier...s."

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# THE ASA/MAA JOINT COMMITTEE ON UNDERGRADUATE STATISTICS AND ITS NSF-FUNDED WORKSHOPS

George W. Cobb
Mount Holyoke College

Newsletter for the Section on Statistical Education
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In 1990 the Mathematical Association of America invited the ASA to collaborate in forming an ad hoc joint committee on undergraduate statistics. The committee, which has roughly two dozen members, holds two open meetings a year: one at the Joint Mathematics Meetings in January, and one at the Joint Statistics Meetings in August.

Here are some of the group's activities:

1991 MAA's Curricular Action Project made statistics the subject of one of its five focus groups (See Steen, 1992 for the group's report).

1992 Conference Board of the Mathematical Sciences Chairs' Colloquium: George Cobb presented the recommendations of the Focus group.

1993 Joint Mathematics Meetings:

(a) Mary Parker organized and chaired a contributed paper session, "Using data in the teaching of statistics."

(b) In a joint effort with the Statistics in the Liberal Arts Workshop (SLAW), Don Bentley, Robin Lock, Tom Moore, Mary Parker, and Jeff Witmer presented a minicourse on teaching statistics.

1995 Joint Mathematics Meetings: Robert Hayden and Mary Parker organized and chaired a contributed paper session, "Making statistics come alive."

1993-5 STATS Project. NSF-funded workshops for mathematicians who teach statistics.

The STATS workshops.

The MAA's STATS project (Statistical Thinking and Teaching Statistics) was designed for mathematicians, who teach statistics but who do not have recent or advanced training in the subject, in order to introduce them to some recent developments in statistics, especially those that distinguish statistics from mathematics. Each workshop is run by a coordinator and two presenters, all nationally known statisticians committed to education and actively involved in applied work. Funding is provided by a grant to the MAA from the Division of Undergraduate Education of the National Science Foundation.

In all, nine regional workshops have been funded: two were held in 1993 and three in 1994, with four more planned for summer 1995. For the three years combined, we have received about 500 applications for the 216 available places. The number and nature of the applications we received has been a gratifying confirmation that there is a need for the workshops, and that the intended audience can indeed be reached. The vast majority of the applicants (roughly 90%) have met our two main criteria: they are (1) involved in teaching statistics to undergraduates, but (2) without recent or formal training in statistics. Roughly half of the applicants have had no post-baccalaureate training in the subject at all. (Surely no other subject in the sciences is so often taught by those with so little training in the subject.)

For further reading:

Albers, D.J., D.O. Loftsgaarden, D.C. Rung, and A.E. Watkins, eds., Statistical Abstract of Undergraduate Programs in the Mathematical Sciences and Computer Science in the United States: 1990-91 CBMS Survey, MAA Notes No. 23. Washington, DC: Mathematical Association of America.

Cobb, G.W. (1993). "Reconsidering Statistics Education: A National Science Foundation Conference," Journal of Statistics Education, v.1, No. 1.

Gordon, F. and S. Gordon, eds. (1992). Statistics for the Twenty First Century, MAA Notes No. 26. Washington: Mathematical Association of America.

Hoaglin, D.C. and D.S. Moore, eds.(1992). Perspectives on Contemporary Statistics, MAA Notes No. 21. Washington: Mathematical Association of America.

National Research Council (1994). Modern Interdisciplinary University Statistics: Proceedings of a Symposium. Washington: National Academy Press.

Steen, L. A. (1992). Heeding the Call for Change: Suggestions for Curricular Action, MAA Notes No. 22. Washington: Mathematical Association of America.

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# THE INTERNATIONAL STUDY GROUP FOR RESEARCH ON LEARNING PROBABILITY AND STATISTICS

Joan Garfield
University of Minnesota

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

The International Study Group is an informal network of researchers who share a common interest in the teaching and learning of probability and statistics. This group was organized in 1982 at the first International Conference on Teaching Statistics (ICOTS) and then met again two years later at the Fifth International Congress on Mathematics Education (ICME). Over the years the study group has grown to include 120 members from over 20 different countries. The current goals of the study group are to facilitate the exchange of information among members, to distribute a newsletter, and to organize meetings of the study group at conferences such as ICOTS or ICME.

For the past seven years a free newsletter has been written and distributed three times a year to the study group which describes research activities of members as well as current journal articles and other publications on psychological and educational issues related to teaching statistics. Our goal is to soon make the newsletter available on the Journal of Statistics Education's Information Server on the World Wide Web.

Members of the Study Group have gathered for informal meetings (mostly to introduce themselves and share research interests) at the past two ICOTS meetings in New Zealand (1990) and in Morocco (1994). The conference in Morocco featured five different sessions where multiple research papers were presented by members of the study group. A collection of papers from these sessions has been produced and is being distributed at cost by the chair of the study group.

Because of the growing interest in research related to teaching and learning statistics, and consequently the increased number of research sessions at ICOTS meetings, the executive committee of the International Association of Statistical Education (IASE) decided that the next IASE roundtable conference (to be held in Granada, Spain in 1996) should have a research theme. This roundtable will explore research on the effectiveness of technology in teaching and learning statistics, and involve many members of the study group.

To become a member of the study group or to order the collection of research papers presented at ICOTS 4, contact:

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# AMERICAN STATISTICAL ASSOCIATION POSTER COMPETITION

Jerry Moreno
John Carroll University

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

In an effort to encourage and promote the understanding and application of statistics and to give special emphasis to graphical displays, the ASA Section on Statistical Graphics and the Center for Statistical Education created the American Statistics Poster Competition in 1990. This competition offers students an avenue in which to express their creativity in presenting data or statistical analyses.

The competition strives to encourage students to discover the usefulness of statistics in displaying data that occur in various contexts in their everyday lives. It is open to all students in grades K-12 in the United States and Canada.

Entries may come from individuals or teams of up to four students. Subject matter is the choice of the participants; original data are preferable. Posters are judged on the basis of overall impact of the display, clarity of the message, appropriateness of the graphics for the data, and creativity shown in the display.

There are prizes totaling $200 that are given in each of four categories: grades K-3, 4-6, 7-9 and 10-12. The winning posters along with honorable mentions are usually displayed at the annual ASA meeting. Some winning posters have been published by Dale Seymour Publications in a booklet called "Student Poster Projects: Winners of the ASA Poster Competition, 1991-1992".

Although the competition has been successful, there is need to increase the number of entries. If your children are of school age, the poster competition offers an excellent opportunity for you to get involved in your child's statistical education. Teachers need your expertise to make them aware of such opportunities as the poster competition, and then to give them suggestions on what statistical graphs are and how to draw them. You will find most teachers to be very receptive to your offering.

Contact the ASA Center for Statistical Education (see the end of the next article for complete contact information) to get a copy of the brochure and application form. Don't hesitate to contact me if you are interested in holding a local poster competition in your area. I will try to help you in any way I can to organize it.

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# UPDATE ON THE QL PROGRAMS

Cathy Crocker
Director of Education
ASA National Office

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

Quantitative literacy (QL) has become a well known phrase around the ASA office. The Center for Statistical Education (CSE) hopes that it is becoming a well known phrase throughout the United States. QL efforts at ASA started when the Joint Committee on the Curriculum in Statistics and Probability was formed by the National Council of Teachers of Mathematics (NCTM) and ASA under the leadership of Fred Mosteller. This committee is still active today with Linda Young as the chairperson. CSE has collaborated with NCTM to produce a series of five QL projects. These projects have been sponsored by five grants from the National Science Foundation (NSF).

QL I led to the development and publishing of units for introducing the basics of statistics and probability to students in secondary school. These materials were written by classroom teachers, mathematics educators and statisticians and published by Dale Seymour.

QL II focused on teacher training. Training sessions were for one week during the summer with follow-up sessions during the next year. Local statisticians participated in both the training and the follow-up sessions. More than 3,000 teachers have been trained since these workshops began.

QL III, "A Data-Driven Curriculum Strand for High School Mathematics," has developed material that is presented in two-day workshops to high school mathematics supervisors and department chairpersons. One workshop was held in Manassas, Virginia in March and two were held in May - one in Texas and the other in California. Two complementary needs have been addressed in this grant: how to use data analysis to motivate essential topics in a mathematics curriculum as suggested by the NCTM standards and how to teach skills in data analysis for students to be skilled participants in society.

The elementary school population was not to be forgotten. QL IV provided funds for developing materials to enhance the QL skills of teachers in grades K-6. Five-day workshops were held in the summer of 1994 focusing on concepts in data analysis and in teaching skills, and sharing strategies and materials so teachers could weave a statistics and probability strand into the curriculum for elementary schools. One more workshop funded by NSF will be held this summer.

Materials from both QL III and QL IV are being readied for publication by Dale Seymour. All will be excellent additions to a library and invaluable resources/textbooks for teachers in grades K-12. Gail Burrill, Jim Landwehr, Dick Scheaffer, Ken Sherrick, Carolyn Bereska, Cyrilla Hergenhan, Maria Mastrematteo and many others are to be commended for their work.

QL V (Science Education And Quantitative Literacy or SEAQL) was approved and funded by the NSF in 1994. Jeff Witmer, Art Christensen and Mike Kimmel are the leaders of this project. Teams of classroom teachers have been writing material to be used this summer at a four-week workshop at Johns Hopkins University. Forty-five teachers, representing grades 6-12, will be learning how data analysis can become a part of their lessons/laboratories in chemistry, biology, earth science, physics and general science. Two follow-up sessions will be held during the school year for these teachers to share their experiences with each other and to provide direction for the summer of 1996, when two workshops will be held. Applications for those workshops will be available late in 1995.

QL continues to grow and develop. We are currently working on QL VI (Data-Centered Studies), which will involve interdisciplinary, problem-centered projects to be delivered by teams of teachers. Emphasis will be placed on hands-on activities that encourage collaborative learning and show how data analysis is an integral part of the entire curriculum. We are in "the request for funding" stage at this point.

If you are interested in materials that have been published by Dale Seymour, please e-mail us and we can send you a copy of what is available. In 1996 more materials will be available as the QL III and QL IV materials are published. We also have a roster of QL-trained teachers available to conduct workshops for teachers. For further information please contact

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# THE NEW ADVANCED PLACEMENT STATISTICS COURSE

Rosemary A. Roberts
Chair, AP Statistics Test Development Committee

Newsletter for the Section on Statistical Education
Volume 1, Number 2 (Summer 1995)

The College Board recently approved an AP course and examination in statistics. The first AP statistics examination will be given in May 1997. This article gives some background information about the course and discusses the nature of the course and examination.

In 1987 the AP Calculus Development Committee conducted a study of possible new offerings in the mathematical sciences. A survey of high schools and colleges indicated that there was strong support for a course in statistics. It is noteworthy that this occurred at a time when there was a great interest in changing the way in which introductory statistics is taught at the college level. It was also a time when a knowledge of statistics was becoming recognized as being important for people in all walks of life. The Committee recommended to the College Board that a Task Force be established to study the feasibility of offering an AP course in statistics.

The Task Force began its work in 1992. To determine the feasibility of offering an AP statistics course, the Task Force sent a preliminary course outline to various high schools and colleges. The goal was to determine whether the high school teachers thought it would be feasible to offer the course and whether the colleges would give placement and/or credit to students who had successfully completed the course. Responses from the high schools indicated strong support for the course although concern was expressed about the use of technology and teacher training needs. The proposed course outline was also well received by college and university statistics and mathematics departments. The client disciplines were not as supportive. Their departments wanted additional statistical techniques included before they would award either placement or credit. Given the variety and specificity of the client disciplines' needs, a course that could satisfy all or even most of the client disciplines seemed much less feasible than a course emphasizing a common core of concepts and techniques. The Task Force thus recommended that a concept-oriented AP statistics course and examination be created and this was approved by the College Board in late 1993.

In 1994 the AP Statistics Test Development Committee was formed and started its work to make AP statistics a reality. The committee has written a Preliminary Course Description, developed test questions for the first exam in May 1997, and planned workshops for teacher training. The Preliminary Course Description, published in April, 1995, includes a course outline, a discussion of the AP statistics examination including sample questions, and statements on the use of technology and instructional emphasis.

The topics for the AP statistics course are divided into four major themes: exploratory analysis, planning a study, probability, and statistical inference. Within each theme the topics emphasize statistical thinking and minimize computational procedures. The instructional emphasis is toward a mode of teaching that engages students in constructing their own knowledge. Important components of the course should include the use of technology, projects and laboratories, cooperative group problem solving, and writing as a part of concept-oriented instruction and assessment.

The AP Statistics examination consists of a 90 minute section of multiple choice questions and a 90 minute section of free response questions. The two sections are equally weighted. The free response section asks the student to answer open-ended questions and to complete an investigative task involving more extended reasoning.

While it would be ideal for students to have access to the computer during the exam, this is currently unrealistic. Thus, graphing calculators will be required and computer output will be provided as necessary. Students will be expected to be familiar with standard computer output and every school offering the AP Statistics course is encouraged to make available a computer with an appropriate software package for use both in and outside the classroom.

Teacher training is a major concern of the Committee. Last summer members of the Committee led a teacher workshop at Clemson University. This summer the College Board will launch a more far-reaching teacher training effort by hosting a workshop in San Antonio. This will be attended by selected high school teachers and statisticians and will again be led by members of the Committee. It is anticipated that teams of these teachers and statisticians will subsequently conduct workshops across the country.

A Preliminary Course Description (IN-201619) is available from:

Advanced Placement Program
P.O. Box 6670
Princeton, NJ 08541-6670
Phone: (609) 771-7243

# CONFERENCE ON ASSESSMENT

Joan Garfield
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Newsletter for the Section on Statistical Education
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A working roundtable conference on assessment and statistics education, organized by Iddo Gal and Joan Garfield and funded by the National Science Foundation, was held at the University of Pennsylvania in September, 1994. This two-day conference included 36 individuals representing the areas of mathematics education, statistics, educational assessment, and curriculum development. Teachers of statistics at the elementary, secondary, and college level were also included, as were directors of major statistics curriculum projects at all educational levels.

Five working groups met to discuss issues related to assessment of student learning of data analysis and probability, issues involved in large scale assessment, training of teachers to use alternative assessment, and the role of technology in assessing student learning. Various publications and reports will be forthcoming based on discussions and working group reports. Iddo and Joan are also editing a handbook on Assessment and Statistics Education which includes chapters on many of these topics as well as examples of good assessment practice. For more information, contact

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