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Association for Women in Mathematics

Volume 13, Number 1 NEWSLETTER January-February 1983

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RETIRING PRESIDENT'S REPORT

I have no news to report except to repeat the announcements regarding the Denver meeting. By the time you receive this some of you might be on your way to the meeting. I hope to see you at the panel discussion on "Mathematicians and Computers", at the Business Meeting, at the Emmy Noether Lecture entitled "How do perturbations of the wave equation behave?" by Cathleen Morawetz, and at the AWM party, all on Thursday, January 6, 1983. Of course, I hope to see you at the AWM Table too.

It seems fitting that as I bow out as AWM President, I think back on the last two years. It has been a tremendous experience for me, and I have benefited greatly from meeting, talking and working with many of you. I have before me on my desk Judy Roitman's last President's Report, where she talks about the passage of responsibilities from the pioneers to a larger group of women in AWM. This distribution of responsibilities and duties has been further consolidated in the last two years, and we now have several AWM committees and individuals working on different projects. We are constantly reviewing our by-laws to see if they still make sense for us, thus preserving continuity while welcoming change.

One of the exciting AWM events in the last year was the Emmy Noether Symposium at Bryn Mawr College in March 1982. I am honored to have been President of AWM during that splendid event. Our credibility as a professional organization was strengthened by a grant from the NSF for the Symposium, and by a grant from the Sloan Foundation for our Speakers' Bureau. Plans for a revitalized Speakers' Bureau are under way under the direction of Judy Wason, and I hope the Bureau will attract the attention of many institutions that wish to invite women speakers.

During my tenure as President I realized that the members of AWM represented many diverse interests; this is one of the strengths of AWM that we wish to preserve, but also an indication of all the roles that we have to play. Traditionally, for historical reasons, we have been closer to the AMS, but we are now also starting to forge links with the MAA.

I would like to end by thanking the Executive Committee and all my friends and coworkers in AWM who helped me along with their generous support. I know that AWM will be in good hands when Linda Rothschild takes over as President, and I wish her every success.

Bhama Srinivasan
Dept. of Mathematics
University of Illinois at Chicago
Chicago, IL 60680

CALL FOR NOMINATIONS FOR NEW AWM OFFICERS

The nominating committee will greatly appreciate suggestions from the membership for the offices of President-elect, Treasurer, and Members-at-Large of the Executive Committee for terms beginning fall 1983. Please send your suggestions to the President or to any member of the nominating committee. It is not necessary to obtain permission from the candidates you wish to suggest; the nominating committee will do this.

Deadline for nominations is February 10, 1983.

The nominating committee: Susan Montgomery, Chair
University of Southern California
Los Angeles, CA 90089

Louise Hay
University of Illinois at Chicago
Chicago, IL 60680

Pat Kenschaft
56 Gordonhurst Ave.
Upper Montclair, NJ 07043

MARSTON MORSE MEMORIAL LECTURE

by Anne Leggett, with an assist from Alice Schafer

The sixth Morse Memorial Lecture was delivered by Professor Karen Uhlenbeck of the University of Illinois at Chicago on Monday, October 25, 1982 in Princeton, New Jersey at the Institute for Advanced Study. The title of her talk was "Variational Methods in Gauge Field Theory." A small honorarium and expenses are paid from a fund endowed by friends of Marston Morse.

We congratulate Karen for this honor. Her professional activities are many and distinguished. Some highlights appear on the remainder of this page.

Prof. Uhlenbeck received her Ph.D. from Brandeis University in 1968. She has held positions at M.I.T., Berkeley, the University of Illinois, and Northwestern. Since 1976, she has been at the University of Illinois at Chicago. She spent the academic year 1979-80 at the Institute for Advanced Study and is currently a Visiting Member at the Mathematical Sciences Research Institute, University of California at Berkeley.

Uhlenbeck's 29 papers have appeared or will appear in a variety of journals including the Transactions of the American Mathematical Society, the Journal of Differential Geometry, Communications of Mathematical Physics, and the Journal of Functional Analysis. Her works in progress are: Regularity of minimal Coulomb gauges, Einstein metrics of stable holomorphic bundles, and the Boundary of the moduli spaces of self-dual connections (with R. Schoen, S.T. Yau, and C. Taubes, respectively). Her research work has been supported by the National Science Foundation from 1972 to the present. She has delivered invited lectures literally all over the world: Bonn, Tokyo, Indiana, Maine, China, Bryn Mawr. In 1983, she will be speaking at the International Congress of Mathematicians. She has had three Ph.D. students (Bonita Driscoll, Robert Lockhart, and Steven Sedlacek).

Despite all the research activity, she finds time for a good deal of professional service. She is a member of the editorial board of the Illinois Journal of Mathematics and has been for the Journal of Differential Geometry. For the National Science Foundation, she has been a member of Advisory Committees on Mathematical and Computer Sciences and on Other Alternative Modes of Support. She has served the AMS in a number of capacities, including being a Member-at-Large of the Council and a member of the Nominating Committee. And, of course, she has been an active and supportive member of AWM.

REPORT ON CBMS MEETING

by Eleanor G. Palais

On Friday September 24 through Sunday September 26 I attended a meeting of the Conference Board of Mathematical Sciences as a representative of AWM. Mary Gray was also there. The Board was charged with filing a preliminary report in mid-October discussing the future curriculum of mathematics in both elementary and secondary schools.

Topics which were covered were: What is still fundamental to teach in pre-college mathematics? How does technology fit into today's mathematics curriculum? What is mathematics' role with other subjects and how should these subjects interact? The group also discussed the issues of teacher supply, education and re-education.

There were a number of position papers which were presented and discussed on Saturday. The format of the meeting was small working groups reporting back to the assembled group for feedback and further input.

Approximately thirty people attended representing AWM, AMS, MAA, NCTM, among others. Also present were representatives from Two-year colleges, the American Statistical Society, the NSF, the National Science Board, and the Sloan Foundation. The meeting was organized by Marcia Sward of CBMS. Several high school teachers were present. The meeting was chaired by Henry Pollak.

The preliminary report, when drafted, will be submitted to the National Science Board Commission on Mathematics and Sciences by mid-October. After further discussion among group members, the final draft of the report will be presented to NSB by mid-November. .

WOMEN MATHEMATICIANS IN CANADA

AWM panel at Toronto meeting, August 25, 1982
second installment

Mary McLeish

"Discussion of the Problems of Husband-Wife Teams in the Mathematical Sciences"

In what was, at least in the 5 years prior to 1980, a job-scarce discipline, if one member of a family was employed by a mathematics department, there was great reluctance to hire another member in a tenure-track slot. This was certainly my own experience at the University of Alberta during these years, when I worked on a variety of temporary contracts. The isolated location with no other colleges, etc., in the area compounded the problem. Leaves were not granted to my husband to enable me to do meaningful post-doc, etc. As time went on, my husband was gaining seniority which brought with it a greater involvement in departmental activities, often including factious issues which would leave my loyalties questionned. For example, to a significant extent by himself, he brought about the existence of a separate department of Statistics, and Applied Probability--an involvement which has left some mathematicians in the original department unwilling to speak to him to this day!

It was about this time that I decided to make a break of my own, to Computer Science, for a long time a separate group at Alberta. I did obtain a tenure-track position in Computing Science with a small attachment to the new Statistics group. One's troubles are, unfortunately, not over. Last year a very touchy issue arose between these two departments over a statistics course taught by computer scientists (a course I had taught). It resulted in the Statistics Department alone blocking the computer scientist's request for new faculty positions, and it was generally known that my husband was active in this motion. Now, I find myself suspect by my own colleagues.

On another level, within the husband and wife team, trying to keep pursuit of career goals "fair" seems to me to be almost impossible, especially when children are involved. A girlfriend, a recent Ph.D. in computer science, believed in a rotational system. However, in pure mathematics certainly, if either party slows down for any significant length of time, getting back in the game becomes very difficult. Other problems that can arise, which are not always easy to rotate, occur when one party wishes to make a "career" move or becomes appointed to time-consuming national committees or journal editorships or is invited away to give a large number of talks, etc. (all of which have been my own husband's situation lately). If both parties were equally active simultaneously, it would result in what for myself would be too heavy a reliance on others to parent my children.

As a final note, I have to admit honestly to a certain amount of pressure throughout my earlier years in mathematics against my role as wife and mother--which somehow seemed more visible with a husband working in the same department. On entering computer science, I found a very different attitude. My sex did not seem to be noticed, and questions of whether I had children and what I did with them never seemed to arise. Albeit the very different job market is partly the cause, my own feeling is that, even today, it still goes beyond that.

NEWS FROM AWM MEMBERS

from Nazanin Azarnia, Miami University, Hamilton Campus

The Ohio AWM held a breakfast meeting on October 23, 1982 in conjunction with the meeting of the Ohio Section of the MAA at Youngstown State University. A small group of women attended.

The group discussed different ways to encourage female students to join AWM. One suggestion was to give several free student memberships to institutional members, like those offered by AMS and MAA.

Discussion then turned to the series of talks "Biographies of Famous Mathematicians" given at section meetings every spring. To give more exposure to female mathematicians two possibilities were considered:

1. Have this year's talk about a famous woman mathematician.
2. Present an annual talk about a well-known female mathematician.

The second option seemed to be more favorable. The first talk will be presented next year at the Spring meeting in Marietta, April 22-23, 1983.

from Elizabeth Berman Appelbaum, Shawnee Mission, Kansas

Perhaps you readers will be interested in a member of AWM who changed careers. I taught college mathematics from 1970 to 1980. I decided I would have more opportunity in computer science, so I took 12 hours of courses and got a job in 1981 as a programmer with American Telephone and Telegraph. I work at the Data Processing Center in Overland Park, Kansas, a suburb of Kansas City. The work is challenging and pleasant. I miss mathematics and I miss teaching, but I am glad I made this move. As a mathematician, I worked using a professional name, Elizabeth Berman, but now I am using my married name, Elizabeth Berman Appelbaum.

Claudia Zaslavsky has written several books. Count on Your Fingers African Style and Tic Tac Toe and Other Three-in-a-Row Games: From Ancient Egypt to the Modern Computer are both children's books published by Crowell/Lippincott Junior Books, Dept. 128, 10 East 53rd St., New York, NY 10022. The first, which depicts the rich cultural diversity of African peoples and introduces a new way of thinking about numbers and finger counting, was on the 1980 lists which follow: The Human Family--Understanding Other People, selected by the National Conference of Christians and Jews; Notable Children's Trade Books in the Field of Social Studies; and Outstanding Science Trade

Books for Children. Preparing Young Children for Math: A Book of Games, published by Schocken Books, Inc., 200 Madison Ave., New York, NY 10016, is suitable for classroom and home use. The games and activities begin with manipulation of concrete materials, then progress to pictures and symbols, and finally to abstract concepts having no visual representation. Africa Counts: Number and Pattern in African Culture is published by Prindle, Weber & Schmidt, 20 Providence St., Boston, MA 02116. The mathematical contributions of a variety of sub-Saharan African peoples--from prehistoric times to the present, from finger counting to pure mathematics--are examined in the context of their social and economic development. Zaslavsky shows how numeration systems and number patterns have emerged from and are interrelated with the history, ethnology, anthropology, linguistics, politics, literature, art, and oral tradition of Africa.

WOMEN IN MATHEMATICS AND SCIENCE

by Phyllis Chinn, Department of Mathematics, Humboldt State University, Arcata, CA 95521

The course Ann Moskol described in the September-October 1982 AWM newsletter is the most recent in a series of classes on women in science (I will use "science" throughout this article to indicate "science and mathematics") of which I am aware. I taught such a class in 1978, for which I prepared by finding out as much as possible about other similar classes. I think that the existence of such classes and of organizations like AWM has contributed to the publication of much new material on women scientists. In particular, Teri Perl, Math Equals; Teri Perl and Joan Manning, Women, Dreams and Mathematics; Diane Emberlin, Contributions of Women in Science; and Susan Schacher, Hypatia's Sisters are all collections of biographies of women scientists. Whole books or articles have been published about other women scientists. For $3.00 from Humboldt State University Foundation, you can obtain a 44-page bibliography of articles about women in science and math, which I wrote in 1978 and revised in 1980. Nancy Martin at the University of New Mexico also has an extensive bibliography exclusively of biography and autobiography of women scientists.

My course was publicized through the Women's Studies department and was in the Humboldt State University bulletin of available courses for Spring 1978 (with no course description). Twelve students (all women) enrolled: one from Women's Studies, three elementary education majors, two part-time math instructors, one geology major, one natural resources major, and four majors in biological sciences. Most of the students had known me prior to the course and enrolled because I had told them about it. We all learned a great deal about particular women scientists as well as problems and prospects for women in various sciences. The students and I all enjoyed the class. Basically for financial reasons, the course has not been offered since.

For my class, students read Women and Success as well as selected articles about women in science. They read and reported on a biography of a woman scientist, as well as doing an extensive research project. Some classes included visits from women scientists. Topics included characteristics of women in science, determinants of success, family attitudes and relationships, the impact of education on women in science, social factors, inborn differences between the sexes, economic factors and related problems of professional women.

I could send a copy of my course outline to anyone who would like it.

Of other similar courses, the earliest one of which I am aware was taught by Mary F. Zinn as two courses at Oberlin College, 1974-75. Class met once a week for seven weeks. The fall seminar "Women in Science" Career Choices and Outcomes" analyzed the image of woman in Western society, inquiring whether this image is antithetical with the image of a successful scientist, studied why so few women evidence serious interest in science and why for those few the success factor is low, and looked at some successful

women scientists to analyze determinants in their careers. The format of the spring course, "Women in Science: Contemporary Challenges and Achievements," was primarily that of symposia with guest speakers who were women scientists from a variety of fields and occupations, or spouses thereof. Readings for both courses were extensive and varied. In the first course some readings provided general background information on the sociology and psychology of women. Readings specific to Women in Science included two by Alice Rossi, and ones by Eleanor Maccoby, Doty and Zinberg, Martha S. White, Harriet Zuckerman, Bachtold and Werner, as well as selections from Ruth Kundsin's book Successful Women in the Sciences and J.R. and S. Cole's book Social Stratification in American Science.

Ellen Switkes and David Kliger at the University of California, Santa Cruz, have offered a Women in Science seminar twice in alternate years prior to Summer 1977. Approximately 15 students enrolled, mostly science majors, some from women's studies. Ruth Kundsin's Women and Success was the text. Outside speakers from industry, government, medicine, and academic science professions spoke about their life and careers. Sessions were held with the affirmative action officer and career counselor.

Nancy Martin has offered a Women in Science course jointly with Jane Gillespie at the University of New Mexico, Spring 1976, and (I believe) again in 1978. She taught a Women in Science and Technology class at Stanford University Winter 1977. The courses explored "the contributions women have made to science and technology from the beginning of history to the present, and the effect of societal values on a woman's ability to achieve and on the impact of that achievement." In conjunction with these classes Nancy Martin has compiled an extensive bibliography of books and articles on women scientists. The book list for the course at Stanford was Women in Science, H.J. Mozans; Women in Mathematics, L.M. Osen; Women and Success, R.B. Kundsin, ed.; Women from the Greeks to the French Revolution, S.G. Bell. The class met twice a week (3 units) for lecture and discussion and occasional guest speakers.

John Beer, a historian of science, has taught a seminar on "Women in Science, Technology, and Medicine" at the University of Delaware. The seminar uses "an historical approach, studying the experience of women in the scientific professions, noting the changes which have occurred over time and seeking useful insights for young women embarking on a scientific career." The seminar begins with everyone reading and discussing the same books. In 1976 these were R.W. Hogeland, ed., Woman and Womanhood in America and R.B. Kundsin, ed., Women and Success. The latter identified the major issues for the semester. The second part of the course students gave reports on books and articles, many selected from Audrey Davies' Bibliography on Women. Audiovisual materials were shown and women in scientific careers visited the seminar to speak of their own experiences.

Susan Schacher taught "Women and Science" at the University of Washington during Summers 1975 and 1976. The course covered historical and contemporary women in science, the organizations for women scientists, the psychological and sociological aspects of women in science, women as objects of science, women and science fiction, women as victims of science, and toward a science for the people. The 1975 course put together the booklet Hypatia's Sisters.

Gertrude Swedberg (Lee) taught a 2-day workshop, "Discovering Women in Science" at Eastern Washington University in Spring 1982. She developed six 20th century themes of science through the women whose work and discoveries contributed to them. Topics included "Fragmenting the Atom," "Exploring the Infinitely Vast," "Medicine, the Greatest Battle," and "The Microstructure of Life."

There are several other courses about which I know less--some because they had not yet been offered, others because I heard of them second- or third-hand. Ruth Bleier and Patricia Spain Ward have been preparing a course on "Women in Science: A Biographical Approach" to be offered at the University of Wisconsin Medical School.

Lynn Harrington Brown and Martha Chiscon co-taught a course "Women and the Science Disciplines" at Purdue University. Margaret Rossiter taught an undergraduate seminar on "Women in Science and Medicine", I believe at University of California, Berkeley.

Margaret Alic at Portland State University advertised a course on History of Women and Science, Winter term 1978. This was designed to be "a survey of the history of

women's contributions to science, an examination of the structure of the scientific establishment and the roles of women within it." I was personally interested to note that the course met one evening a week and that the class description mentioned the availability of free child care at PSU for late afternoon and evening classes.

Michele Aldrich at AAAS informed me of the existence of the following Women in Science courses: 1) California State University, Fresno, School of Natural Sciences, Department of Physics, "Women in Science" (past and present)--contributions of women scientists from 1700's to 1960. First taught 1973. 2) California State University, Sacramento, "History of Women in Science" course 1973-?. Examine the biographies and contributions of women scientists in 20th century; also, cultural and psychological basis for the underrepresentation of women in scientific fields. 3) Kansas State University, Division of Biology, "Women in Science", 1975-?. Information, biographical materials on successful women scientists. 4) Juniata College, Department of Chemistry, Huntingdon, PA, course on "Women in Science", 1974-?.

Other people have said that Peggy Smith at California State University, Hayward; Mary Jo Strauss at George Washington University; Rachel Skilitsky at University of Wisconsin, Milwaukee; Agnes Kadar at Nassau Community College in Garden City, NJ; and Jean Stanek, Shawna Swan and Ruth Blitz at California State University, Chico, have all developed similar courses.

A course which is quite different from the preceding and springs from similar concerns is Women and Technology taught by Chris Bose and Phil Bereano at the University of Washington. The course used extensive readings from many sources rather than a text. A few of the many topics covered were Technology and Social Change, Feminist Sensibilities, Home and Work Force Technologies, Effects of Technology Industrialization, Twentieth Century Women's Labor Force Participation, and Bio-Medical Technologies.

Teri Perl at San Francisco State University has proposed a course on Women in Mathematics to study the biographies and mathematics of women mathematicians. She has written a book for the course entitled Math Equals.

I am not listing any of the "Math Anxiety" and "Math Confidence" type courses offered as there are many of them and lists are available elsewhere. I would like to mention the one "Science Anxiety" course of which I know, taught by Jeff Mallow at Loyola University of Chicago.

The last item of related interest that I will mention here is the accomplishment of the History Committee of Women's Resources Center of Memphis which secured a Board of Education resolution stating in part: "That a fair and accurate presentation of the achievements of both men and women of every race, creed, color, and religion be taught even if this should require the revision and rewriting of all textbooks, teaching outlines, and supplementary materials." This group is now working to have their State Commissioner of Education affirm a similar resolution, and plans on a similar national campaign.

WINIFRED L. C. SARGENT

by H. G. Eggleston, Royal Holloway College, Egham, Surrey
Reprinted from the Bulletin of the London Mathematical Society 13(1981), pp. 173-176, by permission of the LMS and the author.
Thanks to Lee Lorch for bringing the article to our attention.

Winifred L.C. Sargent, who died in October, 1979, was born on 8th May, 1905, at Ambergate in Derbyshire, the only child of her father's second marriage. Brought up in the Quaker Community at Fritchley close by, her early education was provided by her father and by a small private school for Friends' children. She entered the Friends boarding school at Ackworth (near Pontefract) in 1916 and three years later went on to the Mount School at York with a Joseph Rowntree entrance scholarship.

Since the Mount School was not strong on the mathematical side, she left and worked for her Higher School Certificate as a day girl at Herbert Strutts' School, Belper. The school, although only founded in 1909, had already achieved a high academic reputation, and it was from here that she gained a Derby County Scholarship in 1923 and a State Scholarship and Mary Ewart Scholarship to Newnham College, Cambridge, in 1924.

At Cambridge the dominant mathematical interest was mathematical analysis in its various forms. It was a type of mathematics that appealed to Miss Sargent and for which she had a natural aptitude. An Arthur Hugh Clough Scholarship in 1927 and a 1st Class B* degree were followed by a Mary Ewart travelling scholarship and a Goldsmiths Company Senior Studentship in 1928. Immediately after her first degree Miss Sargent embarked upon research work, but she did not consider her results were adequate and left the University to teach at Bolton High School.

In 1931, Miss Sargent was persuaded to become an Assistant Lecturer at Westfield College, moving to a similar position at Royal Holloway College five years later. In 1939, she became a research student of Professor Bosanquet and, although there was less than one year's detailed supervision (before the war intervened), from that time onwards Professor Bosanquet exercised a decisive influence on her work.

In 1941 she became a lecturer at Royal Holloway, and moved from there to Bedford College in 1948. Six years later she was awarded the degree of Sc.D. by Cambridge University and had the title of Reader conferred on her in respect of the position she had at Bedford College. She retired and cut all her ties with university life in 1967.

By the 1930's the theory and the applications of Lebesgue integration were well established. However, there were many other integrals and derivatives that had been defined for various reasons. The elucidation of the exact relations and properties of these new integrals and derivatives offered a wide and challenging field for research. It was in this field that Dr. Sargent did almost all her work.

[3] is a typical paper. In it the properties of Denjoy-Perron integrable functions are considered. For such a function the Cesàro-derivate CDf(x) is defined by

$$CDf(x) = \lim_{h\to 0} \frac{2}{h^2} \int_x^{x+h} (f(t) - f(x))dt.$$

One result is that if f(x) is C-continuous in $a \leq x \leq b$ and CDf(x) exists in $a < x < b$ then for some ξ in $a < \xi < b$ we have

$$\frac{f(b)-f(a)}{b-a} = CDf(\xi).$$

This, of course, is a direct analogue of Rolle's Theorem, but the techniques used in its proof are entirely different, requiring new and sophisticated arguments. In this paper as in much of Dr. Sargent's work, the arguments are pushed as far as they will go and counter examples given to show that the results are the best possible.

In [4] she developed properties of Burkill's Cesàro-Perron integrals that are analogous to properties of the Perron (or special Denjoy) integral. This arose out of work of Grimshaw and Bosanquet, and led her to the definition of a Cesàro-Denjoy integral equivalent to the Cesàro-Perron. [5] includes a direct and elegant proof of monotonicity of a function under certain conditions that is fundamental to the development of the Cesàro-Perron theory of integration.

[4] contains a mean value theorem which was later extended in [12] to the general case λ for C_λ functions. This last paper also contains a proof that C_λ-continuous functions are Darboux continuous. A second generalisation of [4] appears in [15] which includes a new integral V_nD equivalent to C_nD but based on the generalised derivative of de La Vallée Poussin.

Questions of summability factors leading on to properties of Kernels are given in [7], [13], [16], [17] and [18]. These papers contain numerous important results, but attention must be drawn to the idea of a normed linear space which is a "β-set in itself" a generalisation of being of "2nd Category in itself" which is used to establish a property of transforms of Denjoy integrable functions.

[18] is another paper with many important results, including the following concerning Cauchy-Lebesgue integrals.

A necessary and sufficient condition that $k_s(t)$ should be such that

$$\lim_{s\to\infty} \left(\int_0^\infty x(t)k_s(t)dt\right) = \int_0^\infty x(t)dt$$

whenever $x(t)$ is such that the right hand side exists and is finite, is that

(i) $\exists\, a(s) > 0$ for all $s > 0$ such that $k_s(t)$ is measurable and essentially bounded over $0 < t < a(s)$ and of bounded variation over $a(s) < t$,

(ii) $\exists\, a, s_0, M$ such that for $s > s_0$, $k_s(t)$ is essentially bounded by M over $0 \leq t < a$ and has total variation less than M over $a \leq t$,

(iii) for $\lambda > 0$, $\lim_{s\to\infty} \int_1^\lambda (1-k_s(t))dt = 0$.

Dr. Sargent also contributed to the theory of fractional integration and differentiation in [11], [14], [19].

The last three papers, [22], [23], [24], are concerned with the properties of BK-spaces--that is spaces of complex sequences in which the mapping from a sequence to one of its terms is continuous. Dr. Sargent established a number of interesting properties both in terms of mappings between BK-spaces and of individual BK-spaces.

For example, if $y \in Y$, a BK-space, and y_n is the sequence formed from the first n terms of y followed by zeros, then a bounded subset B is conditionally compact if and only if $\|y_n\| \to \|y\|$ uniformly on $B + (-B)$.

Dr. Sargent's work is marked by its exceptional lucidity, its exactness of expression and by the decisiveness of her results. She made important contributions to a field in which the complexity of the structure can only be revealed by subtle arguments. Her work was in many ways an expression of her character. Although she was self-effacing and totally lacking in any ambition for self-advancement, yet she was independent and would not tolerate anything which she thought to be second-best. She never attempted to publicize her work, and could only rarely be persuaded to address a seminar--but when she did the result was brilliant. It seems that she never attended a mathematical conference, but she did attend every one of the weekly seminars in Analysis held by Professor Bosanquet from their inception in 1947 until her retirement in 1967.

Dr. Sargent had few interests outside mathematics but she had a passion for walking and enjoyed tennis in her younger days. She will be remembered by her friends for her dedication to the search for mathematical truth, her absolute integrity and above all for the determination with which she imposed on herself and on those she taught the highest and most meticulous standards of accuracy and precision.

List of published works

1. "On Young's criteria for the convergence of Fourier Series and their conjugates", Proc. Cam. Phil. Soc., 25(1929), 26-30.
2. "The Borel derivates of a function", Proc. London Math. Soc. (2), 38(1933), 180-196
3. "On the Cesàro-derivates of a function", Proc. London Math. Soc. (2), 40(1935), 235-254.
4. "A descriptive definition of Cesàro-Perron integrals", Proc. London Math. Soc. (2), 47(1941), 212-247.
5. "On a sufficient condition for a function integrable in the Cesàro-Perron sense to be monotonic", Q. J. Math. (Oxford) (1), 12(1941), 148-153.
6. "On the integrability of a product", J. London Math. Soc., 23(1948), 28-34.
7. "On the order of magnitude of the Fourier coefficients of a function integrable in the $C_\lambda L$ sense", J. London Math. Soc., 21(1946), 198-203.
8. "A mean value theorem involving Cesàro mean", Proc. London Math. Soc. (2), 49(1946), 227-240.
9. "On the summability (C) of allied series and the existence of (CP) $\int_0^x \frac{f(x+t)-f(x-t)}{t}\,dt$, Proc. London Math. Soc. (2), 50(1948), 330-348.

10. "On fractional integrals of a function integrable in the Cesàro-Perron sense", Proc. London Math. Soc. (2), 51(1949), 46-80.
11. "On linear functionals in spaces of conditionally integrable functions", Q.J. Math. (Oxford) (2), 1(1950), 288-298.
12. "Some properties of C_λ continuous functions", J. London Math. Soc., 26(1951), 116-121.
13. "On the integrability of a product, II", J. London Math. Soc., 26(1951), 278-285.
14. "On the continuity (C) and integrability (CP) of fractional integrals", Proc. London Math. Soc. (2), 52(1951), 253-270.
15. "On generalized derivatives and Cesàro-Denjoy integral", Proc. London Math. Soc. (2), 52(1951), 365-376.
16. "On the summability of infinite integrals", J. London Math. Soc., 27(1952), 401-413.
17. "On some theorems of Hahn, Banach, and Steinhaus", J. London Math. Soc., 28(1953), 438-451.
18. "On the transform $y_x(s) = \int_0^\infty x(t)k_s(t)dt$", J. London Math. Soc., 30(1955), 401-416.
19. "Some summability factor theorems for infinite integrals", J. London Math. Soc., 32(1957), 387-396.
20. "On some cases of distinction between integrals and series", Proc. London Math. Soc. (3), 7(1957), 249-264.
21. "Some sequence spaces related to the ℓ^p spaces", J. London Math. Soc., 35(1960), 161-171.
22. "Some analogues and extensions of Marinkiewicz's interpolation theorem", Proc. London Math. Soc. (3), 11(1961), 457-468.
23. "On sectionally bounded BK-spaces", Math. Z., 83(1964), 57-66.
24. "On compact matrix transformations between sectionally bounded BK-spheres", J. London Math. Soc., 41(1966), 79-87.

SOCIAL PROCESSES OF SEX DIFFERENTIATION IN MATHEMATICS

by David R. Maines, Ph.D.; Noreen M. Sugrue, M.A.; and Monica J. Hardesty, M.A.
abstract and conclusions chapter from the final report to the National Institute of Education, "Role Modeling Processes and Educational Inequity for Graduate and Undergraduate Students in Mathematics", NIE-G-79-0114, 1979-1981
The complete report may be obtained for $14 (cost of reproduction plus postage) from: Program on Women, 617 Noyes St., Northwestern University, Evanston, Illinois, 60201.

Abstract

The purpose of this study was to determine social processes of sex differentiation for undergraduate and graduate students in mathematics and how those processes relate to educational inequity. To gather data relevant to those processes, 168 in-depth interviews were conducted with male and female students majoring in mathematics and with faculty at three Chicago area universities. The strength of the study rests in (1) the focus on females who have "survived" the high school attrition process and who are able mathematicians upon entry into college, (2) the pervasive focus on social processes in which educational experiences are embedded, and (3) the systematic sex-comparative research design. Data collection focused on various aspects of the influence process, including family and educational influences before college, the role modeling process, and family and career aspirations. Data analysis was qualitative in nature, and the data are presented in the form of (1) simple distributions of responses suitable

for determining overall patterns and (2) an analysis of direct quotes to determine personal meanings. An explanatory schema is presented regarding sex-differentiation which was induced from the data. That schema hinges on processes of self-selection, differential association, sex variation in the specificity of support networks, narrow vs diffuse perceptions of the world, and differences in opportunism and instrumentality. Little evidence of systematic or overt sex discrimination was found in the universities.

Conclusions

In concluding this report, we wish to stress the long term and cumulative processes of sex differentiation. That is, not only does sex differentiation occur early in a person's life but the patterns of participation, vocabularies of motive, and meanings that are expressed through that differentiation build up and affect the person's conduct and options late in life. This is revealed in our major findings.

First, sex differences in schooling at the high school level and before were minimal, if nonexistent. Males and females were equally exposed to female math and science teachers, course taking, and advanced math track participation. Also, level of encouragement was essentially the same. The major difference in schooling was that a portion of females who were encouraged to continue in math also experienced discouragement. Our major finding here, therefore, is that while schooling was non-differentiated mixed messages were more characteristic of female experiences than those of males.

Second, there was an over-riding similarity in career goals while in high school; males and females were equally oriented toward professional occupations with the exception of education. In that area, males more frequently focused specifically on university careers in mathematics while females focused on secondary school teaching in mathematics. This dissimilarity, especially for the graduate student sample, was also expressed through parental influence on career orientation.

Third, the major analytical theme of this study is that there is significant sex differentiation in the social worlds and orientations which contextualize male and female students. These worlds are composed of meanings, vocabularies of motive, and patterns of personal choice. The concepts we use to describe those differences are the focused worlds of males and the diffuse worlds of females. Nearly all our findings relate either directly or indirectly to the differentiation of these worlds. We suggest that the origins of focused worlds rest in part in the focused messages males receive from family and school; the diffuse worlds of females originate in part in the mixed messages they receive. We further suggest that these worlds are carried with males and females as orienting perspectives into their lives as young adults and that these perspectives influence how they participate in public spheres.

Fourth, focused and diffuse worlds are expressed through a variety of experiences, values, and decisions. Males' decisions to major in mathematics in college tend to be based on the positive value of mathematics; females' decisions tend to incorporate factors outside of the subject matter of math. Males tend to select a college for its academic excellence; females, in addition to that criterion, incorporate a number of "circumstances" into their decisions. Males define their major problem in terms of their ability to perform well at mathematics; females modify that assessment by also defining problems in terms of social relationships.

Fifth, findings noted in the previous paragraph enable us better to specify a theme concerning the sex differences in the relationship between math and other arenas of participation. The focused worlds of males are composed of primary meanings imputed to activities directly involving mathematics and secondary meanings of those not directly involving mathematics. The pursuit of mathematics, in other words, modifies other patterns of participation. The diffuse worlds of females are composed of primary meanings imputed to activities not directly involving mathematics. These meanings modify activities directly involving mathematics, which, as a consequence, become secondary. This difference is a sensitizing distinction, and does not apply equally to all individuals, but we suggest that it becomes sharper in form as individuals move from undergraduate to graduate education in mathematics.

Sixth, anticipated patterns of career and family participation were clearly differentiated for undergraduates. Males envision what we termed linear futures, in

which work was their main involvement and family was a desired but side involvement. Females envision what we termed contingent futures, in which main involvements disappeared in ambivalence about how career and family would relate to one another. The significance of this finding is twofold: these futures exist in the present and thus become very much a part of focused and diffuse worlds, and the anticipations of these futures form the base of self-fulfilling prophecies, which contribute to their actualization. This reflexive process, of course, exists in a cultural context that permits it to operate and it reinforces the conditions of choice.

Seventh, male and female graduate students enter graduate school on unequal footing. The source of this inequity is traceable to the conditions that gave rise to focused and diffuse social worlds. Males have had long term intrinsic interest in mathematics and in aspiring to become mathematicians. Females tend to begin their graduate training with less specific career goals, and their motives for going to graduate school are not as focused as those of males. This differential base of entry becomes reified in meanings and activities during graduate school. Males work longer hours, define their major problems in terms of activities related directly to mathematics, interact with faculty on an individualistic and task-oriented basis, and see sponsorship in pragmatic terms. Females define their major problems as those embedded in the social arenas, identify with friends and family more than do males, prefer the organized classroom as a format for learning mathematics, and see sponsorship more in terms of nurturance. While clearly a higher proportion of female graduate students than female undergraduates are specifically careerist, a significant proportion also express ambivalence about family and career participation.

Eighth, we found no evidence of overt barriers to females who pursue mathematics through to the completion of the PhD, and thus we are reluctant to conclude that overt sex discrimination systematically exists in mathematics. We do maintain that these processes leading to sex differentiated contexts in which males and females attempt to become mathematicians tend to be advantageous for males. The nature of the barriers we can empirically document, however, were covert in nature. They were expressed through females' perceptions that they were not being taken as seriously and in their feeling of themselves as a numerical minority. Although more females than males reported that sex stereotyping was a problem, a majority of females stated it was not a problem. Both male and female respondents were hard put to come up with stories of active resistance to female students.

Ninth, the life histories of faculty tend to reflect the distinction between focused and diffuse social worlds, although a significant proportion of the female faculty display focused orientations. We conclude that one of the significant processes leading to the PhD is self-selection and that this process for females enables those with focused orientations to complete their education more readily than those with diffuse orientations. Regardless, female work styles (collectively-oriented) tend to conform to the diffuse mode and male work styles (singularity-oriented) tend to conform to the focused mode.

Tenth, findings from data on role modeling were rather a surprise to us. Males have fewer role models than females, and when they do name someone as role model, that person tends to be a professor. Females list family and friends as role models more frequently than do males. We believe these findings also reflect focused and diffuse social worlds. The surprise was in finding that undergraduate females do not model themselves after female faculty, and if anything, see those faculty in negative terms. The faculty, moreover, are not overwhelmingly attracted to the concept of role modeling. They are at best passive participants in the process and, while there are those who express a willingness to serve as role models, the modal response was to emphasize the burdensome and dysfunctional qualities. On this basis, we cannot support the contention that role modeling is a process which contains promise to reduce sex inequities in mathematics.

Implications for Policy

We have argued that focused vs diffuse orientations, which are long term and cumulative contextual properties, account for much of the sex differentiated nature of

experiences related to mathematics. Those orientations, however, are created from the intersection not only of schools and universities, but also of families, friends, personal values, and personal decision making. How can the responsibility for the creation of those orientations be assessed in a way that would lead to an appropriate policy formulation? Frankly, we are troubled by that question, and we take the position that the answers depend very much on one's perspectives or assumptions.

If one assumes, for example, that the only function of a university department is to perpetuate a manpower pool, then it is justified in putting its energies primarily into those students who most likely will complete the requirements for the PhD on time and fill vacant slots in the labor force. Certainly attention must be given to the problem of the turnover of personnel. If, however, one assumes that an additional mandate of departments is to identify and nurture the intellectual growth of talented students, then perhaps departments must broaden their efforts. Such broadening could take the form of a more compassionate view of students; they represent not only a potential manpower pool but human beings with biographies that may militate against or facilitate the expression of talent. We suspect that departments would respond to us by asserting that they do both. And indeed we think most departments sincerely believe they do. Our point, however, is that the identification and promotion of talent is an exceedingly complex process that must involve looking beyond performance per se. Departments can ill-afford to view their students merely as products that only need to be packaged and marketed. The social orders that students bring with them show otherwise. The issue of how work and family participation is integrated, for example, is far from resolved. It is true that there is a public dialogue about how men and women will coordinate the sometimes conflicting demands of work and family, but how those demands are to be resolved is not yet part of our culture. Females currently envision themselves as sacrificing their early careers, and they express a great deal of ambivalence about the trade-offs they face. Males do not envision such trade-offs, but we believe that they cannot exempt themselves either from the dialogue or the ambivalence. Part of the current divorce rate of middle aged couples, for instance, is due to males' lack of participation in discussions of these issues. We therefore emphasize that changes in the social order in which males and females participate must become part of the agenda in university departments.

The complexities underlying that emphasis should, at this point of our report, be manifest. Those complexities inherently involve the interaction of an individual and society, and raise as a serious issue the kind of person someone is becoming while living his or her life. Surrounding this issue of "becoming" is the interaction of multiple decision-makers, including the individual. In this sense, one of the implications of our research is that individual decision making and personal weighing of the value of multiple choices is part of the process of sex differentiation in mathematics. Males and females, in other words, are not only differentiated by society, but they also differentiate themselves. We insist we are not blaming the "victim," but at the same time we cannot blame "society." Causation does not rest in those polarities. Rather, we recognize that the processes that create and perpetuate sex differentiation involve the interaction of systems of freedom and constraint that are not only derived from the actions of others but from the actions people impose on themselves. Through the process of making situational adjustments in their lives, people commit themselves to lines of action with future consequences they may or may not anticipate. Thus, individuals, both male and female, must accept a measure of responsibility for the choices they make when presented with an array of options.

While we maintain that an emphasis on individual decision making is a proper one, we also must emphasize that the distribution of all possible choices is not entirely controlled by the individual. The social order exists prior to the individual, and it presents them with sex differentiated realities. It is exactly in this sphere where families, schools, and friends combine to reify the norms and contexts of becoming. In other words, the rationale and substance of choice often are imposed on the person in a way that sets the probabilities that certain choices will be made. It is precisely this process that departments should be aware of simply because it often masks talent.

These sets of issues lead us to contend that the complexities of sex differentiation are much more profound than we had anticipated or read in any program statement or research report. Indeed, if our data could support the contention that early influences in math were the critical factor for the groups we studied, we could make recommendations concerning elementary education. We also could make recommendations if our data pointed to inequities in secondary education. But our data reveal that early schooling influences do not appear as significant factors for the individuals we studied, so those kinds of policy recommendations are not possible. On the other hand, we remind the reader that our study considers only the "successes"--those who survived all the documented or potential influences that combine to produce enormous sex differences in mathematics for the general population of males and females. Two conclusions thus follow. First, policy recommendations based on other studies should be implemented to increase the number of females who survive the elementary and secondary school experiences as "successes" still interested in mathematics. Second, we must not overlook the individualism and determination of the females we did study as important components of their success. No matter how diffuse that groups may be in comparison to males, when compared to all females it appears very focused.

Accordingly, one of the possibilities we must seriously consider is that women who persist in mathematics are in some respects self selected, are those who can deflect experiences which militate against persistence, and who have a personal tolerance for isolation. This consideration suggests that women who do persist adopt the "male model" to some degree. We reject the form of that expression as sexist, but at the same time wish to inquire into fundamental processes that are implied by it. We can make that inquiry by asking about the functions of being focused, as opposed to being diffuse. We find that when women are focused and exposed to interpersonal and professional opportunities, their career performance exceeds that of diffuse males. What this notion implies is that the question of skewed sex distributions in mathematics is not directly an issue of sex. Rather, it is an issue of the structure of the self in relation to the distribution of influence and patterns of participation in public and private arenas. Therefore, sex differentiation in mathematics <u>as sex differentiation</u> exists only insofar as these influences and patterns of participation are more characteristic of females than males. Of course, the fact of the matter is that most males are not likely to be so exposed. However, the implication of this notion is that if males were exposed to patterns that typify females' lives, they would experience many (but obviously not all) of the same kinds of problems that females experience. This contention, which is offered here only as an implication of our data, is supported by a preliminary analysis of our current NIE funded study (NIE-G-81-0029) of processes of attrition of males and females out of mathematics. That analysis shows that males who drop out of math at the same points that females drop out tend to have similarly diffuse orientations and backgrounds. We therefore wish to underscore the point that sex differentiation is only a rough indicator of a more fundamental differentiation (i.e., focused <u>vs</u> diffuse) in mathematics.

Why does this differentiation show up in mathematics? We believe the answer must consider seriously the nature of mathematics itself. Mathematics, perhaps more than any other academic discipline, is cumulative in nature. The successful understanding of advanced mathematics depends upon the successful understanding of less advanced mathematics. Mathematical knowledge and understanding is built up, not merely acquired. This means that those who do not have a firm grasp of early mathematical concepts will have an exceedingly difficult if not impossible task of catching up. It is not just the building up of mathematical knowledge that we wish to emphasize here, however, but that focused persons are more likely to have that basic understanding of concepts and theory that will allow them to persist. With this in mind, we can propose that focused orientations become very important in the pursuit of mathematics and the forging of careers in the field. These orientations, in fact, might be thought of as functional requisites for mathematical performance. To the extent that women do not acquire those orientations, they, as a consequence, are disadvantaged. Conversely, to the extent that males do acquire them, they perpetuate the skewed sex distributions.

Because these processes are so broad based and represent the interpenetration of many sectors of society, we resist the temptation to offer fast and easy recommendations. Policy which is disrespectful of empirical and conceptual findings does not constitute a public service. However, we can pose the following issues and recommendations. First, we should reconsider the question of whether the goal of producing more women with Ph.D.'s in mathematics is worthwhile. Persons with doctorates in mathematics tend to be highly specialized and thus qualified for only a narrow sector of the labor market. To the extent that job market demands are restricted, an overproduction in the supply of job applicants, whether male or female, qualified or unqualified, is a less than laudable objective. Second, this issue of supply raises the question of how much mathematics is required by females to enable them, on the basis of mathematical skills, to compete equitably with males in the job market. This question pertains to the amount and nature of mathematics demanded by the job itself. We know that roughly two-thirds of the labor market requires some mathematics, and to the extent that females do not possess mathematical skills, they cannot successfully compete for those jobs. A college major or minor in mathematics, combined with a major or minor in another field, might well give females the best combination of skills either for immediate entry into the labor market or for advanced graduate training in fields other than mathematics. From this standpoint, departments might well begin to find solutions to sex inequity by offering minors or other structural programs in mathematics that are specifically designed to meet the various labor market demands of, say, social science, pre-law, pre-med, engineering, or humanities majors. Third, insofar as sex differentiation in mathematics is so broad based, the means of encouraging young males and females must be correspondingly broad. Clearly this is the most difficult policy question of all, because it involves the private spheres of family and friendship participation. However, after-school clubs or activities involving mathematics might be designed to help females achieve more focused orientations. Diffuse females must somehow acquire a capacity to deflect militating influences and they must learn to "see" mathematics in their daily lives as males tend to do. Educational institutions, teachers, and parents can encourage this by making an effort to channel leisure time and to encourage females to play at mathematics as men and boys do. Any program such as this must allow for individual differences yet be sex blind in its structure and functioning. This kind of activity would not be designed to produce more female mathematicians, but to help provide for them a set of values, self perceptions, and facts about the world that they can use in making their own decisions later in life. Fourth, in light of contemporary times, graduate departments must diversify yet focus even harder on instilling excellence in their graduate students. This notion implies that equity cannot be achieved solely through programs such as affirmative action (although such programs certainly function well to sensitize people to issues of inequity) or forms of "reverse discrimination." Rather equity must come from responsible responses to conditions of pluralism. The organization of departments must be capable of instilling excellence not only in students oriented toward research in pure mathematics but in the applied areas as well as secondary education. This horizontal diversification, which would reflect various career and personal goals of students, must be accompanied by vertical integration. Such integration would tend to eliminate the prestige hierarchy in mathematics which has a tendency to discredit areas not directly relating to pure mathematics. The uniform emphasis on excellence could be reflected in faculty positions that pertain directly to alternative careers in mathematics and in which incumbents of those positions are rewarded not solely on the basis of their mathematical discoveries but on the basis of their performance in alternative career education and placement. The concern for both diversification and excellence as two fundamentally inseparable dimensions of graduate departments could have the consequence of identifying and nurturing talent in students whether they conform to the focused or diffuse models previously discussed.

This concern stems not only from the findings of our research but from our personal values. Those values hold that, above all, educational institutions are in the business of producing excellence. To the extent that systematic patterns of differentiation, such as those based on sex, inhibit the identification and development of talent, however, those institutions must be held accountable for failing their mandate.

OF POSSIBLE INTEREST

Applications for Interdisciplinary Incentive Awards are due at NSF on February 1, 1983. These awards enable individuals trained in either the sciences or the humanities to enhance their ability to address contemporary ethical issues in science and technology. Applicants must have five years professional experience and a record of accomplishment in their special field. Applications must identify host specialists with whom applicants will work over the course of the award. Recipients receive a stipend of up to $20,000 yearly, for a maximum period of two years, and a modest allowance for travel and activities support. Detailed application forms may be obtained from the EVIST program, NSF, Washington, DC 20550, or from the HST program, NEH, Washington, DC 20506.

Women's studies, women of letters. G.K. Hall Publishers, 70 Lincoln St., Boston, MA 02111.

Judge, Lawyer, Victim, Thief: Women, Gender Roles, and Criminal Justice, edited by Nicole Hahn Rafter and Elizabeth Anne Stanko. Northeastern University Press, P.O. Box 116, Boston, MA 02117.

Books and Journals in Women's Studies. Transaction Books, Rutgers-The State University, New Brunswick, NJ 08903.

Family issues and women's studies. Sage Publications, The Publishers of Professional Social Science, 275 South Beverly Drive, Beverly Hills, CA 90212.

Women's issues. ILR Press, New York State School of Industrial and Labor Relations, Cornell University, Box 1000, Ithaca, NY 14853.

DEADLINES: Jan. 24 for Mar.-Apr., Mar. 24 for May-June, May 24 for July-Aug.
AD DEADLINES: Feb. 6 for Mar.-Apr., Apr. 5 for May-June, June 5 for July-Aug.
ADDRESSES: Send all material except ads to Anne Leggett, Math. Dept., Western Illinois University, Macomb, IL 61455. Send everything else, including ads, to AWM, P. O. 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 institutional advertisers below are Affirmative Action/Equal Opportunity employers.

University of Alabama, Huntsville. Dept of Mathematics, Huntsville, AL 35899. F. L. Cook, Chmn. One or more tenure track positions, beginning 9/1/83. Rank & salary commensurate with experience & credentials. Required: excellent research ability & a specialty area of numerical analysis, differential equations (ordinary or partial), mathematical modeling, or optimization. Funded research experience desirable. By 2/1/83 send application, vita & 3 letters of reference to Chmn.

CA State University, Chico. Dept of Math, Chico, CA 95929. Dr. Jim Jones, Chair. Three tenure track full time positions, Fall, 1983. All require Ph.D in math or stat. Candidate should have broad math background & be able to teach a diversity of undergraduate courses. Teaching load 12 units. Salary range $19,044 - $28,884. By 2/15/83 send application, resume & 3 reference letters.

CA State University, Fullerton. Dept of Math, Fullerton, CA 92634.(1) Several lectureships Fall, 1983. Teaching load 12 units per semester, lower division, upper division and/or graduate. Required: Ph.D., outstanding teaching qualifications & demonstrated research capability. Rank & salary($20,868-$36,540) determined by experience & qualifications. By 3/31/83 send vitae & inquiriesto Chair of Selection Committee. (2) Tenure track position in numerical analysis 1983/84. Teaching load 12 units per semester, lower division, upper division and/or graduate. Required: Ph.D., outstanding teaching qualifications & demonstrated research capability. Rank & salary (20,868 - $36,540) determined by experience & qualifications. By 2/15/83 send vitae & inquiries to Chair of Selection Committee. (3) Tenure track position in modelling, numerical analysis, or optimization 1983/84. Teaching load 12 units per semester, lower division, upper division and/or graduate. Required: Ph.D., outstanding teaching qualifications & demonstrated research capability. Rank & salary (20,868 - $36,540) determined by experience & qualifications. By 3/1/83 send vitae & inquiries to Chair of Selection Committee.

CA State University, Sacramento. Dept of Math & Stat., 6000 J Street, Sacramento, CA 95819. Wallace Etterbeek, Chair. (1) Three tenure track Asst Professorships. Salary range $20,868 - $22,896. Required: Ph.D. in Math or Stat. completed by 9/83, good teaching ability & 3 reference letters. Interested in applicants in fields of applied probability & statistics or computer oriented applied mathematics, or those who have a record of publications and are continuing research in pure or applied math or stat. Appointee will teach 12 units for Dept each semester. Apply by 2/1/83. (2) One year Asst Professorship (salary $19,044 - $22,896) 8/83. Required: Ph.D. in Math or Stat.; 12 unit per semester teaching load; commitment to excellence in teaching. By 3/1/83 send resume, transcripts & 3 letters of recommendation to Math & Stat Hiring Committee.

San Jose State Univ. Dept of Math & Comp Sci, San Jose, CA 95192. Dr. John Mitchem,Chair. Five tenure track Asst Professorships (possibly 1 Assoc Professorship). Required: Ph.D. by 8/1983 with competence in at least one of pure or applied mathematics, computer sci or stat; commitment to quality teaching at all levels, interest in curriculum development & departmental affairs. Salary for Asst Prof is $19,044 - $22,896; for Assoc Prof $23,976 - $28,884. By 2/15/83 send vitae & 3 letters of reference.

Univ of CA, Berkeley. Dept of Statistics, Berkeley, CA 94720. Leo Brieman, Chmn., Personnel Committee. (1) Assoc. Professorship tenure track Fall, 1983. Ph.D. required. Teach courses in probability & statistics; conduct program of interesting research with emphasis on applicable statistical methodologies. Apply by 2/15/83. (2) Assoc. or full professorship with tenure Fall, 1983. Required: distinguished research record in statistics. Apply by 2/15/83.

University of California, Davis. Dept of Mathematics. Two positions in Computer Science effective 7/1/83. Level of appointment determined by qualifications. Required: Ph.D. in computer science or related field with evidence for potential for research and teaching in computer science. Prefer candidate to teach computer science at upper division and graduate levels. Send resume and 3 letters of recommendation to Carlos R. Borges, Chairperson, Dept of Math, Univ of CA, Davis, CA 95616.

Univ of CA, Santa Barbara. Dept of Math, Santa Barbara, CA 93106. Prof James B. Robertson, Chmn. (1) Tenure track asst professorship in nonlinear differential equations & global analysis. Required: outstanding res. potential & excellence in teaching; research specialties in dynamical systems, global or qualitative theory, or modern mathematical physics desired. Send resumes & letters of recommendation to Chmn. (2) Openings for visiting lecturers and/or visitors in Stat for 83/84. Looking for strong interests in research & teaching. One year appts with possibly a second year. Faculty on sabbaticals who can spend part of year are also encouraged to apply. Salary depends on qualifications & experience. Send vita, list of publications & names of 3 references to Chmn by 3/1/83.

Metropolitan State College. Dept of Math Sciences, Box 38, 1006 11th St., Denver, CO 80204. R. D. Whittekin, Chmn. Three positions for Fall, 1983. Required: Ph.D. in math or closely related fields & evidence of effective teaching. Teaching load 12 hours per semester. Three year probationary period required before regular faculty status granted. Application & resume due 1/24/83, and 3 reference letters and transcripts due 2/14/83.

Albertus Magnus College. Dept of Math, 700 Prospect St., New Haven, CT 06511. Prof Florence Jacobson, Chair. Full time position 9/1/83. 12 hours teaching per week. Prefer Ph.D. in math with some expertise in comp sci. Undergraduate teaching experience desirable. Rank & salary depend on qualifications. By 3/15/83 send resume & 3 letters of recommendation.

Connecticut College. Dept of Math, Box 1614, New London, CT 06320. S.Wertheimer, Chmn. Asst Professorship in Math/Comp Sci. Required: Ph.D. & commitment to scholarship & teaching (3 courses per semester) introductory & advanced comp sci & math. Our computer resources include a PRIME 550II (48 lines) & several micros. Send resume & 3 letters of recommendation to Chmn.

Wesleyan University. Dept of Math, Middletown, CT 06457. Anthony W. Hager, Head. Junior tenure track position in Comp Sci, Fall, 1983. Area of specialization is completely open & teaching responsibilities are two courses per semester. Wesleyan's central computing system operates a DEC SYSTEM - 2060. By 2/15/83 send vita & 3 letters of recommendation to Head.

University of Central Florida. Dept of Math, CCII, Rm 226, Orlando, FL 32816. Position of Chair of the proposed Dept of Math, effective Fall, 1983. Required: established record of excellence in research, strong commitment to teaching & capability for leadership & administration. In addition to Ph.D. in Math, candidate must possess experience & background appropriate for the rank of Professor. Current Dept has 29 faculty members. By 2/1/83 send vita, 3 letters of reference & transcripts to Chair, Search Committee.

Southern IL Univ, Carbondale. Dept of Math, Carbondale, IL 62901. Ronald Kirk, Acting Chmn. (1) Visiting positions 8/16/83. Required: Ph.D. preferred. Strong credentials in teaching. Research interests compatible with those of faculty. Duties: teaching 12 hours per semester & participation in research seminars. Send inquiries by 5/15/83 to Visiting Positions c/o Ronald Kirk. (2) Tenure track asst professorship in analysis. Prefer applicants in areas of complex variables, functional analysis or harmonic analysis. Required: Ph.D. & evidence of excellence in research potential in analysis; teaching excellence preferred. By 2/1/83 send application & 3 letters of recommendation to Analysis Position c/o Ronald Kirk. (3) Tenure track asst/assoc professorship in numerical analysis or optimization. Ph.D. required; demonstrated evidence of excellence in research & potential for such in numerical analysis or optimization. Prefer teaching excellence. By 2/1/83 send application & 3 letters of recommendation to Numerical Analysis/Optimization Position c/o Ronald Kirk.

University of Illinois, Urbana. Dept of Math, Urbana, IL 61801. Heini Halberstam, Head. Two tenure track asst professorships with salary at least $23,000. Persons with exceptional credentials could be considered above this level. One appt will be in some branch of analysis; other will be in some branch of applied math. Will consider applicants in both discrete & continuous applied math. Candidates should have strong research ability & excellence in teaching. By 1/31/83 send curriculum vitae, list of publications, transcripts & have 3 references write us directly.

Saint Mary's College. Math Dept., Notre Dame, IN 46556. Sr Miriam Patrick Cooney, Chmn. Tenure track position (rank & salary negotiable) Fall, 1983. Required: Ph.D., commitment to teaching & active involvement in mathematical scholarship. Teaching load 12 hours per week. Sabbaticals & fringe benefits generous. Apply to Chmn.

University of Iowa. Dept of Comp Sci, Iowa City, IA 52242. Douglas W. Jones, Chmn., Faculty Search Committee. Asst & assoc professorships. Required: Ph.D. & strong research commitment. Limited number of visiting positions may also be open. Dept research facilities include a PDP - 11/23 and a VAX-11/780. Available software includes Unix, Interlisp & Ada. Other facilities include an IBM 70 & a network of Prime 750 & 850 computers. Please send resume, names of 3 references & copies of any recent publications or technical reports.

Kansas State Univ. Dept of Math, Manhattan, KS 66506. Tenure track asst professorship 83/84. Salary commensurate with ability. Required: Ph.D. & demonstrated research ability in numerical analysis of problems in partial differential equations, nonlinear wave propagation, scattering theory or fluid mechanics & ability to solve these problems on computer. By 2/15/83 contact Dept Head.

Kansas State University. Dept of Statistics, Statistical Laboratory, Dickens Hall, Manhattan, KS 66506. Dr. Arthur D. Dayton, Head & Director. Two tenure track asst professorships 9/1983. Teaching, research/consulting positions require Ph.D. in Stat with interest in theory and/or application. By 2/1/83 send resume & names of 3 references.

Bates College. Dept of Math, Lewiston, ME 04240. Prof David C Haines, Chair. Opening for replacement of faculty member on leave 82/83. Position will probably be available following year & may become tenure track. Ph.D. required. Send resume, transcripts & at least 3 letters of recommendation to Chair.

Goucher College. Dept of Math & Comp Sci, Towson, MD 21204. Dr. Robert Lewand, Chmn. Three asst professorships Fall, 1983. Duties: teaching undergraduates both math & comp sci. Average load: 9-11 hrs per wk. Salary from $20,000 depending on experience. Send vita, transcripts of graduate work & 3 letters of recommendation.

U S Naval Academy. Dept of Math, Annapolis, MD 21402. F. I. Davis, Chmn. Three-year tenure track asst professorships Fall, 1983. Initial 10 mo. salary $20,000-$27,000 commensurate with experience & qualifications. Research opportunities exist for augmenting salary during summer intersessional period. Specialization in applied math desired but not essential. Required: Ph.D., commitment to excellence in teaching & ability to pursue independent research. Send resume, transcripts & 3 letters of recommendation to Chmn.

University of Maryland. Dept of Math, College Park, MD 20742. Prof John Osborn,Chmn. Possible tenure or tenure track positions 8/1983. Rank & salary dependent on qualifications. Exceptionally strong research program essential. By 1/15/83 send vita, description of current research & 3 letters of recommendation.

Mass. Institute of Technology. Dept of Math. Two junior openings at instructor or asst prof level 9/1983. We are interested in applied mathematicians or theoreticians who would fit into an environment where there is considerable applied work. Current interests of our faculty involve robust estimation, statistical computing, graphics, pattern recognition, design of experiments, categorical data & time series. Required: Ph.D. by 9/83. Send transcript & vita & have 3 or 4 letters of recommendation sent to Herman Chernoff, Stat Center, MIT, Bldg E40-107, 1 Amherst St., Cambridge, MA 02139.

Worcester Polytechnic Inst. Dept of Math Sciences, Worcester, MA 01609. One or two tenure track asst professorships. Required: Ph.D. & research interests paralleling current activity in Dept (applied analysis, differential equations, applied probability, combinatorics, discrete organization); strong commitment to scholarship & teaching, both in classroom & in advising student research projects. Research & teaching interaction with other disciplines is encouraged. Send resume to P.W.Davis at above address.

Hope College. Dept of Mathematics, Holland, MI 49423. Prof John L. Van Iwaarden, Chmn. Tenure track position. Ph.D. in math preferred. Rank dependent on qualifications & experience. Salary & benefits are competitive. Background & interest in using computers desirable. Prefer candidates in numerical analysis, mathematical statistics, operations research, mathematics education and/or applied math. Require excellence in teaching & strong research activity. Please forward vita, transcripts & 3 reference names to Chmn. You may contact Dept representative at Annual Winter AMS-MAA meetings in Denver.

Hope College. Dept of Comp Sci., Holland, MI 49423. Prof Gordon Stegink, Acting Chmn. Tenure track appt 1983/84. Rank & salary open. Required: commitment to teaching & at least a Master's Degree in comp sci or equivalent experience. Duties: teaching undergraduates at all levels; supervising undergraduate research projects & advising undergraduate majors. College anticipates delivery & installation of a network of DEC VAX 11/750 computers by summer of 1983. In addition Dept supports a microcomputer laboratory which contains 6 Radio Shack TRS-80s, an Apple II, a tektronics 4051, and an Ohio Scientific Challenge II. Please contact Chmn.

Michigan State University. Dept of Math, E. Lansing, MI 48824-1027. Prof J.E.Adney,Chmn. (1) Several (full time tenure track) asst professorships 9/1/83. Ph.D. in math with interest in research & teaching. By 1/1/83 send resume & have 3 letters of recommendation sent. (2) Two postdoctoral fellowships in math. Appt for 1 year with second year renewable depending on funds. Duties include teaching one course each term & spending rest of time on research. These fellowships are normally offered to persons (regardless of age) who have had doctorate less than 2 years. Apply by 1/1/83.

Michigan Technological University. Dept of Math & Comp Sciences, Houghton, MI 49931. Dr. Richard Millman, Head. Several tenure track positions in applicable mathematics (e.g. probability, fluid mechanics, ODE, POE, etc.) statistics, differential geometry, operations research, numerical analysis & computer science. Also several visiting positions. Required: excellent research & teaching . To apply, write Dr. Millman, Head.

Mankato State University. Dept of Math, Astronomy & Statistics, Mankato, MN 56001. Dr. C. D. Alders, Chmn. Tenure track asst professorship 1/83 or 9/83. Ph.D. required. Prefer applicants in numerical analysis or applied math. Research interests must be compatible with needs of Dept. Apply by 12/1/82 for 1/83 employment and by 2/15/83 for 9/83 employment. Send vita, research interests & 3 letters of recommendation.

University of Minnesota, Minneapolis. School of Mathematics (127VH) 206 Church St.,S.E. Minneapolis, MN 55455. Willard Miller, Jr., Head. Several tenure track positions. Outstanding research & teaching abilities required. Ability to interact with mathematicians in other fields. Salary competitive. Current teaching load 5 one-quarter courses per academic year. Send vitae & 3 letters of recommendation by 2/1/83.

Winona State University. Math & Comp Sci Dept, Winona, MN 55987. Janet Sill, Search Committee. Full time tenure track appt as asst/assoc prof 9/1983. Primary duty to teach undergraduate computer science courses based on ACM guidelines; some mathematics courses possible. Master's degree in comp sci or doctorate in one of the math sciences with demonstrated competence in comp sci. Salary 22-31K. Open until filled. Apply to Janet Sill.

University of Nebraska, Lincoln. Dept of Math & Stat, Lincoln, NE 68588-0323. Tenure track asst professorship in stat/probability 8/1983. Two course teaching load at undergraduate & graduate levels. Required: evidence or promise of strong research & teaching ability. By 2/1/83 send resume, transcripts & 3 letters of recommendation to Daniel Mihalko, Chairperson, Search Committee.

Dartmouth College. Dept of Math, Bradley Hall, Hanover, N.H. 03755. (1) Prof in Comp Sci. Required: established record in research, strong interest in teaching & interest in providing leadership for a growing program in comp sci. (2) John Wesley Young Instructorship. Two year, non-renewable, postdoctoral appt for Ph.D's with strong interests in teaching & research. Teaching duties average 6 hours/week. Stipend of $18,000 supplemented by resident research fellowship of $2500. For both positions write to Martin Arkowitz, Chmn.

Montclair State College. Dept of Math & Comp Sci, Box V137W, Upper Montclair, N.J. 07043. Kenneth C. Wolff, Chmn. Three tenure track positions (Instructor/Asst Prof) in Comp Sci or Comp Sci & Math 9/1/83. Teaching load 12 hours per semester. Required: Masters in Comp Sci or Ph.D. in related field. Salary range: $16,080 - $21,707 for Instructor; $19,546 - $26,390 for Asst Prof and $23,780 - $32,080 for Assoc Prof. Send resumes & inquiries to Prof. Wolff.

Rutgers, the State Univ of N.J. Dept of Math, New Brunswick, N.J. 08903. Prof. Charles Sims, Chmn. (1) Visiting positions. Required: proven record of outstanding research in pure or applied math & concern for teaching. These are nonrenewable one or two year positions. (2) Hill asst professorships. Required: recently received Ph.D., outstanding promise of research in pure or applied math & concern for teaching. These are 3 year nonrenewable positions.

(3) Tenure track asst professorships. Required: Ph.D; outstanding research ability in pure or applied math & concern for teaching. (4) Senior Mathematical Physicist at full professor level. Required:national & international record of outstanding research & concern for teaching. (5) Instructorships & lectureships. Required: special concern for teaching, but some interest in research; Ph.D. received or imminent. These are one or two year non tenure track non-renewable positions. For all positions send resumes & 3 letters of recommendation to Chmn.

Rutgers, the State Univ. of N.J. Dept of Statistics, New Brunswick, N.J. 08903. Dr. William E. Strawderman, Chair. Asst. Professorship, Fall, 1983. Ph.D. required by 12/31/83. Appt is for 3 years on tenure track line. Duties: teaching undergraduate & graduate statistics; research in stat leading to publications in refereed journals; statistical consulting with faculty & students conducting research in the Ag. Exp. Station. Please contact Chair.

Rutgers, the State Univ of N.J. Dept of Math, NCAS, Newark, N.J. 07102. Jane Gilman, Chmn. Tenure track asst/assoc. professorship Fall, 1983. Required: Ph.D. in Comp Sci or Math & ability to assist Dept in expansion of present Comp Sci minor to a major. Teaching load 9 hours per semester; strong research accomplishment or potential in area of Comp Sci or Math. Send resume & 3 letters of recommendation to Chmn.

New Mexico State Univ. Dept of Math Sciences, Las Cruces, N. M. 88003. Carol L. Walker, Head. Visiting position(s) & possible tenure track position(s) in math, numerical analysis or statistics, Aug. 22, 1983. Salary 83/84 $19,000 & higher depending on rank, qualifications & experience. Required: Ph.D. & commitment to teaching & research. Send vita & have 4 letters of reference sent to Head.

Hamilton College. Dept of Math, Clinton, N.Y. 13323. Anne L. Ludington, Chair. One year position to replace faculty member on leave. Teaching 10 hrs/semester. Rank & salary dependent on experience. Send vitae & 3 letters of reference to Chair.

Russell Sage College. Women's Div. Dept of Math Sciences, Troy, N.Y. 12180. Dr. Rita Murray, Chairwoman. Tenure track asst professorship Fall, 1983. Prefer applicants with evidence of outstanding teaching. Course load includes undergraduate courses in math as well as service courses in comp sci. Salary depends on qualifications. Send resume & references by 2/1/83.

Rensselaer Polytechnic Inst. Dept of Math Sciences, Troy, N.Y. 12181. Robert E. O'Malley, Jr., Chmn. Tenure track openings at all levels 9/1983. Ph.D. & strong research potential in applied math or comp sci required for junior positions & outstanding record in applied math or comp sci for senior level appts. Teaching 6 to 7 hours/week per semester. Two or three visiting & postdoctoral appts - all levels. Contact Chmn.

St. Lawrence University. Dept of Math, Canton, N.Y. 13617. R.G.Cromie, Search Committee Chmn. Several tenure track asst/assoc professorships 9/83. Ph.D. in math sciences. Prefer candidates whose interests parallel interests of current faculty, & who can teach intro. comp sci or assist in math/econ major. Quality teaching & research potential expected. By 1/31/83 send letters & resume to R.G.Cromie.

University of Rochester. Statistics Search Committee, Box 630, Rochester, N.Y. 14642. Several tenure track asst professorships or higher for 83/84 in Dept of Stat, Div of Biostatistics or jointly. Required: strong research potential in some area of statistical theory or methodology or the interface with computing. One position is joint with the Cancer Center; other possibilities for joint appts exist with another mathematical science or social science. Salary $20,000 up. Persons with recently completed Ph.D's (or near completion) may apply. Send applications (with 3 letters) to Stat. Search Committee.

Syracuse University. Dept of Math & School of Education, Syracuse, N.Y. 13210. Tenure track renewable assoc.professorship; research potential important, teaching experience desirable, & doctorate required, with specialization in math education. By 2/15/83 send detailed vita, 3 letters of reference & transcript to Prof. L.J. Lardy, Chmn. Dept. of Math.

University of North Carolina, Chapel Hill. Dept of Math, Chapel Hill, N.C. 27514. Lectureship or visiting asst. professorship 8/1983. Required: strong research program & excellent teaching. Send 3 letters of recommendation, vitae & abstract of research program to Chmn., Math Dept.

Cleveland State Univ. Dept of Math, Cleveland, OH 44115. Thomas W. Hungerford, Chmn. Visiting asst/assoc professorship 83/84. Required: Ph.D. & established record and/or strong potential in research. Commitment to excellence in teaching. Normal teaching load 2 courses per semester. Competitive salary & excellent fringe benefits. By 2/15/83 send vita & 3 letters of recommendation.

Miami University. Dept of Math & Stat, Oxford, OH 45056. David J. Lutzer, Chmn. (1) Tenure track asst professorship in Stat 8/1983. Required: Ph.D. in Stat, ability in research & interest in teaching. (2) Tenure track asst professorship 8/1983. Required: Ph.D. in math, stat or math educ; teaching ability & interest in research. Knowledge of statistics or computing desirable. Duties: teaching 12 hours per semester on Hamilton Branch Campus (near Cincinnati). Send vita, graduate transcripts & 3 letters of recommendation to Chmn.

Oberlin College. Dept of Math, Oberlin, OH 44074. Robert M. Young, Acting Chmn. Three year continuing (tenure track) faculty position 83/84. Duties: (1) teach a semester course in linear algebra, (2) teach other courses from beginning & advanced offerings of Dept, to make total of 5 courses per year, (3) participate in senior Honors Program and (4) participate in academic advising, service on committees & scholarly research. Required: Ph.D. completed or expected by 9/83; strong interest in teaching & productive scholarship; interest in mathematical modeling & applications. Salary $17,500 or higher. By 2/1/83 send application, vita, academic transcripts & related information to Acting Chmn.

Lewis & Clark College. Dept of Comp Sci, Portland, OR 97219. Prof H.S.Shapiro, Comp . Search Committee. Position in expanding Comp Sci program. While Ph.D. is preferred, other applicants should apply. Appointee will teach a broad spectrum of undergraduate courses. College stresses quality teaching & provides opportunity for research. By 1/15/83 send vitae, transcript & 3 letters of recommendation to Prof. Shapiro.

University of PA. Dept of Math EL, Philadelphia, PA 19104. Prof. Jerry L. Kazdan, Chmn, Personnel Committee. A limited number of teaching-research positions in mathematics 83/84. Appt effective 7/1/83. By 1/1/83 send resume & 3 letters of reference describing both research & teaching ability.

Rhode Island College. Dept of Math & Comp Sci, 600 Mt Pleasant Ave., Providence, R.I. 02908. Helen E. Salzberg, Chair. Tenure track position 8/1983. Required: at least a Master's in Comp Sci with undergraduate work in Comp Sci, math, or a related field. Duties include research & teaching. Salary $20,000 - $27,000, good fringes, summer employment. By 3/1/83 send application with college placement office credentials to Office of Personnel Services, Atten: Math & Comp Sci Dept.

University of Tennessee. Dept of Math, Knoxville, TN 37996/1300. John S. Bradley, Head. Professorship or Assoc Professorship in numerical analysis 9/1983. Areas of interest include numerical partial differential equations, numerical linear algebra, optimization and nonlinear systems. Successful appointee should have outstanding research record & will be expected to complement and provide leadership in a strong, established numerical analysis program. Possible tenure track openings at junior level and/or visiting positions with level depending on qualifications. Research interests should be compatible with those of present faculty: algebra, analysis, integral equations, math ecology, numerical analysis, ordinary & partial differential equations, probability statistics, topology. Send resume to Head.

University of Texas, Austin. Math Dept, Austin, TX 78712. E.W. Cheney, Recruitment Committee. Two tenure track asst professorships & four two-or-three year terminal instructorships Fall, 1983. Asst professorships should be at least 2 or 3 years past Ph.D. with strong research records. Instructor candidates should have recent Ph.D's in areas in which Dept has active research. Contact E. W. Cheney.

University of Texas, San Antonio. Div of Math, Computer Science & Systems Design, San Antonio, TX 78285. Prof Stanley G. Wayment, Director. Several tenure track Asst/Assoc Professorships 9/1983. Required: Ph.D. & an interest in teaching & research. Applicants in mathematics, statistics, computer science, systems design or mathematics education will be considered. Send vita to Director.

Norwich University. Dept of Math, Northfield, VT 05663. Steven K. Ingram, Chmn. Instructor of asst professor 9/1983. Ph.D. or ABD in comp sci or numerical analysis preferred. Expert professional interest in teaching undergraduates. Send application, vitae & 3 letters of reference by 2/1/83 to Chmn.

University of Washington. Dept of Math GN 50, Seattle, WA 98195. Opening for numerical analyst with expertise in area of numerical solutions of partial differential equations. Rank & salary open. Excellent computing facilities. Required: Ph.D. & strong teaching & research records. Send curriculum vitae, bibliography & have 4 letters of recommendation sent to Chmn., Appointments Committee.

University of Wisconsin, Eau Clair. Math Dept., Eau Clair, WI 54701. Dr. Marshall E. Wick, Chmn. One or two year lectureship with possible renewal (not tenure) Aug.1983. Teach variety of undergraduate courses; some preference to those in algebra. Doctorate preferred; also excellent teaching. Send application, resume, graduate & undergraduate transcripts & 3 letters of recommendation to Chmn by 1/31/83.

Late Arrivals

University of Kansas. Dept of Math, Lawrence, KS 66045. C. J. Himmelberg, Chmn. Several postdoctoral instructorships. One year appt, but normally renewable for second or third year. Required: Ph.D. or nearly Ph.D. completed. Prefer applicants whose research interests mesh with those of current staff. By 3/1/83 send resume & dissertation abstract & have 3 letters of reference sent to Chmn.

U Mass, Boston. Dept of Math Sciences, Boston, MA 02125. Prof Ethan Bolker. Several positions in undergraduate & Master's program in Comp Sci. Rank & salary open for regular faculty positions, Director of Master's Program and for long term, part-time positions for persons in computer industry. Required: Ph.D. (completed or expected) in comp sci (or equivalent experience), research or research potential in comp. sci, interest in teaching. Send resume & cover letter to Prof. Bolker.

Oberlin College. Dept of Math, Oberlin, OH 44074. Robert M. Young, Acting Chmn. Instr/Asst Professorship. 3 year appt 83/84. Ph.D. completed or expected by 9/83. Broad background in math; specialties in topology, geometry, number theory & analysis preferred. Teach 5 courses per year. Salary $17,500or higher. By 2/18/83 submit resume & have transcripts plus 3 letters of reference sent to Acting Chmn.

Bryn Mawr College. Dept of Math, Bryn Mawr, PA 19010. F. Cunningham, Jr., Chmn. Looking for person for one year appt 83/84. Candidate should have Ph.D. or be close to it. Must be interested in & have promise in teaching & research. Please send application & 3 letters of recommendation to Chmn.

SUNY - Albany. Dept of Math & Stat., Albany, N.Y. 12222. Prof L. Childs, Chair.
(1) Asst professorship in Stat 9/83. Qualifications: promise of excellence in research, strong teaching ability, interest in & aptitude for applications.
(2) Asst professorship in math 9/83. Qualifications: promise or evidence of excellence in research, strong teaching ability, compatibility of research interests with those of existing faculty. Send vita, summary of research interests & have 3 letters of recommendation sent to Chair.

Reed College. Dept of Math, Portland, OR 97202. H.E.Chrestenson, Chmn, Search Committee.
One or two one-year positions expected 8/1983. Teaching load 11 hrs per week. Ph.D. desirable. These are non tenure track positions, replacing faculty on leave. Applications accepted until positions are filled.

University of Oregon. Dept of Math, Eugene, OR 97403. Theodore W. Palmer, Head.
Assoc Professorship 9/83 with research specialty in statistics or probability. Required: Ph.D. & record of teaching & research in one of these specialties & ability to direct Ph.D. research. Competitive salary with excellent fringe benefits. Two year fixed term appt with tenure consideration by second year. Apply by 1/30/83.

College of Wooster. Dept of Math Sciences, Wooster, OH 44691. Donald G. Beane, Chmn.
Renewable position 9/83 for person to teach elementary & advanced mathematics. Prefer people with specialties in discrete math/combinatorics, applied math or statistics. Required: Ph.D. received or imminent; excellence in teaching. Normal teaching load 3 courses per semester & direction of senior independent study in the specialties. Contact Chmn.

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JANUARY/FEBRUARY, ~~1982~~ 1983