

Association for Women in Mathematics

Volume 16, Number 1

NEWSLETTER

January--February 1986

PRESIDENT'S REPORT: NOV-DEC 1985

Kovalevsky Symposium:

Over the long weekend of October 27-28, 1985, the AWM sponsored a symposium in honor of Sonya Kovalevsky.

On Saturday, together with the Bunting Institute, there was a program for high school students, with films and workshops. At the luncheon, one of the students told me that she had been forced to go by her father, and was very pleased she had done so. The students came from a variety of high schools in the Boston area.

On Saturday and Sunday there were three special sessions at the AMS meeting in Amherst which were arranged in coordination with the symposium. The organizers of these were Jane Cronin Scanlon, Lesley Sibner and Jean Taylor.

On Sunday evening and Monday there were lectures at the Bunting Institute on the mathematical heritage of Sonya Kovalevsky. It is hoped that the lectures at the special sessions and those at the Bunting Institute will appear as a book.

Annual Meeting: New Orleans, January 7-12, 1986

The Noether Lecturer this year will be Madame Yvonne Choquet-Bruhat. We are also sponsoring a program, in conjunction with the AMS and MAA in honor of Julia Robinson. It is being organized by Lenore Blum and the main speakers will be Martin Davis and Constance Reid. We will have our semiannual business meeting and party. I look forward to seeing all of you there.

An important Issue:

The current political climate and the "Star Wars" program of the administration is an extremely important issue for the mathematical community. Mathematicians will be asked to participate and those who do will be rewarded. Mathematics has been underfunded for many years and there is a real need for money for research. It is very tempting to take whatever money is offered and to put it to good use. However, the new programs to support "basic research in mathematics" may operate under different rules than those currently in use by agencies such as NSF.

These rules may make it impossible to do mathematics in the open manner traditional at a university. Certain subjects will be supported at the expense of others; those who have contracts under these programs will be more able to support graduate students and obtain expensive computer equipment. The publicity about these programs and the review processes may be quite different from those we are accustomed to. There may be requirements for prior review of work done under these contracts. New programs already exist. For example, the CIA in cooperation with DARPA (Defense Advanced Research Projects Agency) is supporting a number of researchers in dynamical systems.

It is extremely important that ALL aspects of the effects of "Star Wars" money on the mathematical community, not only those mentioned above, be discussed openly and at length. This newsletter is one forum for discussion. I invite your opinions.

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DIRECTORY

A Directory of National Women's Organizations was just published by the Allstate Insurance Companies and Sears, Roebuck and Co. AWM has been included in this directory. One of the primary purposes of the directory is to form a bridge between nonprofit organizations and the corporations and foundations who are potential funders. At the present time, distribution of this directory is planned to corporations and foundations, governmental leaders, and to the media.

OF POSSIBLE INTEREST

A conference on Women, Power, & Sex in the 21st Century takes place on January 13, 1986 at the Roosevelt Hotel, New York City. Write Women, Power, & Sex in the 21st Century, % Cicutelli Associates, 505 Eighth Ave., Suite 1801, NY, NY 10018.

Feministische Studien recently devoted an issue to "Women and Science: Intrusion - not Exclusion." It included an article by Anna Maria Stuby on Sofia Kovalevskaja and her work. Beltz Verlag, Postfach 1120, 6940 Weinheim, West Germany.

Oryx Press, 2214 North Central, Phoenix, AZ 85004. *Women in Particular: An Index to American Women* is a reference work that notes the contributions to U.S. history of some 15,000 women. *Contemporary American Women Sculptors*. Other women's titles.

Publications on Women. International Labor Office, Sales Office Suite 330WM, 1750 New York Avenue, N.W., Washington, DC 20006.

Women in Culture and Society series. The University of Chicago Press, 5801 S. Ellis Ave., Chicago, IL 60637.

Women's Studies. The Univ. of Tenn. Press, P.O. Box 6525, Ithaca, NY 14850.

Women's Studies. Indiana University Press, 10th & Morton Streets, Bloomington, Indiana 47405.

Women's Studies. The University of Wisconsin Press, 114 N. Murray St., Madison, WI 53715.

WOMEN, HEALTH AND TECHNOLOGY: CALL FOR PAPERS

The Women's Center and the Women's Studies Program at The University of Connecticut are sponsoring a conference on Women, Health and Technology. Women produce, use and are affected by a vast array of technologies in the health care setting, the workplace, the home and the neighborhood. The purpose of the conference is to explore the many relationships between technology, women and health, including the possible positive and negative effects of technology on women's mental and physical health. Papers making cross-cultural comparisons are welcome. Basic research, thought pieces and applied papers from non-academics as well as academics are encouraged. Proposals for papers or panels should be received no later than February 28, 1986. Two copies of the submission (500-750 words) summarizing the presentation should be sent to: Kathryn Strother Ratcliff, Chair, Women, Health and Technology Conference, Women and Technology Project, 417 Whitney Road, Box U-181, The University of Connecticut, Storrs, CT 06268.

LETTER FROM THE EDITOR

This letter, I'm reporting on some interesting things I have run across in my own reading or that some of you have sent to me. If you would like to write similar summaries of some of your own reading, send them to me, and I'll print them if they're of general interest.

"The Learning Machine," a TV show on BBC1, had an episode about girls and computers. The program was done by Celia Hoyles, Professor of Mathematics at the Institute of Education, London University. Emma Previato, Boston University, sent me an article about it--"Gender gap" from *The Listener* (the BBC program guide), May 30, 1985.

It sounds as if the situation in Great Britain is no better than it is here in the U.S. Girls account for only 20% of those studying to qualify in computer science. 80% of home computers are bought for boys. Many people, including teachers and computer professionals, believe women and girls are not well-suited for computer work. One teacher explained why a computer is not "attractive" to a girl: "...it's a cold, soulless machine and women are much more tender or sympathetic creatures and they can find nothing in common with a computer." Says the article:

There is one thing that is almost certain in the near and long-term future, and it is that computers in some form or another will play an essential role in our society. Knowledge of computing and information technology will be a source of power. Yet already there are differences in terms of access to computers, which could lead to the virtual exclusion from this power of a vast number of our population, and most of those will be girls.

One interesting point was that schools do not provide adequate computers for the learning of word-processing in the business curriculum. Is that true in the U.S. as well? And one is left with this ideological question:

if the resource problem could be solved and girls got unlimited and uncontested access to computers in such courses (i.e., office skills), is this the right way to introduce them to the new technology, or is it just reinforcing the same old images of what girls do?

Of course the program featured successful women computer professionals and rejected the view that girls are "not mathematical." And the article ends with a hopeful statement:

What is important to recognise is that a computer is not just something that girls like or don't like, can cope with or can't cope with. Reactions to the computer depend on what we put in them and how we choose to incorporate them into our educational system. In the right sort of learning environment, and with the right sort of software, computers can improve the traditional content and ways of learning in schools, which would be an advantage for all children in all subjects and especially for girls in the mathematical and scientific areas. This must be our aim, and in working for this aim we must ensure that girls are given appropriate support for their learning and are introduced to the full range of computer use. If this is not done a situation of disadvantage for girls could be made still worse.

A review essay, "Psychology and Gender" by Nancy M. Henley, appears in *Signs: Journal of Women in Culture and Society*, Vol. 11, No. 1, pp. 101-119. The section on sex-related differences in cognition has a subsection on mathematical performance. It focuses mainly on the controversy aroused by Benbow and Stanley's

articles. Here is a provocative sentence from page 108: "Most investigators would agree that there seems to be some likelihood of a small but true difference in mathematical performance favoring boys, though its source and the mechanism of its realization are not clear." The next subsection reports on theories of brain organization. Much work is being done on brain "lateralization" and how it relates to sex differences in mathematical and verbal abilities. From page 111: "Investigation in this field includes some of the more controversial research going on today; while some argue that such work is indefensible in the current political climate, one can also maintain that, given the continued interest in this area, feminist scholars must stay informed and involved in order to keep it from being a mire of misogyny."

The Association of Teachers of Mathematics of Philadelphia and Vicinity, affiliated with the National Council of Teachers of Mathematics, produces the *ATMOPAV Newsletter*. The editor sent me a copy because AWM was mentioned in an article about resources for women and mathematics.

The newsletter is well-produced and interesting. Some of the articles relate to the Philadelphia area, of course, but others are relevant for all math teachers at the elementary or secondary levels. Articles included puzzles, teaching ideas for math and computer science, and a report on linear programming, as well as the resource list mentioned above.

For membership information, write Sister Marita Donald IHM, St. Hubert's High School, 7320 Torresdale Avenue, Philadelphia, PA 19136.

The October-November 1985 issue of the *AWIS Newsletter* contains an article "Reaching Out to the High Schools" by Suzanne Amador, Harvard University. It reports on the AMITA School Visiting Program, a program presently funded and administered by the MIT Admissions Office. From the article:

The AMITA School Visiting Program... remind[s] young women of the freedom of choice they earn by taking science throughout high school. Sponsored by the MIT women's alumnae association, the program enlists volunteer help from women professionals for a series of informal talks with high school students. The volunteers are primarily engineers, scientists, and businesswomen. Using personal anecdotes and hard facts, they stress that the students need to take as much math as possible to keep open their career options. They point out that even if a woman marries and has children, she will probably find that a job is a necessity, not a luxury. Her skills will then determine her income and her enjoyment of her work. By demonstrating the importance of these skills in the job market and by describing their own experiences in nontraditional careers, they also show that an interest in science and technology is both healthy and practical.

Last spring, one hundred forty volunteers visited sixty-one Boston-area high schools. The formats of the meeting ranged from class discussions to school assemblies.

For more information, write: Marty Ward, MIT Admissions Office, 77 Mass. Ave., Cambridge, MA 02139. (617) 253-3354

You may recall having read news reports in September, 1984 about the Second International Mathematics Study. The *International Association for the Evaluation of Educational Achievement Second Study of Mathematics Summary Report, United States* has been published by the University of Illinois, copyright 1985. It is available for \$7.80 plus \$1.00 postage from Stipes Publishing Company, 10-12 Chester Street, Champaign, IL 61820. From the introduction:

In 1981-82, students and teachers in about 500 mathematics classrooms across the United States joined their counterparts in some two dozen

countries around the world in a comprehensive study of school mathematics. This study was designed to provide detailed information from each country about the content of the mathematics curriculum, how mathematics is taught and how much mathematics students learn. The information is intended to help policy analysts and mathematics educators in individual nations analyze their school programs and identify areas of strength and weakness, and to provide data which are useful to national officials as they plan for future directions in school mathematics in their own countries.

The study was organized around the following three aspects of a curriculum: the intended curriculum (curriculum analysis), the implemented curriculum (classroom processes), and attained curriculum (student outcomes). In this country, questionnaires and achievement tests were used to obtain the data.

Here are some of the findings:

* The teacher of a typical U.S. eighth grade mathematics class was experienced and well-trained, having 13 years of teaching experience, 9 or 10 semester courses in mathematics, 2 courses in mathematics teaching, and 4 courses in general education and pedagogy.

* The teacher of a typical senior high school mathematics class had about 16 years of teaching experience with eight years at the senior level. This teacher had a median age of 40 years and had taken about 16 semester courses of mathematics.

Eighth grade achievement--

* U.S. students were slightly above the international average in computational arithmetic (calculation) and well below the international average in non-computational arithmetic (e.g., problem solving).

* By end of eighth grade, U.S. achievement in algebra was comparable to the international average.

* No overall patterns of differences in mathematics achievement between boys and girls were found at the eighth grade level, and in any case, no difference was greater than 2 percent.

Twelfth grade achievement--

* The achievement of the calculus classes, which were the nation's best mathematics students, was at or near the average achievement of the groups of senior secondary school mathematics students in other countries.

* The U.S. precalculus students (the majority of twelfth grade mathematics students) achieved at a level which was substantially below the international mean scores for all countries in the Study, and in some cases were ranked with the lower one-fourth internationally.

* Male twelfth grade students sampled consistently performed better than the female twelfth grade students and, for many topics, made at least marginally better gains during the year.

The concluding remarks are particularly interesting. I quote again:

...the eighth grade curriculum was typically a "low intensity" presentation. That is to say, many topics were dealt with only briefly--for perhaps a period or two. As a result, insufficient provision may have been made for developing a solid conceptual base upon which subsequent mathematics is to be learned. This impression of the curriculum was in marked contrast to the more "intense" approach to the study of mathematics found in some other countries, most notably in Japan.

...The twelfth grade program was built upon a foundation that is by most international standards highly compartmentalized. In the U.S., high

school mathematics typically consists of one year of algebra, one year of geometry, another year of algebra, and then more advanced topics in the fourth year, such as analytic geometry, trigonometry, or calculus. In most countries of the world, a more integrated approach to mathematics is taken, in which the subject is presented in a more cohesive and unified fashion. It is plausible that the "fragmentation" and "low intensity" found in many of our mathematics programs could be allayed by a more integrated approach to the high school mathematics curriculum.

Indeed food for thought.

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HONORS AND AWARDS

from the AMS Notices:

The National Science Foundation (NSF) has announced twenty-six awards totaling \$2.27 million under its 1985 Visiting Professorships for Women program. Six mathematicians were among those receiving awards.

The program encourages participation of women in the nation's science and engineering enterprise by giving women scientists and engineers from industry, government and academic institutions opportunities to serve as visiting professors. In addition to research, visiting professors undertake lecturing and counselling activities to increase the visibility of women scientists and engineers and to encourage other women to pursue careers in science and engineering. Awards ranged in size from \$32,623 to \$146,498, and in duration from six to twenty-four months.

The recipients in the mathematical sciences follow (the institutions in parentheses are their home institutions, those outside the parentheses are those at which the Visiting Professorship is to be held): Donna Brogan (Emory University), University of Michigan; Vera Pless (University of Illinois, Chicago), California Institute of Technology; Leslie M. Sibner (Polytechnic Institute of New York), University of Pennsylvania; Marie France Vigneras (University of Paris), University of California, Berkeley; Alice Whittemore (Stanford University), Harvard University; Carol Wood (Wesleyan University), Rutgers University.

Dr. Ann Hibner Koblitz was recently elected Co-Chair of the Women's Committee of the History of Science Society. The Committee is working on a roster of people doing research on women in science, and is preparing a bibliography of bibliographies, obituaries, etc., on women scientists. If any AWM members are interested in being included in the roster, and/or have bibliographies they would like to share, please write her at 6547 17th Ave. N.E., Seattle, WA 98115 for further information.

CHILD CARE AT NEW ORLEANS

If you are interested in child care at the New Orleans meeting, please contact Sylvia Weigand, Mathematics Department, University of Wisconsin, Madison, WI 53706.

Some information about child-care arrangements is given in the AMS Notices.

MINA REES LIBRARY DEDICATED

press release

The Graduate School and University Center of the City University of New York named its library in honor of Dr. Mina Rees, President Emeritus of the Graduate School and founding president of the institution, on Tuesday, November 12, 1985.

"It is fitting that our library should be named in honor of the woman whose energy and vision first breathed life into the concept of doctoral education at The City University of New York," observes Harold M. Proshansky, President of the Graduate School and University Center. "Mina Rees is the living embodiment of academic and professional excellence--an inspiration to all who would pursue a life of scholarship and administration in its highest form. It is to her early leadership as founder and president of The Graduate School that we owe the existence of this outstanding institution today; it is to her continuing involvement, and that of others who emulate her, that we will owe its future."

Joining Proshansky at the library dedication was Joseph S. Murphy, Chancellor of The City University of New York; Steven M. Cahn, Provost and Vice President for Academic Affairs of The Graduate School and University Center; Robert Lumiansky, President Emeritus of The American Council of Learned Societies; Alex Heller, Distinguished Professor of Mathematics at the City University Graduate School; Jane Ross Moore, Chief Librarian of the Mina Rees Library and Vartan Gregorian, President of The New York Public Library and Chairperson of the Board of Visitors of The Graduate School and University Center.

Dr. Rees served as President of The Graduate School and University from 1961-1972. A noted mathematician, she received a B.A. degree from Hunter College and a Ph.D. in mathematics from the University of Chicago. She has served the City University for more than 35 years in a variety of teaching and administrative positions, a career that was interrupted for 10 years during and after World War II while she held high ranking positions with the Office of Scientific Research and Development and the Office of Naval Research, respectively. In addition, she has served as chairman of the Council of Graduate Schools in the United States and as chairman and president of the American Association for the Advancement of Science.

In the course of a long and distinguished career, Dr. Rees has received the President's Certificate of Merit, the King's Medal for Service in the Cause of Freedom (British), the first Award for Distinguished Service to Mathematics presented by the Mathematical Association of America, and the National Academy of Sciences Public Welfare Medal.

REPORT ON KOVALEVSKAIA SYMPOSIUM

by Bernice Auslander

The symposium in honor of the legacy of Kovalevskaja, sponsored jointly by AWM and the Mary Ingraham Bunting Institute, was held at Harvard University on October 26, 27 and 28.

On Saturday, October 26, teachers and women students from Boston-area high schools gathered to hear talks about topics in applied mathematics and opportunities in mathematics. Presentations were given by Deborah Hughes Hallett, Marianne Gardner, and Pamela Coxson. This program was partially supported by Arthur Little, DEC, Mitre Corporation, and Pfizer Inc. About 25 teachers and 85 students attended.

It was an extremely successful undertaking. Even at the end of the day, the students were still energetic and enthusiastic, and several of the teachers suggested that this become an annual affair!

On Sunday evening, October 27, and Monday, October 28, the research portion of the symposium took place. This portion was funded by NSF. The speakers were Nancy Kopell, Ann Hibner Koblitz, Chuu-Lian Terng, Takahiro Shiota (for Mark Adler), Jean Taylor, Patricia Bauman, Michael Shub, Nancy Hingston, and Linda Ness. The talks were attended by mathematicians from all over the country, and were interesting and well-presented.

SPEAKERS' BUREAU: UPDATE FOR 1985-1986

by Alice T. Schafer, Director

This update is really an addendum to the fine article about the Speakers' Bureau written by Jeanne LaDuke for the May-June issue of this *Newsletter*.

The 1985-86 edition of the Speakers' Bureau brochure is now available and ready for use. The number of AWM members registered with the Bureau has risen to 206 and the number of coordinators to 69, of whom 55 are also speakers. There are speakers and/or coordinators in every state and the District of Columbia as well as in three other countries. These increases have made it possible to reorganize the Bureau by state, rather than by region of the country, with the larger states themselves divided into regions, and with an increase in the number of metropolitan coordinators. In addition to a listing of the speakers and their topics, with the appropriate audience, the preferred phone number of each speaker and coordinator is given in the brochure. In the first few pages of the booklet there is information about the operation of the Bureau, as well as a geographical distribution of the speakers and coordinators.

In 1984-85 the number of talks given under the auspices of the Bureau rose to 117, an increase of 100 over the past two years combined. Clearly, the good organization of the Bureau by Judith C. Wason was paying off. If each AWM member works to maintain the interest in and use of the Bureau in 1985-86, the number of talks given ought to increase even more. Indeed, if each member arranged for just one talk, think of the results!

As you know from Jeanne LaDuke's article, Pamela G. Coxson of Ohio State University will become the Director of the Speakers' Bureau on January 1, 1986. She will be an excellent Director. Let's help her in every way that we can to ensure the continued success of the Bureau.

The new booklet has been mailed to all speakers and coordinators. Any AWM member who wishes to have one may obtain it from Margaret T. Munroe, Administrative Assistant, at the AWM address.

REENTRY ENGINEERING PROGRAM

The University of Dayton/Air Force Logistics Center Reentry Program is a unique second degree education/employment program designed to enhance the career opportunities for adults with prior degrees in mathematics or science. Specially designed and scheduled courses advance the participant with an already firm academic background to the academic level needed to quickly expand their career horizons. The program offers one year of tuition-paid courses in electrical engineering at the University of Dayton for an additional degree in electrical engineering (begins in April), liberal grants for relocation and living expenses, and three years guaranteed civilian employment experience as an electrical engineer at one of five Air Force Logistics Centers nationwide or the Defense Electronics Supply Center in Dayton. Write: Prof. Carol M. Shaw, Asst. Dean of Engineering, University of Dayton, 300 College Park, Dayton, OH 45469.

CORRECTION: U.S.-SOVIET PROFESSIONAL EDUCATORS PROGRAM

press release

A corrected press release was received after last issue's deadline.

The price for the tour given in the last issue was too high:

please note that the program's cost is \$1825 per person.

- * How do children learn reading, writing, and arithmetic?
- * How is bilingualism maintained in the USSR?
- * What kind of research preceded the current reforms of the Soviet educational system?
- * How are research results disseminated to pedagogical establishments, and how are they ultimately adapted for classroom use?

American educators, curriculum planners, and academic professionals will soon have the opportunity to discuss these and many other questions with their Soviet counterparts. Citizen Exchange Council's annual educators' exchange departs for a 16-day program on March 7, 1986. The itinerary includes meetings in Leningrad, Simferopol, Yalta, Kishinev, and Moscow.

The Soviet educational system is guided by the USSR Academy of Pedagogical Sciences, which has thirteen institutes and a network of experimental schools and classes. Representatives of the Academy will brief the American group and answer questions.

This program has been organized by Claudia Zaslavsky and Lotus Dix-Jones in cooperation with CEC, a non-profit cultural exchange organization dedicated to increasing US-Soviet understanding. Ms. Zaslavsky, who has a Masters degree in mathematics, has pursued doctoral studies in mathematics education. This is her fourth educators' tour of the USSR and the second that she has organized. Ms. Jones is a doctoral candidate in psychology at the City University of New York. As an educational consultant, she has developed teacher training materials and conducts tutoring and mathematics workshops.

This trip may be tax deductible for some. Based on current fares, the program costs \$1825 per person. This includes roundtrip flights from JFK, visa processing, all scheduled transportation in the USSR and Helsinki, double occupancy in first class hotels, all meals in the USSR, breakfast and dinner in Helsinki, transfers with baggage handling, guides, sightseeing, scheduled excursions and performances, and CEC's program of meetings and visits. Single accommodations are available for additional payment. CEC invites all educational professionals to participate. For more information, write: Claudia Zaslavsky, 45 Fairview Ave. #13-1, New York, NY 10040. 212/569-4115.

SOUTHEAST ASIAN SEMINAR: CALL FOR PAPERS

The Southeast Asian Seminar on Women and Science in Developing Countries, jointly sponsored by the S. V. Kovalevskaia Memorial Fund, the IUHPS Women's Commission, and the Vietnam Women's Union, will be held in Hanoi, Vietnam on January 8-10, 1987. Scientists, historians and others interested in contributing to the Seminar are invited to send papers on the history or the present position of women in science, technology, and medicine in developing countries; or on the relationship between the status of women, scientific-technological development, and other questions of political, social, and economic import. Papers must be submitted in English, which will be the language of the Seminar, and must be suitable for a 20-minute presentation. The deadline for receipt of manuscripts is July 31, 1986. Please submit papers to Dr. Ann Hibner Koblitz, Director, Kovalevskaia Memorial Fund, 6547 17th Ave. N.E., Seattle, WA 98115.

TRAVEL GRANT TO VIETNAM

The Kovalevskaia Fund will make a grant of \$2000 for travel and expenses to one American woman researcher in applied mathematics to spend the month of January 1987 visiting and lecturing in Vietnam--three weeks in Hanoi and one week in Ho Chi Minh City (formerly Saigon). In addition, all hotel accommodations, meals, and transportation will be paid for by the Hanoi Mathematical Institute.

The preferred fields of applied mathematics are: applied p.d.e., numerical analysis, optimization, nonlinear analysis, applied mathematical physics, applied statistics, mathematical economics.

Interested mathematicians are invited to apply to the address given below. Please send *four copies* of your CV, list of publications, and a short statement (about a page). The statement should describe what you would lecture on in Vietnam, and may include any special reasons for wanting to visit Vietnam.

The deadline for receipt of applications is March 1, 1986. The award will be announced in mid-April, 1986. Please send all application materials and any requests for further information to Dr. Ann Hibner Koblitz, Kovalevskaia Fund, 6547 17th Ave. N.E., Seattle, WA 98115.

WOMEN AND MINORITIES IN SCIENCE AND ENGINEERING

Executive Summary from the publication of this name,
National Science Foundation 84-300, January 1984

This report, the second in a biennial series mandated by public law 96-516, presents information on the participation of women, racial/ethnic minority group members, and the physically handicapped in science and engineering. In keeping with its purpose as an information resource, this report makes no recommendations on programs or policies; rather, it discusses issues of interest to policymakers and others concerned with the full use of the Nation's resources in science and engineering.

Despite substantial gains over the past decade, women and minorities are still underrepresented in science and engineering, both in employment and in training. Their rates of participation in precollege science and mathematics courses and in undergraduate and graduate science and engineering (S/E) education are lower than those of men and the majority. Women and minorities who earn degrees in S/E fields generally have higher rates of unemployment and lower average salaries than their counterparts. These and other differences noted in the report can reflect differences in sociodemographic characteristics (such as years of work experience), differences in career preferences, or a combination of such factors. They may also reflect inequitable treatment.

One of the dramatic features of the last decade has been the trend for more women to select education programs leading to S/E degrees. Women received 37 percent of S/E bachelor's degrees granted in 1981, up from 27 percent in 1971. At the doctorate level, women earned 23 percent of the S/E degrees granted in 1982, compared with 11 percent 10 years earlier.

The greater number of women and minority S/E degree recipients has made possible the growth of these groups in S/E employment. Once they have obtained their degrees, however, women and minorities are more likely than their counterparts to be unemployed (although their rates are still relatively small compared with those experienced by the overall U.S. work force). Women and minority scientists and engineers who are employed are less likely to hold jobs in science and engineering, although more than 80 percent do hold such positions. In addition, the salaries of women and blacks range from 20 percent to 10 percent below those of their male and white counterparts.

Because of the increasing proportion of S/E degrees being earned by women and minorities, there is less disproportionate representation among the younger members of these groups. If this growth trend continues, it is likely that differences in employment representation will decrease. The greater proportions of women among S/E degree recipients is causing a shift in concern from access to S/E education and training to career advancement in S/E fields. Among minorities, the fundamental concern continues to be participation in precollege science and mathematics coursework--a necessary precursor to increased attainment of S/E degrees.

Females and minorities take fewer years of mathematics and science in high school than do males and the majority and have lower scores on standardized tests such as the Scholastic Aptitude Test (SAT). Differences in test scores between females and males, however, are smaller than those between racial/ethnic minorities and the majority.

Although efforts were made to develop data on scientists and engineers with physical handicaps, many respondents did not answer questions about handicap status in the surveys underlying the data in this report. The best estimate is that about 2 to 3 percent of all scientists and engineers have a physical handicap.

The major findings emerging from available data on women, racial minorities, Hispanics, and the physically handicapped are summarized below.

WOMEN

Employment

Employment of women scientists and engineers increased by over 200 percent between 1972 and 1982, compared with about 40 percent for men. As a result, in 1982, women accounted for 13 percent of the S/E work force, roughly double their representation in 1972. However, this level was still considerably below women's representation among more aggregated groups; they represented 45 percent of both total U.S. and all professional and related worker employment.

Representation of women varies substantially by field. For example, one in every four scientists but less than one in every twenty engineers was a woman in 1982. Within the sciences, the representation of women ranged from 12 percent of environmental and physical scientists to 45 percent of mathematical scientists.

There are differences in the characteristics of male and female scientists and engineers that can affect career patterns. Reflecting their more rapid increase in employment, almost two-thirds of the women compared with slightly over one-third of the men had less than ten years of professional experience in 1982. Furthermore, the female S/E work force was younger than the male; three-fifths of the women but only one-third of the men were under 35 years of age.

Only one-fifth of the women compared with one-third of the men cited management or administration as their primary activity, a statistic that reflects in part their fewer years of professional experience. Furthermore, within educational institutions, women were less likely than men to hold tenure or be in tenure-track positions.

Annual salaries for women scientists and engineers averaged almost 80 percent of those for men, about the same differential as in 1972. This differential remained after controlling for the differences in S/E field distributions between women and men. The salary differences were less for younger scientists and engineers.

About 80 percent of the employed women scientists and engineers were working in S/E jobs in 1982; the comparable figure for men was about 90 percent. Among those holding doctorates, roughly 90 percent of both women and men held S/E jobs.

The unemployment rate for women scientists and engineers was about twice that for men in 1982 (4.3 percent vs. 2.0 percent), and the rates for women were higher across all major fields.

Statistical indicators derived from available data suggest greater underutilization of women than men in science and engineering. If those who are (a) unemployed involuntarily, (b) working involuntarily in part-time jobs, and (c) working involuntarily in non-S/E jobs are considered as a proportion of the total,

one finds that about 9 percent of women compared with 3 percent of men are underutilized in science and engineering.

Labor market indicators, such as labor force participation and S/E employment rates, for women scientists and engineers vary in a fairly narrow range by race. For women S/E's, differences by race are less than the differences by sex within all racial groups. Hence, it appears that gender is a more significant factor than race in the labor market behavior of minority women in S/E fields.

Education and Training

With respect to precollege preparation, females and males are equally likely to be enrolled in academic programs in high school, but males take substantially more courses in mathematics (including honors courses) and science. This difference is reflected in scores on standardized tests of mathematics and science achievement: while females have slightly higher scores than males at younger ages (9-year-olds), males score significantly higher among 17-year-olds.

Scores for females on the mathematics component of the Scholastic Aptitude Test (SAT) are well below those for males (443 vs. 493). When stratified by intended undergraduate major, males who planned to major in a natural science field scored higher on the mathematical component than did females. Among prospective engineering students, however, mathematics test scores for females were higher than those for males. On the Graduate Record Examination (GRE), scores for men and women were roughly similar on the verbal and analytical portions of the test, but men scored higher than women on the quantitative component.

Women earned about 37 percent of the S/E bachelor's degrees awarded in 1981, up from 26 percent in 1970, but earned one-half of all undergraduate degrees in 1981. By S/E field, the share of degrees awarded to women in 1981 ranged from 52 percent in the social sciences to 11 percent in engineering.

At the doctorate level, women earned 23 percent of the S/E degrees granted in 1982, up from 11 percent a decade earlier. The proportion of new women doctorates in 1982 was greatest in psychology (45 percent) and least in engineering (5 percent).

RACIAL MINORITIES

Employment

In 1982, blacks accounted for 2.6 percent of all employed scientists and engineers, but over 9 percent of total U.S. employment and over 6 percent of all professional and related worker employment. Asians, on the other hand, represented 4.5 percent of the employed scientists and engineers but only about 1.6 percent of the overall U.S. labor force.

The representation of native Americans is about the same among scientists and engineers as in the overall U.S. work force. Data on native Americans, however, should be viewed with caution since they are based on an individual's perception of his or her native American heritage; such perceptions may change over time.

Racial minorities are concentrated in different fields of science and engineering than are their white colleagues. Asians (two-thirds) and whites (over one-half) are more likely than blacks (almost one-half) to be engineers rather than scientists. Among those who are scientists, blacks are more likely than whites to be social scientists, while whites and Asians are more likely than blacks to be computer specialists.

The unemployment rate for black S/E's in 1982 (4.6 percent) was more than twice that for whites (2.1 percent). Unemployment among Asians averaged 3.3 percent; among native Americans, it averaged about 1 percent.

Racial minorities are younger than whites and have fewer years of professional experience. Almost two-fifths of the white scientists and engineers in 1982 reported fewer than ten years of professional experience, compared with almost one-half of the blacks and over two-fifths of the Asians. Partially reflecting their fewer years of professional experience, minorities are somewhat less likely than whites to be primarily engaged in management. In 1982, 25 percent of the whites

cited management as their primary activity. Blacks (23 percent) were almost as likely as whites and more likely than Asians (18 percent) to be in management or administration.

Underutilization for scientists and engineers varies by race. Almost 8 percent of the black S/E's were either unemployed, working involuntarily in part-time jobs, or working in non-S/E jobs, as compared with 4 percent of white and 5 percent of Asian S/E's.

On average, black scientists and engineers earn lower salaries than whites, Asians, or native Americans. In 1982, average annual salaries were about \$30,000 for blacks but about \$34,000 for other races. The gap between black and white salaries remains after controlling for the differences in S/E fields between whites and blacks.

Education and Training

Whites and Asians scored consistently higher than blacks and native Americans on the SAT over the 1976-1982 period. The largest differentials were on the mathematics component of this test. In 1982, blacks scored 117 points lower than whites (366 vs. 483), while scores for native Americans were 59 points lower (424). Asians scored consistently higher than whites on the mathematics component; in 1982, their average score was 513, 30 points higher than for whites.

Blacks earned 6 percent of the S/E bachelor's degrees and about 2 percent of the S/E doctorates. By S/E field at the bachelor's level, the share of degrees awarded to blacks ranged from less than 4 percent in engineering to more than 8 percent in the social sciences. However, blacks accounted for 10 percent of overall undergraduate enrollments and 5 percent of graduate enrollments. Native Americans earned about 0.4 percent of the S/E bachelor's degrees and accounted for 0.7 percent of the total undergraduate enrollment.

HISPANICS

Employment

Hispanics in 1982 represented almost 5 percent of all employed persons, almost 3 percent of all professional and related workers, and slightly over 2 percent of all scientists and engineers.

Among Hispanic S/E's, almost three-fifths were engineers rather than scientists, roughly similar to the overall engineer-scientist split. Among scientists, Hispanics were somewhat more likely than all scientists to be social scientists and less likely to be computer specialists or physical scientists.

In 1982, almost half of the Hispanic S/E's had fewer than ten years of professional experience; among all S/E's the comparable figure was two-fifths.

Annual salaries for Hispanic scientists and engineers averaged about 90 percent of those for all S/E's (\$31,500 vs. \$34,100) in 1982.

Hispanic scientists and engineers were more likely than non-Hispanics to be underemployed; that is, working involuntarily in a part-time job or working in a non-S/E job.

Education and Training

A much smaller proportion of Hispanics than all high school seniors are in academic curriculums, and those who are take fewer mathematics and science courses. This difference is reflected in the fact that Hispanic "college-bound" seniors scored below all college-bound seniors on the mathematics component of the SAT.

Hispanics earned about 2.5 percent of the S/E bachelor's degrees awarded in 1981, up slightly since 1976. At the doctorate level, they earned 1.6 percent of the S/E degrees granted in 1981.

PHYSICALLY HANDICAPPED

Almost 2.5 percent, or about 85,000, of all scientists and engineers reported a physical handicap in 1982. Of these, 28 percent reported an ambulatory handicap,

23 percent had a visual handicap, and about 18 percent reported an auditory handicap; the remaining 30 percent did not specify the nature of their handicap. Given the high rates of non-response to questions relating to handicap status in the surveys underlying this report, the data should be used with caution.

Those S/E's reporting handicaps are much more likely than all scientists and engineers to be out of the labor force. In 1982, almost 20 percent of those reporting a physical handicap compared with only 5 percent of all scientists and engineers were neither working nor seeking employment.

THE KOVALEVSKAIA FUND

Dr. Ann Hibner Koblitz, Director, Kovalevskaia Memorial Fund,
6547 17th Ave. N.E., Seattle, WA 98115

...is it really possible not to stretch out one's hand, is it possible to refuse to help someone who is seeking knowledge and cannot help herself reach its source? After all, on woman's road, when a woman wants to take a path other than the well-trodden one leading to matrimony, so many difficulties pile up. I myself encountered many of these. Therefore I consider it my duty to destroy whatever obstacles I can in the paths of others.

--Sofia Kovalevskaia, 1882

Purposes

The Kovalevskaia Fund aims to:

- (1) strengthen the role of women in science in Vietnam through appropriate forms of encouragement and support;
- (2) more generally, increase the contact and cooperation between women in science in developing countries, encourage scholarly investigations of connections between the status of women and scientific-technological development, and develop methods for the effective support of women in science in developing countries.

Current Projects

(1) A delegation of two women scientists from Vietnam attended the XVIIth International Congress of History of Science in Berkeley from July 31 - August 8, 1985, and also visited several universities in the U.S. Their visit was organized jointly by the Kovalevskaia Fund and the U.S. Committee for Scientific Cooperation with Vietnam.

(2) A small international conference in Hanoi, to be called "The Southeast Asian Seminar on Women and Science in Developing Countries," is being planned for the first week of January 1987. The Kovalevskaia Fund will provide travel grants for ten participants from South and Southeast Asia. The aims of the conference include the establishment of channels for regular communication and cooperation between different countries and the discussion of plans for a larger international meeting in 1991 on the occasion of the 100th memorial of Kovalevskaia's death. The Seminar is being co-sponsored by the Women's Commission of the International Union for the History and Philosophy of Science.

(3) The Vietnamese will establish a Kovalevskaia Prize to be awarded each year to one or two women students or researchers in some area of natural science. The Kovalevskaia Fund will supply each woman a prize in two parts: (i) Western scientific books of her choice costing approximately 1000 dollars, and (ii) as soon as she is able to travel in North America, Europe, or Japan, a grant of 1000 dollars for the purchase of scientific materials (more books, photocopying, etc.) or travel to scientific meetings while abroad. The Vietnam Women's Union has agreed to publicize the prize widely in Vietnam.

(4) The Fund will offer a grant for a one-month visit to Vietnam (January, 1987) to an American woman researcher in applied mathematics. If this is successful, the Fund will make a similar grant the following year (1988) in applied biology.

The first three of these projects were arranged with the Vietnam Women's Union and the State Commission for Science and Technology. The fourth is the result of discussions with the directors of the Mathematical Institute and the Biological Institute of the National Center for Scientific Research in Hanoi.

The Kovalevskaja Fund is interested in exploring other practical ideas. For example, the Fund arranged for transportation to Vietnam of several boxes of journals and books donated to the Hanoi Pedagogical Institute by a member of AWM. (The Pedagogical Institute seems to have the highest proportion of women students, as well as the largest number of faculty members, both male and female, who are actively interested in encouraging women in scholarly careers.)

Many projects of a more ambitious nature are possible, involving several different developing countries, but only after assessing the progress of these first four and after enlarging the financial resources of the Kovalevskaja Fund.

How You Can Help

(1) Publicity and contacts. Please let us know of any organizations or newsletters which would be interested in carrying information on these activities. We would be very interested in co-sponsorship of our programs (for example, the Seminar on Women and Science in Developing Countries) with other organizations.

(2) We would like to develop a mailing list of women in science in Africa, Asia and Latin American and of all people in all countries who are interested in issues related to our concerns.

(3) If you or your library has scientific journals or books which can be donated to the Hanoi Pedagogical Institute, please contact us at the address above.

(4) Tax-deductible contributions, made out to "Kovalevskaja Fund," are very welcome. Send to address above.

ANNOTATED GUIDE TO WOMEN'S PERIODICALS

The *Annotated Guide to Women's Periodicals* lists over 250 publications in the U.S., Canada, Mexico, Central and South America. Each publication is briefly reviewed by category and indexed by title and geographically. The *Annotated Guide* is a 150 page, perfect bound booklet. Subscriptions are \$12/ind. (2 issues), \$20/inst. & libr., \$6.50/ind. (single copy), \$10/inst. Please make checks payable to the *Annotated Guide*. U.S. funds preferred. Order from: *Annotated Guide*, Box E-94, Earlham College, Richmond, IN 47374.

NAS EXCHANGES WITH USSR AND EAST EUROPEAN ACADEMIES OF SCIENCES

The National Academy of Sciences (NAS) invites applications from American scientists who wish to make visits beginning during the period January 1, 1987, through December 31, 1987, in the USSR, Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania, and Yugoslavia. Long-term research visits of five to twelve months' duration are encouraged, particularly those where contact with colleagues in the other country has already been established. The minimum length of visits is one month.

Applicants must be US citizens and have a doctoral degree or its equivalent by the time of the intended visit in mathematics; the physical, biological, or engineering sciences; social or behavioral sciences; or biomedical sciences. With

regard to the social and behavioral sciences emphasis is on empirical and quantitative analysis and on the analysis of individual and group behavior. Necessary expenses will be met by the NAS and the foreign academy, including reimbursement for long-term visitors for salary lost up to a predetermined maximum and expenses for accompanying family members for long-term visits.

Requests for applications should reach the National Academy of Sciences not later than February 14, 1986. Deadline for receiving completed applications is March 3, 1986; applications must be postmarked by February 28, 1986. Address application requests to: National Academy of Sciences, Office of International Affairs, Soviet and East European Affairs, 2101 Constitution Avenue, N.W., Wash., DC 20418. 202/334-2644.

ON CAMPUS WITH WOMEN

reprinted from the summer, 1985, issue of the publication of the same name published by the Project on the Status and Education of Women, Association of American Colleges, 1818 R St., N.W., Washington, DC 20009

Is College Bad for Women's Self-Esteem?

Women who were top high school students feel significantly worse about themselves after two years in college. According to a University of Illinois study of 36 men and 45 women, while in high school 23 percent of the men and 21 percent of the women ranked themselves as "far above average" in intelligence. By the time they were college sophomores, an almost identical percentage of the men--22 percent--graded themselves as highly, while only four percent of the woman felt they compared that favorably. Co-researcher Karen Arnold says women's self-image worsens in college because "they're not getting the same recognition, the chance to use their skills, the [potential employers] seeking after them, the chance to try things."

Keeping Staff Aware of Stereotyped Writing

"Stereotyping in the Media: Cases and Columns" arrives on the desk of staff members in the university relations division at Michigan State University six times a year. It is a packet of news items culled from national and local publications that contain sexist, racist or biased language. Accompanying each item is an explanation of the bias. Maril R. Stratton, assistant director of public relations, assembles and distributes the 20-25 page packet, "to keep the university communicators on their toes." "We are trying to make the communicators in our division and in the university proper more aware of language and images that may be offensive to some people." On occasion she has had to include her own writing in the packet. For example, she says, "I wrote a headline for an article that said, 'Six Women Artists Featured at Gallery,' as though the word 'artist' were generically male." Oops!

Penalty for Sexist Terminology

The "Guidelines for Authors" of the *Psychological Rehabilitation Journal* includes the following under the heading "Manuscripts not conforming to the following guidelines will be returned to the author without review": "Avoid the use of the generic masculine pronoun and other sexist terminology."

Teaching Teachers How to Teach Math

Teacher Education and Mathematics (TEAM) offers a comprehensive approach to teacher education. It is designed to reduce math anxiety and sex-role stereotyping in elementary education. The series helps education students to increase their skill and knowledge of mathematics, and to develop positive attitudes toward the subject.

• Since the majority of undergraduate elementary teacher education students continue to be women, most of whom have not studied math, they are often anxious about teaching math. The program enables them to reduce their own anxiety level, to develop solid skills to teach math, and to create a positive classroom environment.

The program, directed by Elaine B. Chapline and Claire M. Newman of Queens College of the City University of New York, is divided into two components. The first consists of four instructional modules to increase teachers' math skills and knowledge. The second has four attitudinal modules designed to develop positive math attitudes. A separate instructor's manual describes the different components of the TEAM project, with suggestions on how to use the materials most effectively. The entire TEAM set (9 books, 2 tapes) is available for \$54.25 and each book and tape is available separately. For ordering information, contact EDC/Women's Educational Equity Act Publishing Center, 55 Chapel St., Newton MA 02160. Toll free: (800)225-3088. In Massachusetts: (617)969-7100.

Want Your Daughter To Succeed? Send Her to a Woman's College

A new study by the Women's College Coalition tracks the undergraduate and subsequent life experiences of two fairly recent graduating classes--1967, whose members are now in their late 30's, and 1977, whose members are in their late 20's. The study looks at undergraduate fields of concentration, undergraduate extra-curricular activity, graduate study, work status, family status, and current involvement in the community. It also explores the attitudes of these women toward their college experience, and toward a number of issues related to the position of women in society. Some major highlights of the survey include:

*Nearly three-quarters of the women's college graduates are in the work force.

*Roughly half of the alumnae who work full-time earn a salary of more than \$25,000 and one-fifth earn more than \$35,000.

*Almost half of the graduates who work hold traditionally male-dominated jobs, such as lawyer, physician or manager.

*Almost half of the graduates have earned advanced degrees, and 81 percent have continued their education beyond college.

*More than three-quarters of the graduates have in some way continued their involvement with their colleges.

*Seventy-one percent of the alumnae would be inclined to attend the same college if they were to go to college all over again, and more than two-thirds would be inclined to go to a women's college again.

*Ninety percent of the respondents stated that their colleges were successful in fostering and developing self-confidence in women students.

The 24-page study, '67/'77: *A Profile of Recent Women's College Graduates*, is available for \$5 (members) and \$6 (nonmembers) from Woman's College Coalition, 1725 K St., NW, Washington, DC 20006.

Economics Profession Inhospitable to Women?

The economics profession seems to be lagging behind other fields in terms of percentage of doctorates granted to women. In 1983-84, those economics departments that grant most of the Ph.D.'s reported that only 16 percent of their doctorates went to women. Many academic departments continue to be 100 percent male in their senior ranks and some are 100 percent male in their entirety. The 1983-84 American Economic Association survey showed that in 41 top doctorate-granting institutions there were only 22 women faculty above the rank of assistant professor. This means there were at least 19 departments which had not a single woman above the rank of assistant professor. Of the 189 departments granting a bachelor's degree only, there were only 49 women at the rank of full or associate professor leaving at least 140 institutions with no woman above the assistant professor level. These data appeared in the Annual Report 1984 of the Committee on the Status of Women in the Economics Profession (CSWEP) contained in the Winter 1985 issue of the Newsletter of the American Economic Association. To help promote the visibility of women economists already in academic positions and to aid institutions seeking to

recruit senior women, CSWEP compiles and publishes a list of women faculty members at institutions which grant graduate degrees in economics. For more information on CSWEP, contact the Chair of the Committee, Barbara Bergmann, Department of Economics, University of Maryland, College Park, MD 20742.

Highlighting Concerns of Women Engineers

A special women's issue of *Graduating Engineer*, published in February 1985, includes articles on getting good first jobs and career advancement, combining marriage and careers and on developing executive skills. The issue also features a new Society of Women Engineers (SWE) survey of members. Some 29 percent of SWE respondents have at least a master's degree and 6 percent have a Ph.D. These percentages are somewhat higher than for male engineers overall. Copies of the issue are \$5.00 from Violet Frey, Magraw-Hill Publishing Co., 1221 Avenue of the Americas, 33rd Floor, New York, NY 10020.

DEADLINES: Jan. 24 for Mar.-Apr., Mar. 24 for May-June, May 24 for July-Aug.
AD DEADLINES: Feb. 5 for Mar.-Apr., Apr. 5 for May-June, June 5 for July-Aug.
ADDRESSES: Send all Newsletter material except ads to Anne Leggett, Dept. of Math. Sci., Loyola University, 6525 N. Sheridan Rd., Chicago, IL 60626.
Send everything else, including ads, to AWM, Box 178, Wellesley College, Wellesley, MA 02181.

JOB ADS

Institutional members of AWM receive two free ads per year. All other ads are \$10.00 apiece and must be prepaid. The vacancies listed below appear in alphabetical order by state. All institutions advertising below are Affirmative Action/Equal Opportunity employers.

University of Alabama, Birmingham. Dept of Math, Birmingham, AL 35294. Prof. Louis Dale, Assoc. Chairman. Tenure track position. Rank & salary open. Prefer candidates in areas of nonlinear analysis, mathematical physics or dynamical systems. Applicants should be strong in research & teaching & able to interact with other researchers in Dept. Send CV & have 3 letters of reference sent to Assoc. Chmn by 2/15/86.

University of Alabama, University. Dept of Math, University, AL 35486. (1) Five vacancies 8/16/86. Rank & salary depend on qualifications. Required: PhD & promise of excellence in teaching & research. Would like people who complement research interests of current faculty. At present we have active groups in algebra, analysis, applied math, differential equations & topology. Will consider applications for tenure as well as visiting positions. At least 3 letters of recommendation addressing teaching & research should be sent to Dept. Send curriculum vitae & reprints/ preprints to James Wang, Chmn., Math Search Committee, Box 1416, University, AL 35486. (2) New position in applied math. Salary up to \$35,000 & rank dependent on qualifications. Prefer applicants in applied math with excellent records in teaching & research. Contact Alan Hopenwasser, Chmn, Dept of Math, P O Box 1416, University, AL 35486.

University of Arizona. Dept of Math, Tucson, AZ 8572]. Tenure track positions at all levels. Required: PhD, excellent research record or potential, strong commitment to teaching. Field is less important than ability, but should complement existing strengths in algebra, computational science, differential equations, dynamical systems, geometry, mathematical physics, nonlinear analysis, number theory, probability & statistics. Send application to Dept Head by 2/1/86.

University of Arizona. Dept of Math, Tucson, AZ 85721. Two postdoctoral fellowships (Research Associate) 8/1986. Candidates should have outstanding research records or potential. By 2/1/86 send applications to Dept Head. Later applications will be considered if position remains open. Several visiting positions next year. By 2/1/86 send applications to Dept Head. Later applications considered if positions remain open.

California State Polytechnic University. Math Dept., Pomona, CA 91768-4033. Tenure track Asst/Assoc Prof. Salary dependent on qualifications. Required: PhD in math; math educ; stat; Teaching experience. Research - industry experience desired. Send resume, 3 references, application, official transcript to Search Committee, Math Dept. by 2/15/86.

California State College, Bakersfield. Dept of Math & Comp Sci, 9001 Stockdale Hwy, Bakersfield, CA 93311. Laird E Taylor, Chair. Two positions in comp sci. Depending on qualifications these may be tenure track, at any rank or fixed term lecturer. Salary range: \$28,200 - \$47,904 plus cost of living raise. Prefer candidates who hold or are near completion of PhD in comp sci. Must have at least a masters degree & experience in comp sci. By 1/16/86 send application, resume & 3 letters of reference to Chair.

California State University, Fullerton. Dept of Math, Fullerton, CA 92634. (1) Tenure track position(s) at Asst/Assoc Prof level Fall, 1986. Required: PhD in math, outstanding teaching qualifications & interest in continued research. Rank & salary dependent on experience & qualifications. Send vita & 3 references by 2/14/86 to Chair of Selection Committee. (2) Lectureship positions for 86-87. Required: evidence of outstanding teaching & PhD in Math. Rank & salary dependent on experience & qualifications. Send vita, 3 letters of reference & list (or transcript) of coursework to Chair of Selection Committee by 3/3/86. (3) Tenure track position in applied math, fall, 1986. Applicant's background should be in applied area such as control theory, numerical analysis, optimization, modeling or applied probability theory. Major component of position is acquisition, development & supervision of projects from local industry in support of our applied master's degree program. Desire previous industrial experience. Required: PhD in math, outstanding teaching & interest in continued research. Rank & salary dependent on experience & qualifications. By 2/14/86 send vita & 3 letters of reference to Chair of Selection Committee.

California State University, Sacramento. Math & Stat Dept, Sacramento, CA 95819-2694. 3 tenure track positions Fall, 1986. Rank dependent on experience. PhD in math or stat (by Sept, 1986) required. Salary range begins at \$26,496. Applicants should be committed to excellent teaching. Teach 12 units per semester. Send vita, transcripts & 3 letters of recommendation (at least one commenting on teaching ability) to Math & Stat Hiring Committee by 2/1/86.

Loyola Marymount University. Dept of Math, Los Angeles, CA 90045. Tenure track asst professorship Fall, 1986. Must teach wide variety of undergraduate courses. Teaching load 9-12 hours. Dept has master's degree program in applied math. PhD required. Send resume & 3 letters of recommendation to Prof. Dennis G Zill at above address.

Pomona College. Math Dept, Claremont, CA 91711. Paul B Yale, Chmn. Tenure track position 9/1986. Required: PhD & excellence in teaching & research. Candidates must be able to teach variety of undergraduate courses. Applications accepted until position is filled.

San Francisco State Univ. Dept of Math, San Francisco, CA 94132. Frank Sheehan, Acting Chair. Two tenure track asst/assoc professorships Fall, 1986. (\$25,000-\$36,000) PhD (or equivalent) in stat or operations research with emphasis in stochastic modeling. Required: demonstrated competence in teaching & res. Teaching & res activity in stat & operations res. Work with undergraduate & graduate students on applied projects. Teaching load 12 hrs per week. Send vita, grad. transcripts & 3 letters of recommendation by 2/1/86.

San Jose State University. Dept of Math & Comp Science, San Jose, CA 95192-0103. Veril L Phillips, Chmn. Five tenure track asst/assoc professorships (professorship in exceptional cases) in any math science; prefer comp sci, applied math, math educ or numerical analysis. Two tenure track assoc or full professorships. Prefer PhD in comp sci but will consider PhD in any math science together with substantial teaching/research experience in comp sci. Approx. salary \$24,000-\$50,000 per academic year. Apply by 2/3/86.

University of California, Berkeley. Dept of Stat, Berkeley, CA 94720. D.R.Brillinger, Chair, Personnel Committee. Tenure track Asst Professorship Fall, 1986. Must have strong research potential. Send resume & names of references to D. R. Brillinger by 1/15/86.

University of California, Los Angeles. Dept of Mathematics, Los Angeles, CA 90024. Yiannis N. Moschovakis, Chair. (1) Three or four regular positions in pure mathematics. Preference will be given to candidates in number theory (including modular forms) and probability (including statistical mechanics). Other fields of particular interest include analysis, geometry/topology, differential equations, and algebra (especially representation theory). Very strong research & teaching background required. Positions initially budgeted at the Asst. Prof. level. Will consider sufficiently outstanding candidates at higher levels in other fields. Teaching load: Five quarter courses per year. (2) Three or four regular positions in applied and computational mathematics. Prefer candidates in numerical analysis, mathematical modeling, and scientific/engineering computing. Very strong research & teaching background required. Positions initially budgeted at Asst. prof. level. Sufficiently outstanding candidates at higher levels and/or in other fields will also be considered. Teaching load: Five quarter courses per year. (3) One or two positions in mathematical computer science. Preference will be given to candidates in analysis of algorithms, coding theory, computational complexity, and the theory of programming languages. Very strong research & teaching background required. Positions initially budgeted at the asst. prof. level. Sufficiently outstanding candidates at higher levels and/or in other fields will also be considered. Teaching load: Five quarter courses per year. (4) Temporary Positions. One or two E. R. Hedrick Asst. Professors. Applicants must show strong promise in research & must have received the Ph.D. during the past 3 or 4 years (but may be of any age): no restrictions as to field; anticipated salary \$34,000. Three year appt; research supplement of \$3,778 first summer. Teaching load: four quarter courses per year, which may include one advanced course in candidates' field. Deadline for applications is 1/1/86. Also a few adjunct asst professorships; two year appt; strong research & teaching background; no restriction as to field. Anticipated salary \$29,400 for academic year. Teaching load: five quarter courses per year. Also several positions for visitors & lecturers. For all positions apply to Chair, Attention: Faculty Search Committee.

University of New Haven. Dept of Math, West Haven, CT 06516. B. K. Sachdeva, Chairperson. Full time tenure track asst/assoc professorship 9/1/86. Qualifications: PhD in math with specialization in applied math; demonstrated excellence in teaching & potential for research. Teaching load 24 credit hours per academic year. Salary & rank commensurate with qualifications. Send resume, transcripts & 3 letters of reference to Chairperson by 2/1/86. Later applications will be considered until position is filled.

Yale University. Dept of Math, Box 2155 Yale Station, New Haven, CT 06520. Gibbs Instructorships for PhDs with outstanding promise in research. Two year appt starting 7/1/86. Light teaching load. Salary at least \$27,000. Submit vita, list of publications, thesis abstract & 2 letters of reference to Gibbs Committee at above address.

Florida International University. Dept of Math Sciences, Miami, FL 33199. Several tenure track asst professorships & one assoc or full professorship 8/1986. Required: PhD in math, research potential, demonstrated teaching ability. Senior position requires demonstrated research record. Duties: 15 semester hours per academic year. Preferred specialties: harmonic analysis, several complex variables, mathematical logic, algebra, combinatorics. Send resume to Recruitment Committee at above address.

University of Florida, Dept of Statistics, 530 Nuclear Sciences Center, Gainesville, FL 32611. Tenure track asst or assoc professorship Fall, 1986. Required: demonstrated excellence in teaching & strong potential in area of biostatistics. Send CV and 3 letters of reference to P. V. Rao by 1/20/86.

Emory University. Dept of Math & Comp Sci, Atlanta, GA 30322. Paul Waltman, Chmn. Three positions. (1) ordinary differential equations, preferably with interest in population biology or mathematical physics (2) nonlinear partial differential equations or differential geometry (3) computer science. Last position can also be filled by mathematician able to teach computer science but with research program in a different area. Rank for all positions open. Required: strong research record (or promise of such in case of new PhD) commitment to excellence in teaching, desire to help build strong graduate program. Send vita & names of 3 references by 2/1/86 to Chmn. Junior applicants should have their reference letters sent directly.

Georgia State University. Dept of Math & Comp Sci, Univ Plaza, Atlanta, GA 30303-3083. (1) Tenure track position 9/1986. Rank & salary commensurate with qualifications & experience. Qualifications: PhD in math with strong res. potential & commitment to teaching. Preference is for discrete math, esp. graph theory. Duties: teaching, research, & service to support B.S. & M.S. degrees in math & comp sci. Send application, vita without date of birth but with citizenship status, 3 letters of reference and transcripts of all undergraduate work to Chairman by 1/31/86 at above address. (2) Tenure track position 9/1986. Rank & salary commensurate with qualifications & experience. Qualifications: PhD with strong res. potential & commitment to teaching. Prefer applicants in all areas of comp sci but especially in artificial intelligence, operating systems, software engineering, data communications, networking & analysis of algorithms. Duties: teaching, res & service to support BS & MS in comp sci. Send application, vita without birthdate but with citizenship status, 3 letters of reference & transcripts of all undergraduate work to Chmn by 1/31/86 at above address.

University of Hawaii. Dept of Math, Honolulu, HI 96822. Prof William A Lampe, Chmn. One tenure track & possibly one temporary asst or assoc prof 8/15/86. Salary range \$18,940-\$28,040 for asst prof; \$23,960-\$35,840 for assoc prof per year. Duties: teach 2 courses per semester & do research. Required: PhD in math or equivalent; commitment to good teaching; res promise. (For assoc Prof demonstrated excellence in res with record of substantial publication.) Desirable: res interest matching or complementing UH's. Apply by 1/15/86 to Chmn. Have 3 letters of reference sent directly to Chmn.

Northwestern University. Dept of Math, Evanston, IL 60201. Stewart Priddy, Chair. Tenure track assoc or full professorship 9/1986. Applicants should have outstanding records in research & teaching. Prefer those in fields which complement the Dept. Send applications, CV & names of 3 references to Chair.

University of Illinois, Chicago. Dept of Math, Stat & Comp Sci, Box 4348, Chicago, IL 60680. Tenure track or tenured positions in pure math, applied math & numerical analysis, prob & stat, theoretical comp sci, & math educ. Outstanding research record required; junior candidates with postdoctoral experience preferred. Visiting positions of 1 or more quarters in connection with a planned 1986-87 emphasis year in combinatorics & complexity. Direct vita & 3 letters of reference to John Wood, Chmn, Search Committee (address above)

Western Illinois University. Dept of Math, Macomb, IL 61455. Larry Morley, Chmn. One or more tenure track asst/assoc professorships Fall, 1986. Required: PhD in a mathematical science. Desirable: strong commitment to excellent teaching & established record or high potential in res. Teach 3 classes per semester. Competitive salary & fringe benefits. By 2/15/86 send C.V., photo copies of graduate transcripts & at least 3 letters of recommendation to Chmn.

Indiana University of PA. Math Dept, Indiana, PA 15705. Two or more tenure track asst/assoc professorships 9/1986. Duties: teach 12 semester hours of undergraduate & graduate courses per semester, assist in course & curriculum revision, advise students, serve on faculty committees & help with other academic & professional activities of Dept. PhD (or degree near completion) required. Some background in applied math & some teaching experience desirable. By 1/15/86 send application, transcripts & 3 letters of reference to Search Committee A at above address.

University of Notre Dame. Dept of Math, Notre Dame, IN 46556. William G. Dwyer, Chmn. Two tenure track positions; will consider all fields but prefer backgrounds in algebra or algebraic geometry. Also several visiting positions: rank & salary depend on qualifications. Applications should demonstrate accomplishment in teaching & res & should include vitae, summary of res with reprints or preprints & 3 or 4 letters of reference.

Purdue University. Dept of Math, West Lafayette, IN 47907. M. S. Baouendi, Head. (1) Several tenure track or research asst professorships 8/1986. Required: exceptional research promise & excellence in teaching. (2) Possibly one position at assoc prof/prof level 8/1986. Required: excellent research credentials. For all positions send resume & 3 letters of recommendation to Head.

University of Iowa. Dept of Math, Iowa City, IA 52242. William A Kirk, Chair. Tenure track, tenured positions & visiting positions at all levels 1986-87 & 1987-88. Selections based on evidence of teaching ability & research achievements & potential; instructional needs of dept & potential for interaction with faculty at research level. Prefer candidates in partial differential equations, differential geometry & numerical analysis. Contact Chair.

University of Northern Iowa. Dept of Math & Comp Sci, Cedar Falls, IA 50614. Tenure track asst professorship. Salary & benefits competitive. Prefer specialty of algebra. Required: PhD, demonstrated teaching ability & research productivity/promise. By 2/20/86 contact Dr. Dvaid Duncan, Head, at address above.

Kansas State University. Dept of Math, Cardwell Hall, Manhattan, KS 66506. (9)3) 532-6750. Louis Pigno, Head. Tenure track asst professorship 1986-87. Salary commensurate with qualifications. Prefer applicants in algebraic topology, differential equations & probability theory but will consider other fields. Required: strong research credentials & commitment to excellence in teaching. Starting date: 8/18/86. PhD or equivalent required. By 2/15/86 send vita & at least 3 letters of reference to Head.

University of Maine, Farmington. Dept of Sciences & Math, 86 Main St, Farmington, ME 04938. Prof Ted Emery, Chairperson of Search Committee. Tenure track asst prof of mathematics. Salary competitive. Education: Prefer PhD in math or math education (completed by 9/1986) but will accept EdD in math education. Strong math background required. Duties: Teach undergraduate courses in math for elementary & secondary education majors and for liberal arts majors. Teaching most important but research desirable. Teach 12 hours per semester. By 2/1/86 send application & vitae to Prof Emery at above address.

University of New Orleans. Dept of Math, New Orleans, LA 70148. Two tenure track asst professorships. One is in stat and the other is open. Also several instructorships. Send C.V. & have 3 letters of reference sent to Hiring Committee by 2/1/86.

U. S. Naval Academy. Math Dept, Annapolis, MD 21402-5002. Prof F I Davis, Chmn. Three year tenure track asst professorship 8/1986. Ten month salary commensurate with experience & qualifications. Research opportunities exist for augmenting salary in summer. Required: PhD, commitment to excellent teaching & ability to pursue independent research. Send resume, transcripts & 3 letters of recommendation discussing applicant's teaching and research to Chmn.

Boston University. Dept of Math, 111 Cummington St, Boston, MA 02215. (1) Several asst professorships or visiting faculty members 9/1986. Teaching load 6 hr/wk. Prefer applicants whose res interests concur with those of present faculty members in algebraic geometry, number theory, probability, stat, dynamical systems, applied math & related areas. Encourage women & minorities to apply. Send vita & 3 letters of reference by 1/1/86 to Search Committee. (2) Several assoc/full professorships 9/1986. Fields of interest include stat, dynamical systems & applied math. Required: demonstrated excellence in res & strong commitment to teaching. Apply by 1/1/86 to Search Committee.

Clark University. Math/C.S. Dept, Worcester, MA 01610. John Kennison, Chair. Tenure track & possibly other positions. Rank & salary dependent on qualifications. All positions require evidence of good teaching particularly for low level courses. Credentials required for tenure track positions include willingness to teach comp sci & res promise in areas compatible with Dept interests, (theoretical comp sci, geometry, group theory, topos theory & related areas.) By 1/20/86 send resume & letters of recommendation to Chair.

Holy Cross College. Dept of Math, Worcester, MA 01610. Two tenure track positions. Area of specialization, rank & salary are open. Teach 3 courses per semester. Generous fringe benefits, sabbatical & fellowship programs. Send undergraduate & graduate transcripts, resume & 3 letters of recommendation to L. Sulski.

Massachusetts Inst. of Technology. Dept of Math, Cambridge, MA 02139. Several asst professorships for year 1986-87. Three year appt. Teaching load 6 hrs/week for one semester & 3 hrs/week for other semester. Open to mathematicians with doctorates who show definite promise in research. Send vita, description of research & your res plans for next year to Pure Math Committee, Room 2-263 or Applied Math Committee, Room 2-345 at above address.

Central Michigan University. Dept of Math, Mt Pleasant, MI 48859. R.J.Fleming, Chmn. (1) Two tenure track positions Fall, 1986. Required: demonstrated excellence in teaching & research; a doctorate with expertise in middle & junior high school math education. (2) Position of statistician with a PhD whose res interests complement existing areas in dept. Background in operations research would be helpful. Excellent fringe benefits. Send resume, transcripts & 3 letters of recommendation to Chmn by 2/15/86. Later applications will be considered until position is filled.

Eastern Michigan University. Dept of Math, Ypsilanti, MI 48197. 2 asst professorships in math and 2 asst professorships in stat Fall 1986. Send a curriculum vita and names of 3 references to Math Search Committee, Dept of Math, 601 Pray-Harrold, Ypsilanti, MI 48197 (313) 487-1444. Deadline is 2/28/86 or thereafter until filled.

Hope College. Math Dept, Holland, MI 49423. Prof John L Van Iwaarden, Chairperson. Tenure track position. Prefer PhD in math. Rank dependent on qualifications & experience. Salary & benefits competitive. Send vita, transcripts & have 3 letters of recommendation sent immediately to Chairperson. Dept representatives will attend Annual Winter AMS-MAA meetings in New Orleans.

Ferris State College. Dept of Math, Big Rapids, MI 49307. Dr. Robert O Kosanovich, Head. Teach math at most levels & advise students in science-oriented curricula. Special interests include applied math, comp sci or pre-college math. Prefer PhD. Require masters in math or computer science & experience in teaching upper level courses in math & computer sci at the college level. Must have demonstrated excellence in teaching, experience in use of computers, & ability to teach BASIC, PASCAL & FORTRAN. Rank & salary open. Send resume & other supportive information by 2/20/86 to Head.

Michigan State University. Dept of Math, E Lansing 48824-1027. Prof Kyung Whan Kwun, Chmn. (1) Several tenure track asst & assoc professorships in numerical analysis & other fields. Prefer candidates with ability to contribute to our new computational mathematics program (e.g., expertise in applied logic, graph theory, other discrete mathematics). (2) One or two postdoctoral fellowships in math (2 yr appt). Duties: teach one course each term & devote remaining time to research. These fellowships are normally offered to persons (regardless of age) who have had a doctorate less than 2 years. Some instructorships available also. For all positions have resume & 3 letters of recommendation sent to Chmn by 1/17/86.

Michigan State University. Dept of Stat & Probability, E Lansing, MI 48824-1027. New asst professorship 9/1/86. May be a second position of assoc/full professorship 9/1/86. Required: PhD in Stat or Probability with excellence in res & teaching. Send resume & have 3 letters of recommendation sent to Prof Dennis Gilliland, Chairperson.

Michigan Technological University. Math Sciences Dept, Houghton, MI 49931. Position of Dept Head. Required: established research record & special interest in applied math or stat, with commitment to active research & teaching. Send resume & have 3 letters of recommendation sent to Headship Search Committee.

Michigan Technical University. Mathematical & Computer Sciences, Houghton, MI 49931. Dr. Martyn R Smith, Head. Tenure track & visiting positions in math, applied math & statistics 9/1986. Required: Excellent teaching & commitment to res. May be some 3-year instructorships. Apply to Head.

University of Michigan. Dept of Math, Ann Arbor, MI 48109-1003. Prof D J Lewis, Chmn. (1) Six tenure track positions 9/1986. Areas of special interest: mathematics of computation, differential geometry, analysis combinatorics, number theory, partial differential equations & applied math. Exceptional res & teaching background required. Salary & rank negotiable. (2) T. H. Hildebrandt Research Asst Professorship 9/1986, 3 year appt, reduced teaching load. Prefer persons of any age with PhD of less than 2 years & those who complete application by 1/6/86.

Wayne State University. Dept of Math, Detroit, MI 48202. Clarence Wilkerson, Chmn. Number & type of positions available for Fall, 1986 still to be determined. PhD required. Excellence in teaching & research expected. Send application, detailed resume & names of 3 academic references.

Carleton College. Dept of Math, Northfield, MN 55057. Steve Galovich, Chmn. Two positions 9/1986; one is for one year only, the other for 2 years with possibility of renewal for 3rd year. Candidates should have strong interest in teaching & working with undergraduates. Send resume & 3 letters of reference to Chmn by 1/15/86.

Moorhead State University. Math Dept, Moorhead, MN 56560. Milton Legg, Chair. Tenure track asst professorship 9/1986. Required: PhD in math educ or an EdD and master's level preparation in math. Elementary and/or secondary teaching experience is desirable. Duties: teach undergraduate math & elementary & secondary methods courses. Screening of applications begins 2/15/86--applications accepted until filled. Apply to Chair.

St Olaf College. Dept of Math, Northfield, MN 55057. Paul D Humke, Chair. Two asst professorships (potentially tenure track). Required: commitment to excellence in teaching & appreciation for value of liberal arts. Send resume, 3 letters of recommendation & statement of professional goals & interests to Chair, by 1/15/86.

University of Minnesota, Duluth. Dept of Math Sciences, Duluth, MN 55812. Tenure track asst/assoc prof or tenured assoc prof 9/1/86. Conduct res & teach 2 courses/quarter including classical applied math, numerical analysis, math modeling & simulation, or applied differential equations at undergraduate or proposed graduate level. Required: PhD in math sciences. Inquire for further requirements for assoc level. Send resume, transcripts & 3 letters of recommendation by 1/17/86 to Dr. S Anderson-(218)726-8272.

Winona State University. Math/Stat, Winona, MN 55987. (1) Tenure track asst/assoc prof 9/1986. Salary dependent on qual. & exp. Primary duty: teach upper division applied stat, service stat & undergraduate math. Required: Master's in Stat. Prefer PhD in Stat. Industrial statisticians meeting degree requirements will be given full consideration. (2) Com. Sci. Full time, tenure track position 9/1986. Rank & salary dependent on qual. & expe. Primary duty to teach undergrad. comp and/or info science courses in ACM guidelines curriculum. PhD preferred. Will consider master's in comp or info science. Prefer applicants with teaching expe and/or bus-indus expe in comp sci. WSU is close to major high tech corporations which offer opportunities for res & continuing education. (3) Comp. Sci. Tenure track position 9/1986. Rank & salary dep. on qual. & expe. Primary duty to teach undergrad comp and/or inf science in ACM guidelines at our Rochester (MN) campus. Required: PhD in comp sci or master's in comp sci with add'l qual. WSU is close to major high tech corporations which offer opportunities for res & continuing educ. All positions open until filled. Send resumes & request for applications to AAO, Human Resources at above address.

Northeast Missouri State University. Div of Math & Comp Science, Kirksville, MO 63501. Larry Morley, Head. Several positions, tenure track & temporary 1986-87. Areas desired are algebra, statistics, applied math & computer science. PhD or near PhD required for tenure track positions. For all positions commitment to excellent teaching & potential for res must be evident. Send application, resume, 3 letters of reference & transcripts of all undergraduate & graduate study to Head.

Southwest Missouri State University. Dept of Math, Springfield, MO 65804-0094. Simon J. Bernau, Dept Head. Several positions open: One professorship, one assoc/prof & 2 asst/prof for Fall 1986. All positions are tenure track (or tenured). Will consider visiting positions. Required: PhD in Stat or Math & commitment to teaching. For senior positions an established res record & ability to work alone are essential. Prefer candidates in analysis, applied analysis or stat, but will consider others. Send C.V. & name of at least 3 referees to Dept Head.

University of Missouri, Columbia. Dept of Math, Columbia, MO 65211. Keith Schrader, Chair. One or more tenure track asst or assoc professorships 1986-87 academic year. Prefer PhD holders with strong interest in research & who can teach effectively at both graduate and undergraduate levels. Prefer candidates in harmonic & probabilistic analysis, algebraic geometry, differential equations, and computational mathematics. By 2/1/86 send application, vita, publication list & 3 letters of recommendation to Chair.

Dartmouth College. Dept of Math & Comp Sci, Hanover, NH 03755. Asst professorship 9/1/86. 3 year renewable tenure track position for recent or new PhDs with demonstrated ability in res & teaching. Prefer candidates in algebra, combinatorics & probability, but will consider others. Send application, statement of interests, graduate transcript, resume & at least 3 letters of recommendation to Recruiting Secretary at above address.

Dartmouth College. Dept of Math & Comp Sci, Bradley Hall, Hanover, NH 03755. John Wesley Young Instructorship in a 2 year postdoctoral appt for new or recent PhDs whose research area overlaps with that of some Dept member. Teach less than 6 hrs per week. Nine month salary of \$21,500 is supplemented by a \$3000 stipend for Instructors in residence 2 more months. Send application, resume, graduate transcript, thesis abstract & 3 letters of recommendation to Recruiting Secretary at above address.

New Mexico State Univ. Dept of Math Sciences, Las Cruces, NM 88003. Carol L Walker, Head. Visiting position(s) & possible tenure track position(s) in math, numerical analysis, stat, computer vision 8/25/86. Salary for 86-87 \$21,000 or higher dependent on rank, qualifications & experience. PhD (or equivalent) & strong commitment to teaching & research essential. Applications are kept on file through hiring period & positions filled as openings occur. Send vita & have 3 letters of reference sent to Head.

University at Buffalo (SUNY). Dept of Comp Sci, 226 Bell Hall, Buffalo, NY 14260. Stuart C Shapiro, Chmn. (1) Two lecturers Fall, 1986. Positions renewable but not tenure track. Primary duties are teaching & advising undergraduates. Required: Masters Degree in Comp Sci & excellent teaching ability. Salaries are extremely competitive. (2) Two asst professorships and one assoc or full professorship to begin with Spring or Fall, 1986 term. Required: PhD in Comp Sci or related field & superior res ability. Applicants for senior position must have demonstrated excellence in comp sci research, publication & funding. Salaries are competitive. For all jobs send resume & names of 4 references to Chmn.

Barnard College of Columbia Univ. Dept of Math, New York, NY 10027. Joan Birman, Chairperson. Senior level position for 86-87 academic year as part of program to build outstanding Math Dept for talented women undergraduates. Candidates should present a distinguished record in scholarly res & teaching. Salary & terms will be competitive. By 1/31/86 send C.V. & names of 3 references to Chairperson.

Hamilton College. Dept of Math & Comp Sci, Clinton, NY 13323. (1) Two year tenure track position. PhD required. 3 years teaching experience desirable. Six courses per year. Required: excellent teaching & continued res. (2) Half time visiting position for either Fall term 1986 or entire year 1986-87. Prefer those on leave from another institution. Teaching load 3 courses. Ability to offer upper level comp course desirable but not essential. For both positions send C.V. & 3 letters of recommendation to Larry E Knop at above address.

Rensselaer Polytechnic Inst. Dept of Math Sciences, Troy, NY 12180. J. G. Ecker, Chmn. Several tenure track openings at all levels in areas of applied math starting 9/1986, or earlier. Required: PhD & strong research potential for junior level appts & demonstrated outstanding record for senior level appts. Teach 6 to 7 hours/week per semester. Also anticipate 2 or 3 visiting & postdoctoral appts at all levels.

University of Rochester. Dept of Math, Rochester, NY 14627. Tenure track or visiting appts 9/1986. Teaching duties are 2 courses per semester. Initial tenure track appt will be for 3 or 4 years. Required: PhD, outstanding res promise & excellence in teaching. No restriction as to field, but we prefer candidates in algebraic geometry, algebraic number theory, algebraic topology, mathematical physics & probability. Send resume & names of 3 references to Chmn, Math Dept.

Russell Sage College. Dept of Math & Comp Sci, Troy, NY 12180. John Hammer, Chairperson. Tenure track asst professorship in comp sci 9/86. Qualifications: MS in comp sci by 9/1/86, U.S. Citizen or permanent resident, excellent oral communication skills. Duties: teach full undergraduate comp sci curriculum & make long-term commitment to

Russell Sage College (Contd)

Russell Sage. Teaching experience highly desirable. By 2/1/86 send resume, transcripts & 3 references to Chairperson. (2) Temporary instructorship in comp sci from 1/86 thru 5/86. Teach 5 undergraduate lower division comp sci courses, two of which run in evening. Candidates must be U.S. Citizens or permanent residents & have a Master's Degree in comp sci & some college level teaching experience. By 1/10/86 send resume, transcripts & references to Chairperson.

SUNY-Albany. Dept of Math & Stat, Albany, NY 12222. Prof J W Jenkins, Chmn. Tenured Full Professor Fall, 1986. Required: distinguished record of research in theoretical statistics with genuine interest in applications. Send C.V. & 3 letters of reference to Chmn.

SUNY College at Brockport. Math/Comp Sci Dept, Brockport, NY 14420. Dr K Nakano, Chairperson. Tenure track position in comp sci 9/1986. PhD in comp sci or related field required. Master's level expertise in comp sci necessary. Preferred areas: operating systems, microprocessors, or networking. By 2/7/86 send resume & have 3 letters of recommendation sent to Office of Faculty/Staff Relations at above address.

SUNY-Stony Brook. Dept of Applied Math & Stat, Stony Brook, NY 11794. Alan Tucker, Chmn. Openings for full, assoc & asst professors. Distinguished research record needed for senior positions; evidence of res potential for junior positions. Affiliation with new Inst for Decision Sciences possible. Send resume to Chmn.

Syracuse University. Dept of Math, Syracuse, NY 13244-1150. L. J. Lardy, Chmn. One or two tenure track appts with rank & salary dependent on qualifications. Prefer candidates in analysis, algebra or combinatorics, but will consider those in other areas. Required: excellence in teaching & research. Send vita & 3 reference letters (and transcript if recent PhD) to Chmn.

Union College. Dept of Math, Schenectady, NY 12308. A. D. Taylor, Chmn. One to three temporary asst professorships. Teaching load 5 courses per year; salary negotiable & dependent on qualifications. All usual benefits. Required: Excellence in teaching & strong interest in scholarship. Send vita & 3 letters of reference (one of which discusses teaching qualifications) to Chmn.

Elon College. Computer Science, Elon College, PA 27244. Dr. Richard C. Haworth, Campus Box 2155, Tenure track appt in Comp Information Science Fall, 1986. Applicants must have strong commitment to teaching at undergraduate level. Desire PhD in comp sci or a related field. Salary & rank are commensurate with credentials, expertise & experience. Submit letter of application & resume to Dr. Haworth.

North Carolina State University. Dept of Stat, Campus Box 8203, Raleigh, NC 27695. Tenure track asst professorship in Biomathematics Graduate Program. Research in applications of math & stat to the biological sciences. Expertise in stochastic modeling preferred. PhD in a math science or a biological science if sufficient mathematical ability. By 1/13/86 send resume, transcripts & 3 letters of reference to Biomathematics Search Committee at above address.

University of North Carolina, Chapel Hill, Dept of Math, Chapel Hill, NC 27514. Position of Univ Distinguished Professor of Math. Required: established record of excellence in research, demonstrated commitment to excellent teaching & ability to provide scientific leadership. Prefer those in areas of partial differential equations and computational & applied math. Send application, vitae & names of at least 4 references to Chmn, Dept of Math.

University of North Carolina, Greensboro. Math Dept, Greensboro, NC 274]2. Tenure track asst professorship in comp sci 8/1986. Visiting position possible. Salary dependent on qualifications and experience. Duties: undergraduate teaching & research in comp sci. Required: PhD in comp or PhD in math with equivalent of MS in comp sci. Will consider applicants with res interest in any area of comp sci or computer related math. Send resume, names, addresses & telephone numbers of at least 3 references to Comp Sci Search Committee at above address.

Bowling Green State University. Math & Stat Dept, Bowling Green, OH 43403. Tenure track asst prof in math or stat Fall 1986. All requirements for PhD must be completed by 8/1986. Will consider all areas complementing work being done in Dept. Duties: research, undergraduate & graduate teaching & active participation in our PhD program. Competitive salary & excellent fringe benefits. Send vita, official copy of graduate transcript(s) & 3 letters of reference to Arjun K Gupta, Chair, by 2/1/86.

University of Cincinnati. Dept of Math Sciences, MI #25, Cincinnati, OH 4522]. C. W. Groetsch, Head. Several asst professorships. Prefer candidates who can strengthen existing research areas in Dept. Required: outstanding potential for research, scholarship & teaching. Send vita & 3 letters of reference to Head.

Denison Univ. Dept of Math Sciences, Granville, OH 43023. Zaven A Karian, Chair. Two asst professorships (tenurable); initial 2 or 3 year appt. Required: PhD in math, comp sci or stat. Commitment to quality instruction of undergraduates essential. Teach 3 courses per semester, advise students & participate in dept activities. By 2/15/86 send resume, transcripts, & 3 letters of recommendation to Chair.

Kent State University. Dept of Math Sciences, Kent, OH 44242. Tenure track positions in comp sci & numerical analysis at all levels Fall 1986. Required for computer science position: PhD in comp sci or closely related field. Required for numerical analysis position: PhD in math or closely related field. All res interests in these areas will be considered. Send resume & have 3 letters of recommendation sent to Chair of Search Committee at above address.

Kenyon College. Math Dept, Gambier, OH 43022. Sabbatical replacement 1/86 thru 6/87. Rank: visiting instructor/visiting asst prof. Willing to appt for all 3 semesters or separately for spring, 1986 and academic year 1986-87. Possibility of renewal for 1987/88. For one semester appt candidate must have substantial graduate work in math, preferably master's degree or beyond. For one year or longer, math PhD preferred. Required: strong commitment to undergraduate teaching. Teaching load: 3 courses per semester in math or possibly math & computer science for candidate with math & comp sci qualifications. For more information call Robert M McLeod at (614)427-2244, X2268. Send vitae, transcripts & 3 letters of reference (at least one regarding teaching) to Chair, Math Dept.

Ohio Wesleyan University. Dept of Math Sciences, Delaware, OH 43015. Prof David L Hull, Chair. Tenure track position Fall, 1986. Teach mixture of math & comp sci to undergraduates. PhD in math with MS in comp sci desirable. Teach 3 courses per semester. Computing facilities include 2 VAX 11/730s & VAX 11/750 net-worked via Ethernet, one IBM 4341 & assorted micro-computers. By 3/1/86 send cover letter, resume, official graduate transcript & 3 letters of reference to Chair.

Oregon State University. Dept of Math, Corvallis, OR 97331. Dr. P. M. Anselone, Chmn. (1) Tenure track asst professorship in pure or applied math 9/1986. Prefer those in areas of geometry, probability & topology. Required: PhD or equivalent. Duties: res activity, teaching 6 to 8 class hrs per week. Salary negotiable. Contact Chmn, atten, Staff Selection Committee, by 1/15/86.

Oregon State University (Contd)

(2) One year visiting appts in math. Required: PhD or equivalent training & experience. All professional ranks will be considered. Visiting rank will be same as person's rank at home institution. Prefer those who augment areas of current research in Dept. & those with expertise in meeting specific instructional needs. Will arrange full or part-time appt. Duties include teaching 6 to 8 class hours per week. In particular cases, renewals may be possible. By 3/1/86 write to Chmn, Attn Staff Selection Committee.

Drexel University. Dept of Math & Comp Sci, Philadelphia, PA 19104. Dr. Loren Argabright, Head. Several tenure track openings 1986-87. Special interests: classical & modern analysis, differential equations, special functions, applied statistics & stochastic modeling, numerical analysis, combinatorics, operations research, scientific computing, computer graphics, operating systems, languages & compilers, computer architecture database systems, and artificial intelligence. Send resume & names of 3 references to Head.

Lehigh University. Dept of Math, Bldg #14, Bethlehem, PA 18015. Two positions (one tenure track) Fall, 1986. Prefer applicants in areas of geometry, algebra, analysis & numerical analysis & those whose research best complements activities of dept. Teach 6 hrs per week. Required: strong commitment to & demonstrated excellence in both teaching & research. Send C.V. & letters from 3 references to Prof. G. T. McAllister, Chmn, Search Committee, at above address.

PA State University. The Capitol Campus, Middletown, PA 17057. Tenure track position in comp sci 8/1986. Rank & salary dependent on qualifications. Prefer PhD in comp sci or in a related field. Required: Potential for growth as a computer scientist. Persons holding MS in comp sci with experience in industry and/or teaching are also encouraged to apply for position of instructor. Opportunities to work within the Ada Educ & Software Development Center are available. Send resume, transcripts & references to Dr. Ruth Leventhal, Provost/Dean, Box AWM, at above address.

Rhode Island College. Math & Comp Sci Dept, Providence, RI 02908. Helen E Salzberg, Chair. To teach comp sci & math, do scholarly work, take part in dept & college committees including curriculum development. Tenure line, Fall 1986. Required: PhD in comp sci or math sciences with ability to teach comp sci. Salary & rank commensurate with qualifications. Good fringe benefits. Send resume, transcripts & 3 current letters of reference to Chair.

College of Charleston. Dept of Math, Charleston, SC 29424. W. L. Golightly, Chmn. Tenure track junior & senior positions Fall, 1986 contingent on budget approval. Qualifications: PhD in one of mathematical sciences, commitment to undergraduate teaching & potential for continuing research. Teaching: 12 hrs/wk, course reductions for those engaged in research. Minimum salary \$26,500. Send resume & have 3 letters of recommendation sent to Chmn.

Vanderbilt University. Dept of Math, P O Box 1543, Station B, Nashville, TN 37235.
 (1) Asst professor. Specialization in an area of combinatorial optimization. Initial 3 yr appt Fall, 1986 (renewable, tenure track). Required: outstanding research potential & evidence of effective teaching. (2) Asst professor in area of classical or modern analysis, applied math or probability. Interested in someone who works in differential equations, numerical analysis, operator theory or mathematical physics. Initial 3 year appt. Fall, 1986 (renewable tenure track). Required: outstanding research potential & evidence of effective teaching. (3) Asst professor in area of topology. Initial 3 year appt Fall, 1986 (renewable, tenure track). Required: outstanding research potential & evidence of effective teaching. For above 3 positions have vita & 4 letters of recommendation sent to Prof. R. R. Goldberg, Chmn, Math Dept.

Vanderbilt University (Contd)

(4) Asst professor (PhD required) with 2 year appt Fall, 1986. Not a tenure track position, but intended for person with demonstrated research potential. Interested in candidates in areas of departmental strengths which include universal algebra, differential equations, graph theory & topology. Have vita & 4 letters of recommendation (including one about teaching) sent to Prof. R. R. Goldberg, Chmn, Math Dept.

Trinity College of Vermont. Natural Sciences & Mathematics, Burlington, VT 05401.

Dr. Joseph A Izzo, Chair. Asst professorship beginning either 1/1986 or 9/1986.

Duties: teaching general college math as well as upper level courses for math majors. Prefer candidates with PhD or DA. Send C.V. & 3 letters of recommendation to Chair.

VA Polytechnic Inst & State University. Dept of Stat, Blacksburg, VA 24061. Dr. Klaus Hinkelman, Head. Tenure track asst professorship, 12 mo. appt between 7/1/86 & 9/15/86.

Required: PhD in stat with strong interest in statistical computing, simulation & statistical graphics; outstanding potential for teaching, research and consulting. 50% teaching (2 courses per semester) 50% research & consulting. Send application, C.V. & 3 letters of recommendation to Head by 2/15/86.

College of William & Mary. Dept of Math, Williamsburg, VA 23185. John Drew, Chmn.

Two tenure track positions Fall, 1986: one at senior level & one at asst/assoc prof level. Prefer candidates in applied math but will consider those with strong research record or potential in any field. Send resume & 3 letters of reference to Chmn.

Washington State Univ. Pullman, WA 99164-6432. Director for new program in Stat providing research, teaching & consulting; assoc or full professor; PhD in Stat or equivalent; annual appt 7/1/86; salary negotiable; inquiries, vitae, names of 5 references addressed to E. P. Catts, Chair, Program in Stat Search Committee, before 3/1/86.

University of Washington. Dept of Math GN-50, Seattle, WA 98195. (1) Several tenure track appts Fall 1986. Seek candidates with strong res & teaching records. Appts will be generally at asst prof level, but in exceptional cases a more senior appt is possible. Prefer those in fields of numerical analysis & optimization. (2) Several 3 year appts Fall, 1986 for recent PhDs of any age with strong res & teaching potential. Competitive salaries & standard benefits. Send C.V., list of publications & 4 letters of recommendation to Chmn, Appts Committee.

University of Wisconsin, Milwaukee. Dept of Math Sciences, P O Box 413, Milwaukee, WI 53201. Robert H Moore, Chmn. Two tenured positions, one in applied analysis, the other in geometric topology, Fall 1986. Required: strong research record & ability to provide vigorous academic leadership. Area of applied analysis is broadly interpreted & includes (but is not restricted to) control theory, optimization & mathematical programming, & differential equations. Send credentials & have 3 letters of recommendation sent to Chmn by 2/10/86.

York University. Dept of Math, 4700 Keele St, North York, Ontario, M3J 1P3 Canada.

J Wick Pelletier, Chair. Tenure track position in Stat; rank open; one or more tenure track or limited-term positions, areas unspecified, to begin 7/1/86.

Desirable: proven ability or demonstrated potential for research & teaching. By 2/1/86 send resumes & 3 letters of recommendation to Chair. In accordance with Canadian Immigration requirements this advertisement is directed to Canadian citizens & permanent residents of Canada.

Queen's University. Dept of Math & Stat, Kinston, Ont, Canada K7L 3N6. Dr. R. D. Norman, Acting Head. One renewable (tenure track) and one non-renewable (one or two year) position 7/1/86. Applicants should have demonstrated potential in research & teaching. Prefer candidates in any field of pure or applied math or stat. Appts will be at asst prof level with salary commensurate with experience. By 2/28/86 send vita & have 3 letters of recommendation sent to Acting Head.

Late Arrivals

University of Idaho. Dept of Math & Applied Stat., Moscow, ID 84843. Assistant or associate professor Mathematics. Tenure track. PhD required. Teaching and research. To apply, send vita and three letters of reference to James Calvert, Dept of Mathematics and Applied Statistics, University of Idaho, Moscow, ID 83843.

University of Maine, Machias. Science/Mathematics Division. 9 O'Brien Ave, Machias, ME 04654. Dr. Charles D. Duncan, Chair. Tenure track position 9/1986 to teach variety of math service courses. Sensitivity to needs of non-traditional and under-prepared students is necessary. Required: Master's degree. By 2/28/86 send application, C.V. and three letters of reference to Chair.

University of Wisconsin, Eau Claire. Dept of Math, Eau Claire, WI 54701. Two asst professorships (one or two year initial appts beginning 8/25/86). Will consider all specialties but prefer algebra, geometry, operations research & statistics. Twelve hour teaching load. Research encouraged. Successful candidates must have commitment to and demonstrated potential for excellence in teaching. By 2/15/86 send application, resume, graduate & undergraduate transcripts & 3 letters of recommendation to Dr. Marshall E. Wick, Chmn, at above address.

California State University, Chico. Dept of Mathematics, Chico, CA 95929-0525. Thomas A McCreedy, Chair. (1) Tenure track position avail. 9/1/86. PhD in mathematics required, at asst, assoc, or prof level. Teach undergraduates and perform research. (2) Temporary one year positions avail. 9/1/86. PhD in mathematics or statistics required, at asst, assoc, or prof level. Teach undergraduates and perform research. For all positions send resume, supporting documents and 3 letters of reference by 2/15/86 to Chair.

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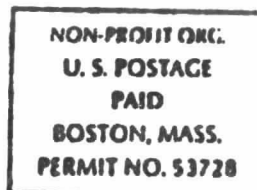
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