FOCUS

Carnegie Corporation Awards MAA Second Grant for Intervention Projects

The Carnegie Corporation of New York has awarded the MAA a second two-year grant in the amount of $350,000. This renews a two-year grant awarded in May 1991 for $327,000. The purpose is to assist Strengthening Underrepresented Minority Mathematics Achievement (SUMMA). This is MAA's program to encourage college and university mathematics faculty to initiate or replicate intervention projects for minority middle and high school students. Under the first grant, twenty-four faculty were awarded a total of $100,000 in small planning grants of up to $5,000.

SUMMA has encouraged twenty-nine projects in the last two years and eighteen more are being planned. The goal is to have every mathematics department sponsor a project each summer for underrepresented minorities. By early 1993, the original Carnegie funds had leveraged an additional $2.7 million from both public and private sources.

THE 1993 AWARDEES ARE

- Martha Aliaga, University of Michigan
- Lyle Anderson, Montana State University
- Ernest Berman, Truman College
- Kenneth Bernard, Niagara University
- Lily Christ, John Jay College, CUNY
- Eugene Curtin, Southwest Texas State University
- Richard Gillman, Valparaiso University
- Gwendolyn Humphrey, Florida A&M University
- John Pantano, Santa Fe Community College
- Nagaraj Rao, Mercy College
- Harriett Walton, Morehouse College
- Jack Worrell, Atlanta Metropolitan College

The institutions include three community colleges, three historically or predominantly Black colleges or universities, four Hispanic serving institutions, as well as liberal arts colleges, comprehensive universities and doctoral institutions. The states represented are Florida, Georgia, Illinois, Indiana, Michigan, Montana, New Mexico, New York, and Texas. A SUMMA spokesman said he was unaware of any mathematics projects for pre-college students directed by mathematicians in the sixteen states outlined on the map on page 2.

The activities under the new grant will involve assisting the awardees in project design and proposal writing. The first step was a proposal

Mathematics at the AAAS

As in previous years, mathematics was well-represented at this year's annual meeting of the American Association for the Advancement of Science, held in Boston in early February. For the truly dedicated, it was possible to spend the entire five-day meeting listening to mathematical talks, though that was not the intention of the AAAS, which seeks to bring scientists and interested laypersons together to discover more about each other's disciplines.

Most of the scheduled events at the AAAS are organized into special half-day sessions, each with four to six presentations running in parallel "tracks." Not all the mathematical talks were in the dedicated "mathematics track"; mathematics formed a significant theme in sessions on anthropology (a series of talks on ethnomathematics, organized by Chandler Davis, University of Toronto), atmospheric and hydrospheric science, chemistry, medical sciences, physics, psychology, social, economic and political science, and statistics.

In the mathematics track, sessions included a series of technical (though very accessible) talks on randomized algorithms organized by Peter Winkler, Bellcore; "Operations Research and Mathematics," arranged by Carl Harris, George Mason University; "Knots in Mathematics and Physics," organized by Louis Kauffman, University of Illinois at Chicago; and "The Impact of Symbolic Computation on Mathematics and Science," arranged by Zaven Karian, Denison University. In the session on the mathematics of everyday language, organized by Keith Devlin, Colby College, all the talks were given by non-mathematicians, and the emphasis was on demonstrating the role that mathematics could play in linguistics. Similarly the session, "Can Computational Modeling Contribute to Industrial Competitiveness?", organized by James Glimm, SUNY at Stony Brook, and Peter Castro, Eastman Kodak, tried to establish the gains that can follow if mathematicians look beyond the borders of their own discipline.

Summer Meetings Information

Vancouver, BC 15-19 August 1993

University of British Columbia

see page 19

MAA Teaching Awards

see page 6

Preston's "Mountains of Pi" Wins AAAS Science Writing Award

At the AAAS meeting in Boston, free-lance writer Richard Preston received the Westinghouse-AAAS science writing award for his article, "Mountains of Pi," a fascinating account of the Russian emigré mathematicians Gregory and David Chudnovsky, which appeared in the *New Yorker* magazine on March 2, 1992. Later, speaking of his award, Preston told FOCUS, "The award from the AAAS shows that the larger scientific community is beginning to raise serious questions regarding the failure of American mathematicians to find Gregory and David a place in the American academic community. Gregory's situation is a scandal and it won't go away."

Photo by Alison Speckman

Shabazz Honored by AAAS

Abdulalim Abdullah Shabazz, Clark Atlanta University, won the AAAS Mentor Award for his outstanding leadership efforts to increase the participation of minorities in mathematics.

Commenting on his award, Shabazz told FOCUS, "I am happy to receive this award. It was a result of the grace of God, and my upbringing. My mother, stepfather, and father gave me the drive to go forward and seek excellence in whatever I wanted to do. My students and teachers have been a great help in making me what I am today.

"What this award really means is, if we go about things in a natural way, and treat students as our own, and give them guidance as a parent, we direct the students in the right way. This enables them to work in the right direction. This works with all students. I teach young people, and older people, and we relate to each other as family. If students are taught with that kind of concern, then they make progress."

Carnegie *from page 1*

writing workshop at the MAA headquarters in Washington, DC in late February. Multiple funding sources will be identified for each project through the use of a development consultant. SUMMA staff will not only visit each new project once it is established, but will also visit selected schools during the design and writing phase of their projects. An additional $50,000 in small grants will be awarded in early 1994.

To tie in the newly developed projects with existing projects, a SUMMA Consortium of Intervention Projects (SUMMAC) has been funded by the National Science Foundation through 1995. The first annual meeting of this companion activity, held in November 1992, is described elsewhere in this issue of FOCUS.

Commenting on the new award, SUMMA Director William Hawkins said, "The funds received under this new Carnegie grant will have a tremendous impact on minority middle and high school students and the mathematics community if the results of the first grant are any indication. The youngsters' lives will be enriched as they participate in mathematics-based summer or academic year projects. The mathematics faculty will help to develop a new generation of numerate professionals. The involvement of mathematicians in pre-college education will be a highly beneficial side effect. These changes bode well for the diverse America of the year 2000 and beyond."
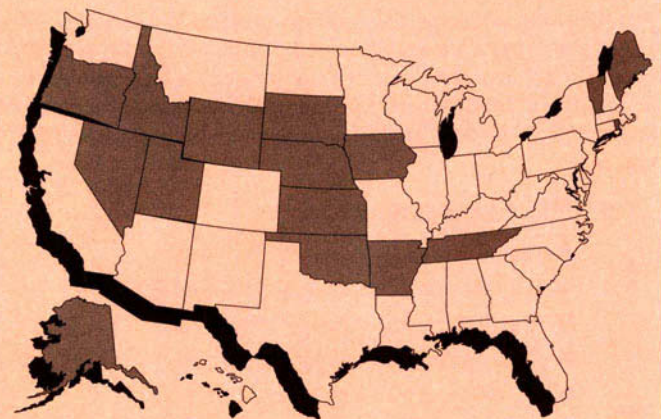
STATES WITHOUT MATHEMATICS-BASED INTERVENTION PROGRAMS

(SHADED)

AAAS *from page 1*

MAA Executive Director Marcia Sward was one of the speakers in the special session on interdisciplinary curricula in mathematics, statistics, and science.

And for those for whom mathematics has always seemed a black art, Karen Parshall, University of Virginia and Judith Grabiner, Pitzer College, organized a session entitled "How Mathematicians Think."

Overall attendance at the AAAS meeting has been growing in recent years, and so has the amount of mathematics included in the program.

One regular attendee at the AAAS meeting was overheard to remark that he always used to spend the meeting going to non-mathematical talks for a change from the specialist mathematics events he went to the rest of the year, but there were so many fascinating mathematics topics this year he found himself spending most of the time at the mathematics sessions.

Next year's AAAS meeting is due to be held in San Francisco, always a highly popular conference location. Watch for the announcement in FOCUS later in the year.

Change in Bylaws Proposed

G.L. Alexanderson, MAA Secretary

The current Bylaws of the Association describe the timing of the elections of the President-Elect and Vice-President as follows: "This ballot shall be mailed to the membership approximately eight months before the annual meeting and the voting shall close four months prior to the annual business meeting." In practice, this timetable has resulted in ballots being mailed in late April or May and accepted until some time in September. Therefore, new officers are not known at the time of the summer meetings in August. There would clearly be an advantage in assuring a smooth transition between officers if the new officers were identified prior to the summer meetings. Then they could be invited to attend (unofficially) the summer meeting of the Executive and Finance Committees and the Board of Governors. In any case, the period during which ballots can be returned seems extraordinarily long, and experience indicates that very few ballots are returned near the end of the four month period. The officers have been aware of the problem for some time and, at the time of the 1991 election, the Thomason Company, which conducts our ballot counting for us, offered the following advice: "As you can see by the chart, all the activity is within the first 6 weeks. We have discovered that voters usually know their choices as soon as the ballot arrives. You might consider shortening your closing date to 6 weeks."

The ad hoc Committee on Elections considered this problem and has recommended a change in the Bylaws. The only objections to the change were that foreign members, as well as people on leave in the spring, might have difficulty returning their ballots on time. However, the Committee decided that allowing four months for ballots to be returned was excessive, even for members outside the United States. To alleviate the problem for people on leave, the Secretary can insert a notice in FOCUS asking members on leave to notify the Washington office, so that ballots can be sent to correct addresses.

The board of Governors has therefore approved the following change in the Bylaws:

That the statement on elections in Article IV, section 2(b) of the Bylaws:

"This ballot shall be mailed to the membership approximately eight months before the annual meeting and voting shall close four months prior to the annual business meeting."

be revised to read:

"This ballot shall be mailed to the membership by approximately April 1 of an election year; returned ballots must be postmarked prior to June 1."

This proposed change will be brought to the membership of the Association at the Business Meeting in Vancouver, August 18, 1993.

Ninth Annual Allegheny Mountain Section Summer Short Course

The course will be held 21–25 June 1993, and will be given by Ralph Grimaldi, Rose-Hulman Institute of Technology.

The course will once again be held at Allegheny College. Course registration will be $115 and room and board will be $105 for a total of $220.

For further information and an application, contact: George Bradley, Department of Mathematics and Computer Science, Duquesne University, Pittsburgh, PA 15282, (412) 434-5115, e-mail BRADLEY@DUQ3.DUQ.EDU.

CBMS Societies Receive Career Grant

Acting on behalf of the Conference Board of the Mathematical Sciences, the MAA has received a three-year grant from the Department of Energy to develop a comprehensive program to prepare and disseminate information on careers in the mathematical sciences. This initiative will serve as the basis for a sustained effort by the fifteen CBMS member societies to provide up-to-date career information in the mathematical sciences to students, teachers, advisors, and guidance counselors in schools and colleges.

There are four related components to the project:

- Gather information about existing career materials.
- Link mathematics community efforts with other organizations that provide career information.
- Develop needed new materials in print and video formats.
- Establish a subscription program for continuing dissemination of career information.

This program will be directed by Dr. Andrew Sterrett at the MAA headquarters in Washington, DC. Responsibility for general policy and project direction will be vested in a steering committee representing the CBMS member societies. The current members of the steering committee and the societies they represent are: Carol Westfall, AMATYC; Samuel Rankin, AMS; Nancy Flournoy, ASA; Jenny Baglivo, AWM; John Alexander, NAM; Linda Hall, NCTM; Frank Trippi, ORSA; and Leon Seitelman, SIAM.

Career information for students should be lively, appealing, and should reflect the great opportunities and diversity of careers in the mathematical sciences. As the first step, we are seeking information about existing materials and programs, including posters, brochures, videos, books, program ideas. Please send us samples or references for any career material that you or your students have found helpful or useful, as well as your suggestions for where new materials are needed.

All correspondence should be directed to: Dr. Andrew Sterrett, Career Information in the Mathematical Sciences Project, The Mathematical Association of America, 1529 Eighteenth Street, NW, Washington, DC 20036. Telephone: (202) 387-5200, e-mail: asterret@maa.org.

Maryland - District of Columbia - Virginia Section Workshop

A five-day workshop sponsored by the MD-DC-VA Section will be given at Salisbury State University on the eastern shore of Maryland this June. This is the 17th year that the Section has sponsored a workshop.

"Energy Systems Modeling," will be given by Howard T. Odum, Systems Ecologist, University of Florida on 1–5 June 1993. Professor Odum has invented a diagrammatic language that combines energetics and mathematics. This is an opportunity to learn about the emerging field of environmental mathematics.

The registration fee (and deposit) is $100. It is expected that NSF support will be available for college faculty. For more information, contact: Dr. Ben Fusaro, Department of Mathematics and Computer Science, Salisbury State University, Salisbury, MD 21801, or phone (410) 543-6471 or 6470.

Prizes Awarded in San Antonio

Some 3,700 mathematicians descended on San Antonio, Texas, for the annual Joint Meetings of the Mathematical Association of America and the American Mathematical Society on 13–16 January 1993. Though the weather was not always as warm as many had expected, the atmosphere certainly was. As usual, a highlight at the Joint Meetings was the awards ceremonies.

Joel Schneider, of the Children's Television Workshop, received this year's Joint Policy Board for Mathematics' Communications Award for his work on the television program "Square One."

The Carl B. Allendoerfer Award for authors of expository articles published in *Mathematics Magazine* was presented to Gulbank D. Chakerian and (posthumously) David E. Logothetti for their paper "Cube Slices, Pictorial Triangulations, and Probability," which appeared in *Mathematics Magazine* 64 (1991): 219–241, and to Israel Kleiner, York University, Canada, for his paper, "Rigor and Proof in Mathematics: An Historical Perspective," *Mathematics Magazine* 64 (1991): 291–314.

Chakerian is on the faculty at the University of California at Davis. Until his death in 1991, Logothetti was a professor at Santa Clara University. His wife sent the Association the following response to his award: *"Dave Logothetti believed that there is another constant in mathematics, in addition to the ones we officially recognize: that constant is beauty. Concepts of beauty are variables. The Principle of Beauty, and the human need for it, are constant. It was the effort to synthesize some of the elements of beauty in mathematics–symmetry and grace, order and freedom, truth and imagination, and that Something beyond imagination that we call joy–that gave Dave and Don so much delight in working on this project. To all the members of the Mathematical Association of America: Thank you for this great honor. And may your lives, like Dave's, be a thing of beauty and a joy forever."*

The Lester R. Ford Award for authors of expository articles published in the *American Mathematical Monthly* was presented to C. W. H. Lam for his paper, "The Search for a Finite Projective Plane of Order 10," which appeared in the *American Mathematical Monthly* 98 (1991): 305–318. Lam is a professor of Computer Science at Concordia University in Canada.

William Dunham and Howard Eves were this year's winners of the George Pólya Awards, given for an article in the *College Mathematics Journal*. Dunham's award is for his article, "Euler and the Fundamental Theorem of Algebra," *College Mathematics Journal* 22 (1991): 282–293. Eves' award-winning article was, "Two Surprising Theorems on Cavalieri Congruence," *College Mathematics Journal* 22 (1991): 118–124.

Dunham, author of the best selling book *Journey Through Genius*, is currently the Truman Koehlet Sr. Professor of Mathematics at Muhlenberg College. Eves, whose books include the well-known *Introduction to the History of Mathematics*, retired from the University of Maine in 1976.

The Chauvenet Prize for expository writing by a member of the Association was awarded to J. M. Borwein, University of Waterloo, P. B. Borwein, Dalhousie University, and D. H. Bailey, NASA Ames Research Center, for their joint paper, "Ramanujan, Modular Equations, and Approximations to Pi, or How to Compute One Billion Digits of Pi."

The Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics, the Association's most prestigious award, was presented to Henry O. Pollak, formerly of AT&T Bell Laboratories, and currently teaching at Columbia University. Among his many activities and positions, Dr. Pollak served as MAA President in 1975–76.

Israel Kleiner

C.W.H. Lam

William Dunham

Henry O. Pollak

Jonathan M. Borwein, Peter B. Borwein, and David H. Bailey

The first winners of the MAA's Awards for Distinguished College or University Teaching of Mathematics were honored, and a number of them demonstrated their classroom skills at a specially organized session. (Please see "Teaching Brings Its Own Awards," page 6.)

Meritorious Service Award Winners

Edward Maurice Beesley, Professor Emeritus of Mathematics at University of Nevada, Reno, Northern California Section.

Professor Beesley served the Northern California Section in numerous capacities including Vice-Chair, Chair, and Program Chair from 1964–66. At the national level he served on the Committee on Sections, Committee on Visiting Lecturers, Program Committee for the Annual Meeting and as Chair of the Committee on Arrangements for the Annual Meeting (1972).

When asked to describe his reaction to receiving this award, Professor Beesley stated, "The unexpected honor prompted recollections of the activities and colleagues that had been so stimulating through the years. I expect to enjoy continued remembrances." Professor Beesley stated that his most rewarding experience as an MAA member was the "opportunity to serve the organization in many interesting ways and the association with members who have become friends."

Jack Graver, Professor of Mathematics at Syracuse University, Syracuse, New York, Seaway Section.

Professor Graver has been an active member of the Seaway Section for over twenty years, including service as First Vice-President of the Seaway Section and a member of the MAA Board of Governors. Since 1986 he has been a member of the Program Committee of the Seaway Section and a lecturer for the MAA Visiting Lecturer Program. Professor Graver's pastime is working with high school teachers and for over thirty years, he has been an active lecturer in both NSF-sponsored, and other, institutes and workshops for high school teachers.

Professor Graver's most rewarding experience as an MAA member has been the "very many mathematical friendships I have made...I was very pleased and very flattered that my colleagues selected me for this award." When asked who has been the greatest influence on his mathematical life, Graver stated, "Ernst Snapper: I have learned mathematics from many people; but from Ernst I learned to be a mathematician."

Harold Hager, Professor of Mathematics at Southeast Missouri State University, Cape Girardeau, Missouri, Missouri Section.

Professor Hager has been a member of the MAA for over thirty years, and has served as Vice-Chair and Chair of the Missouri Section and as a member of the MAA Board of Governors. Currently, Professor Hager serves on the Missouri Section's Selection Committee for the MAA Distinguished Teacher of the Year. He is active in initiatives that promote the teaching of mathematics and is involved in the Missouri Council of Teachers of Mathematics and the Missouri Mathematics Association for the Advancement of Teacher Training.

Professor Hager described his reaction to receiving this award, stating, "I have had the good fortune of having excellent colleagues, both at Southeast Missouri State University and throughout the state of Missouri. It is through my association with these fine people that this award is possible."

Howard Saar, Assistant Professor of Mathematics at North Central College, Naperville, Illinois, Illinois Section.

Howard Saar has been the Secretary-Treasurer of the Illinois Section since 1967. He was awarded the Illinois Section's Distinguished Service Award in 1983 for his steadfast support of mathematics education and his extraordinary commitment to the work of the Section. Professor Saar retired in 1990, following twenty years as an administrator in the Plainfield School System, at which time he accepted his current position. He has also taught at Western Illinois University, Albion College, and was head of the Mathematics Department at Central Michigan College.

Professor Saar says his most rewarding experiences as an MAA member are the "personal friendships and professional associations with many wonderful people in the Illinois mathematics community...I am deeply honored to have been selected by my colleagues for the award of meritorious service."

Norbert J. Kuenzi, Professor of Mathematics at the University of Wisconsin-Oshkosh, Oshkosh, Wisconsin, Wisconsin Section.

Professor Kuenzi has been a member of the MAA since 1965 and a member of the executive board of the Wisconsin Section since 1978. He was chair of the UW-Oshkosh Mathematics Department from 1976 to 1991. He has made national presentations on how to popularize mathematics with mathematical games.

"Professor Kuenzi has a genius for recognizing the possible and for knowing how to make it a reality," reads the MAA/Wisconsin Section award.

He was chair of the Wisconsin Section from 1979–80 and governor from 1981–84. He has been Chair of the Committee on Mathematics Contests since 1984, and was Chair of the Wisconsin Section Executive Board Nominating Committee from 1982–88.

Jacqueline Moss, Professor of Mathematics at Paducah Community College, Paducah, Kentucky, Kentucky Section.

Professor Moss joined the MAA in 1966 and has been a member of the Kentucky Section since then. She currently serves as Section Secretary-Treasurer, and has served as Section Governor and as a member of numerous MAA committees. At the national level, Professor Moss was elected as Second Vice-President of the Association. She has made contributions to other mathematical organizations, serving as President of the Kentucky Mathematical Association of Two-Year Colleges and as President of her local National Council of Teachers of Mathematics chapter.

Professor Moss has twice been honored as Teacher-of-the-Year at Paducah Community College where she has taught for 27 years. She has been similarly recognized within the statewide community college system.

Responding to the award, Professor Moss stated, "This is one of the real highlights of my teaching career. I have enjoyed every minute of my service because it has been rewarding and I have worked with some great people. I appreciate having had the opportunity to serve the community college movement and mathematics education in the state of Kentucky."

Teaching Brings its own Aw
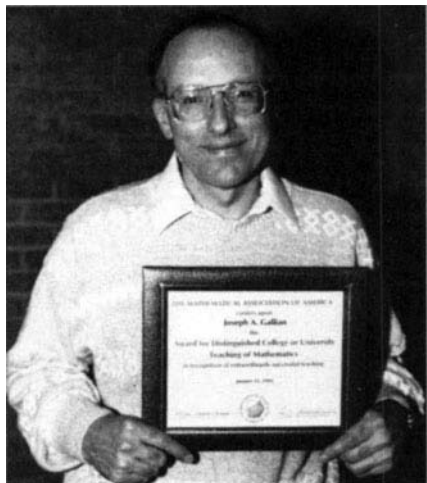
Joseph A. Gallian

Robert V. Hogg

Anne Hudson

Frank Morgan

A notable highlight at the annual Joint Meetings of the Mathematical Association of America and the American Mathematical Society in San Antonio, Texas, on 13–16 January this year was the awarding of the Association's first Awards for Distinguished College or University Teaching of Mathematics.

The following remarks are excerpted from the responses of the awardees.

• Joseph A. Gallian, "The AMS has long had awards for research, expository writing, and service, and the MAA has long had awards for expository writing and service. Now, at last, there is an award for the activity that, for 95% of us, represents our most important and lasting contribution to our profession. It is a singular honor to receive this award and a second honor to be among the first group to be recognized."

• Robert V. Hogg, "It is truly a great honor for me to receive this award. I recognize, however, that the "spinner" just happened to stop on my name among those of many good teachers. So, in a sense, I'm just a symbol for these teachers ..."

• Anne Hudson, "I wish to thank the MAA for instituting an award to recognize teachers of college mathematics, and I feel honored to be one of the 1992 awardees."

• Frank Morgan, "It's a great world for a mathematician."

• V. Frederick Rickey, "My teaching has constantly been honed by reading the Association's publications, by attending its meetings, and by interacting with mathematicians who are interested in teaching."

• Doris J. Schattschneider, "I especially want to thank those who ... showed me that there was "wow!" in mathematics, and appealed to the ham in me.... The only thing I'm sure about in teaching is that there is no algorithm for learning."

• Philip D. Straffin, Jr., "For teaching and learning to proceed with verve, a subject must have excitement and beauty; a teacher cannot pump up dull ideas. What could have more beauty and excitement than mathematics?"
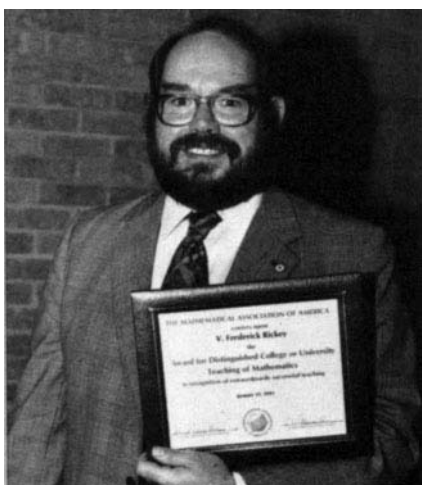
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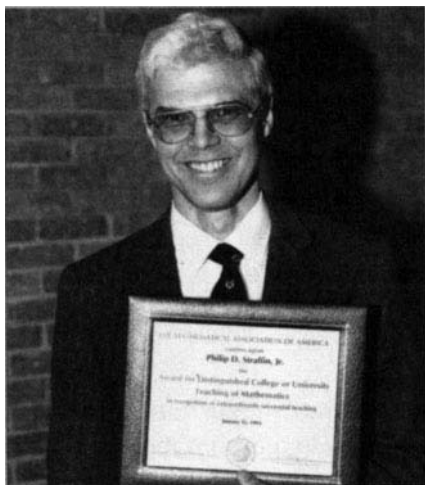
Philip D. Straffin, Jr.

Doris J. Schattschneider

V. Frederick Rickey

Joint Conference of the ISETA and the NCTLA

30 September–2 October 1993

ISETA and NCTLA have announced a joint conference to explore innovative conceptions in teaching to facilitate learning. This conference will reflect the shared purposes of ISETA and NCTLA.

ISETA encourages college and university faculty to apply principles of learning and teaching to develop practical alternatives to the traditional text-lecture-test approach to instruction. NCTLA, a federally-funded center, seeks to identify factors that facilitate student learning and enhance educational effectiveness at the postsecondary level and to disseminate their findings to interested groups.

The conference, hosted by Weber State University, will be held in Ogden, Utah.

For conference information, contact Professor K. F. Klopfenstein, ISETA Secretary and Treasurer, Mathematics Department, Colorado State University, Fort Collins, CO 80523; Phone (303)491-6456; FAX (303)491-2161; e-mail kenk@math.colostate.edu.

Call For Student Papers, Vancouver, British Columbia, Canada

15–19 August 1993

The fifth annual MAA Undergraduate Student Paper Sessions, in coordination with Pi Mu Epsilon, will be held at the joint MAA/AMS/CMS annual summer meetings in Vancouver, British Columbia, Canada in August. Nomination forms for fifteen-minute papers from Sections of the MAA, Departments of Mathematics, and interested individuals, along with additional information may be obtained from Ron Barnes, Dept. of Applied Mathematical Sciences,University of Houston- Downtown, One Main St., Houston, Texas 77002-1094, or via e-mail from barnes@dt3.dt.uh.edu. Expected deadline for nominations and submission of abstracts: 15 June 1993.

SIMS 1993 AIDS Conference

The 1993 SIMS, Societal Institute of the Mathematical Sciences, Research Application Conference (RAC-93) will address quantitative methods for studying AIDS. This SIMS Conference will be held 13-18 June 1993 following the IXth International Conference on AIDS 7–11 June 1993 in Berlin, Germany. The SIMS RAC-93 will be the second conference that SIMS has held on AIDS; the first was held in 1991 at the Mathematical Sciences Research Institute, Berkeley, California.

The site of SIMS RAC-93 is the Heinrich-Fabri Institut, a conference center of the University of Tübingen where SIMS, under a grant from the National Institute on Drug Abuse (NIDA), supports a research group working on AIDS modeling. The Institut at which RAC-93 will be held is located in Blaubeuren, Germany, near Ulm.

RAC-93 will address methods for projections of AIDS cases, mathematical models for the AIDS epidemic, natural history of HIV infections, intervention studies, and clinical trials. Particular attention will be given to issues associated with intravenous drug users.

Program chairs for SIMS RAC-93 are: Dr. Peter R. Bacchetti, Department of Epidemiology and Biostatistics, University of California; Dr. Klaus Dietz, Department of Medical Biometry, University of Tübingen; Dr. Marcello Pagano, Department of Biostatistics, Harvard School of Public Health. For further information contact SIMS (203)966-1008 or FAX (203)972-6069.

The SUMMA Consortium Meets

Florence Fasanelli

For two days last November, seventy-five mathematicians who direct (or have small grants and plan to direct) pre-college mathematics-based intervention projects, met in Washington to initiate the SUMMA Consortium — SUMMAC. This network is intended to link projects and their directors so they can share information about curriculum, funding, and recruitment of minority students. Initiated with a $703,000 continuing grant from the National Science Foundation, SUMMAC has produced a *Directory of Mathematics-based Intervention Projects*. Each of the sixty-seven projects listed is directed by a mathematician. We have learned of two more projects since publication.

These mathematicians and the students they teach are a precious commodity. Very few minorities remain in mathematics even though the minority school-age population is rapidly increasing. California produced only twenty BA's in mathematics among underrepresented minorities in 1991. The SUMMA staff is using its resources to teach interested mathematicians how to develop projects and sustain funding.

Ideas resulting from the deliberative format of the November conference include: introducing a formal mechanism to enable the more experienced grant-writers to "mentor" the less experienced ones; sharing successful proposals with each other; and project directors taking turns doing "check-ups" on other projects to help them stay viable and grow.

One of the participants, William Fleischman, Villanova University, had received a SUMMA small grant in 1991. With funding from the NSF Young Scholars Program and a Howard Hughes grant, he started a project in 1992. He writes of his experience at the first meeting, "The dedication, intelligence, energy, and human concern evident in the formal presentations, responses, and informal discussions gave me great encouragement. More than the informational content of the breakout sessions (and it was substantial), I was struck by the emotional force of the stories behind the projects described by presenters and respondents. And although I had brought to Washington photographs of some of my students as an emblem of what is most important to me in our common effort, I found I did not really need them. Throughout the meeting I felt the presence of the students with whom we work, and in whom we repose our brightest hopes." There will be additional meetings in 1993 and 1994.

Participants were able to spend most of the time in small groups sharing common concerns. Marcia Sward, MAA Executive Director, spoke about mathematics reform and its effects on access, addressing the roles mathematicians can play. J. Arthur Jones, Director of the Offices of Equity and Diversity, Mathematical Sciences Education Board, later picked up this theme in his talk, "Access and School Reform: Tracking/Restructuring/The real issues from a system perspective/ What is the environment in which students/teachers exist?" Uri Treisman of the Dana Center, University of Texas at Austin, asked that we begin to plan for growth and change.

The funds from the National Science Foundation support intervention workshops at the Joint Mathematics Meetings and MAA Sectional Meetings. A quarterly SUMMAC newsletter will link the SUMMAC members and others interested in intervention projects.

This lively consortium is expected to grow substantially over the life of the grant, since the mathematics community and society express an increased awareness of the issues of minority underrepresentation in mathematics-based fields. Long-overdue changes in attitude and practice toward minority students are occurring. SUMMAC members will continue to be major proponents of these changes.

Dr. Fasanelli is Director of SUMMA Intervention Programs

Editorial

Reaction to the Japanese University Entrance Examinations

In December, the MAA published the Japanese University Entrance Examination in Mathematics for 1990, with the official analysis of the results of the exam. The translation from the Japanese was done by Ling-Erl Eileen T. Wu of Menlo College, California, who also acted as editor. The publication of the examination by the MAA was supported by an award from the Alfred P. Sloan Foundation. For convenience, the document was distributed as a pull-out center section of FOCUS, with additional copies being offered for a small fee.

Though the entire production and publication of the problem-set was carried out independently of FOCUS, the newsletter editorial staff was delighted to assist by having the document distributed along with FOCUS. I wrote a small introductory piece on the FOCUS front page, drawing readers' attention to this important document. With so much hot air around these days concerning American high school mathematics education and our status relative to the rest of the world, the more hard facts we have at our disposal, the better-equipped we will be to make sensible judgements as to what to do next. As I said in my short introduction, "I suggest you read this report for yourself . . . and form your own conclusion."

I also asked for responses from readers, and this month's "Personal Opinion" section is devoted to a selection of these responses. In all but one case, I have simply let the writer's words speak for themselves. The one remaining case makes me a little uncomfortable. It is not because of the writer's views (he apparently thinks it was not advisable to publish the Japanese tests), or indeed because the writer ascribes to me opinions that I neither have nor (in consequence) have expressed. Moreover, he is entitled to the opinions he expresses concerning the MAA and the NCTM.

What bothers me is the somewhat inflammatory language. Still, strong language often indicates passion and involvement, both of which are required in order to move forward with new educational goals. The writer is an Association member, with as much right to have his voice heard as anyone else. I suspect that a great many readers of FOCUS will disagree strongly with Professor Rosa's views, just as I do. Because of the many factual inaccuracies in the letter, I felt obliged to add a response, always an editor's prerogative. But I did not feel it appropriate to censor his views, and in this case I felt that non-publication would have amounted to exactly that.

Keith Devlin

The above are the opinions of the FOCUS editor, and do not necessarily represent the official view of the MAA.

PERSONAL OPINION

9215 De Frene
San Antonio, Texas 78250

January 16, 1993

Dear Dr. Devlin:

I am writing with respect to the recent special section in FOCUS concerning the Japanese University Entrance Examinations. I don't necessarily wish to comment with respect to the content of the examination. It is obvious that a Japanese student does in fact possess a greater knowledge of mathematics upon entrance into the university system. Yes, this does have a direct influence upon why they score better than American students on standardized examinations. I have recently returned to America after living in Japan for three years, and have brought with me a greater understanding of why this is so. It is not necessarily the education system, but rather the society that is the driving force behind this. As for the argument that mathematics is learned through rote learning, I think we all can reflect upon our education and safely say that many of the courses that we successfully completed were completed through the aid of rote memorization. And I don't think that has extinguished our originality. Allow me to share my experience with you.

During my three-year period in Japan, I was employed as an English language instructor in the northern part of the country. The school I worked at was what one would call a "Juku," or an after-school school. The students there ranged from first-year elementary students to adults. Topics taught were English, mathematics, and conversational English. Typically, the elementary students enrolled in Basic English courses, while the junior high and high school students enrolled in courses that would supplement the studies that were going on in the public schools. The high school students' focus was primarily on the entrance examination for the university. I don't intend to critique the substance of what was taught, but deal more with the student's approach to learning.

When asked their opinion of the Japanese educational system, responses will typically be one of unhappiness. Many feel exactly as many critics do of the system; it is very strict and only prepares the students for the entrance examination. Although many parents, teachers and students feel this way, they are not about to change this system. In their society, where one is accepted to and graduates from is of more importance than what was studied in college. Therefore, the stress and pressure come before college, instead of after. Where students are accepted depends heavily on their performance on the examination. Once in college, the rest of their lives is more or less determined. It is only natural for someone on the outside to view this system with disdain and disapproval. This is the way their system is and this is the way it has been and will continue to be run. As stated in the special section, in a society which places greater emphasis on quality and level of education, one would expect such a system. May I also add that this applies not only to entrance into the university, but for entrance into high school. So the students are exposed to this pressure from early on. It is even common now for children to take examinations for kindergarten.

What I would like to say is that when we try to discover why it is that Japanese students consistently score better than their American counterparts, examining the educational system is only a very small contributing factor for this difference. Prior to going to Japan, I too felt that the Japanese system was superior to ours, but then I remembered that I was a product of the American system and I think I turned out OK. I did well in high school and continued on to get a BS in Mathematics,

so there was something right. And I know there are a lot of other American students that are similar to myself. In addition, after witnessing the pressure placed on the students, I don't feel that this is appropriate. If that pressure were placed on me in high school, I would have rebelled. So why is it that the Japanese students fare better than Americans?

I feel that the most important reason is "expectation." Parents, teachers, peers, and even the students themselves expect success. You will hear many students say that they hate mathematics, but very rarely does one ever hear them say that they CAN'T do mathematics or that they did poorly in mathematics. They will say that it is difficult, but NEVER will they give up on it. This attitude permeates the society. With a little perseverance, anybody can overcome any hurdle. Quite different from America, where I can remember countless times when someone told me that they failed mathematics or completed high-school and college without ever taking a mathematics course, and they are proud of this "accomplishment." What can we expect from our students when children witness this attitude in adults. Yes, we know that mathematics is difficult, but we CANNOT boast about our failures in math and then wonder why our students do poorly in math. It's not the students or the teachers, it's every one who has ever bragged about their failures in math or accepts less from their children with regard to mathematics because "I did poorly in math when I was a kid so it's OK for my child to do average work in math." Expectation is the key. With the amount of money parents invest in their children in Japan, it is no small wonder that they expect success. If failure is confronted, scapegoats or excuses aren't necessary. You tighten your belt and attempt again. This is the prevailing attitude encountered.

To Americans, this system seems horrifying. But my experience is that these students are typical teen-age students. They are well-adjusted and happy students, and actually enjoy learning. Yes, they feel the pressure placed on them, but they accept it, for they know rewards await them. They know that is the system that they are a part of and that along with their fellow students, they are not alone. For the most part, they actually enjoy studying and learning. An example of this is twice every year, the Japanese government administers an English test. There are four levels to this exam. Successful completion of all four levels serves no purpose except to show the individual their proficiency in English. High school students and adults take this exam only to see how well they understand English. May I also add that this exam is very popular among high school students. I can't think of a similar test in America. All our exams serve a purpose, whether it is for our job or school. None is there solely for the pleasure of the exam-taker.

Even Japanese television encourages education, at least in a roundabout way. There are many examples of shows where a certain topic is discussed, and then questions will be posed and correct answers are rewarded. They are like game shows, but usually TV personalities are the participants for these shows. The questions posed develop logical deduction and inference. This again aids in developing skills required to be successful in mathematics. Even their language, which is basically a symbolic language, also encourages the development of skills necessary for success in mathematics.

Japanese students are better prepared in mathematics, but this is a necessary requirement imposed by their society and their system. It serves their purpose. We can't try to adapt any portion of their system to ours. Just as it would be foolish for them to adapt part of our system to theirs. Each system was developed for their respective reasons.

What we can do is to change our attitude towards mathematics, and education in general. But this solution will take generations to accomplish and will not come about easily.

I hope that this viewpoint will be useful. There are many reasons one can find to support the argument that Japanese students are better mathematically than American students, just as there are many reasons supporting why they consistently score better than American students. We can look at their education system, their language, television, and even geography. (Since Japan is an island nation, it is easier for the Ministry of Education to oversee the program.) I have come away from Japan totally convinced that the driving force behind their performance is their society and their attitude. Once a student embraces the attitude that it is not beyond their reach to succeed, 90% of the battle is won. America must change its attitude toward the "difficult subjects" and impart to our youth that success is attainable. As stated above, the answer to all our mathematical problems is EXPECTATION.

Thank you for your time.

Sincerely,

Dennis Kunimura

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145 College Road
Suffern, NY 10901

January 25, 1993

Dear Mr. Devlin:

When I first perused the report on the 1990 Japanese University Entrance Exam in Mathematics in the December, 1992 issue of FOCUS, I was both surprised and amazed. I could not believe that this was a test used for admission to a university after a student had graduated from high school.

The fact that the test is used in this capacity reveals a great deal about Japan's method of teaching mathematics and even about its system of education in general.

I was surprised that the exam involved so many different areas of mathematics and that it had no multiple-choice section. I cannot think of any American exam used for college entrance that consists of so many different topics, and the absence of multiple-choice questions attests to the fact that the Japanese emphasize conceptual understanding over rote memorization and drill.

I have read that in Japan, an entire class may be devoted to solving just one or two problems. The emphasis is on how to approach and solve a problem. Also, teachers' schedules in Japan provide time for them to carefully hone each lesson to perfection. They encourage students to do their own thinking and to find many ways to solve a problem. The teacher is more of a facilitator, framing the circumstances that will enable students to find their way.

Of course, teaching for conceptual understanding requires more time than rote learning. However, I believe that it is time well-spent.

In contrast, American schools teach mathematics by using rote memorization and drill. Teachers spend months just repeating the content of previous years. For some students, this suffices; however, other students must be re-taught the material, thus demonstrating the fact that the rote memorization and drill of years past were unsuccessful. Because of the lack of time, this is usually all that math teachers in America can cover. Problems which involve more thought and a sequence of steps are usually omitted because there simply is no time to get to them.

I was amazed at the level of the questions on the entrance exam. In my opinion, most of them were college level. Most of the problems were not short answers, but required logical reasoning and sequential thinking in their solution. This again attests to the fact that teaching in Japan stresses conceptual understanding over rote memorization. I liked the way in which the problems were written in the 1990 UECE in Mathematics. Each blank had to be filled with a single digit or sign. This form for the solution demystifies the exam and gives the student the impression that the problem can be solved; it is up to him or her to find the correct solution. It "sets the solution up" for the student without giving any help. It also gives the impression that the test-maker believes that the student is capable of finding the solution. Thus, even the test-maker becomes a facilitator.

We have all read about how poorly American students perform on mathematics exams. I believe this is a direct consequence of how we teach mathematics. We begin in elementary school with a hands-on approach, but as the students proceed through the elementary grades, this approach is used less and less and it is replaced with rote memorization and drill, much of which is repeated from grade to grade. I believe that if we replaced drill with teaching for conceptual understanding, our students would be better problem-solvers and thinkers. We must spend less time on having them memorize facts and more time on giving them real-world problems to solve. I believe that students will learn the basic facts as they work with them in solving problems. Just as in English, students learn the meaning of new words as the incidental by-product of reading.

However, I realize that what I am suggesting requires a great deal of change, not so much in what is being taught, but in how it is being taught. New York State has tried to address the problem by changing the math curriculum in the high school. We now have sequential math courses I, II, and III in place of the traditional algebra, geometry, and trigonometry. The new curriculum includes all three of these topics in each of grades nine to eleven and even adds logic and probability. I believe that this change has had no affect on students' math ability. Some people even argue that students' math skills are now worse than they were before the change. This action in New York reveals that the solution lies in changing the way math is taught and presented, not in changing the topics being taught.

I honestly believe that the change is coming. It is starting now with reports such as this one on Japanese entrance exams and the National Research Council's *Everybody Counts*. It is an American ideal to always strive for improvement. We have accepted the challenge; action cannot be far away.

Sincerely,

Peter Arvanites
Math Instructor
Rockland Community College

February 18, 1993

Dear Professor Devlin:

The Japanese University Entrance Examinations that were part of the December 1992 issue of FOCUS provided useful information about the kind of mathematics that Japanese high school graduates are expected to know. In your opinion, these examinations demonstrate that the Japanese mathematics education is based on rote memorization and regurgitation. However, the books that are used in the Japanese public schools do not support your opinion. Some of these textbooks were reviewed by Richard Askey (*College Mathematics Journal*, 23(1992): 445-448).

Your allusions to the Japanese cram-school racket are scandalous attempts to deflect attention from the deplorable state of mathematics education in the United States. Instead of discussing the English and Japanese systems of education, why don't you direct your editorials toward the two major rackets in U.S. mathematics education — the uncritical endorsements and shameless promotion of the NCTM "Standards," and the equally shameless promotions of Computer Algebra Systems. Of course, since you appear to be deeply involved in the latter racket, it is unlikely to be discussed in your inane commentaries.

In my opinion, the leadership of the Mathematical Association of America is almost as incompetent as the leadership of the National Council of Teachers of Mathematics. The American Mathematical Society is the only organization that is presenting an accurate picture of the real problems in mathematics education. The editors of NOTICES are to be commended for publishing so many letters and articles that expose the psycho-babble and flimflam artists who have done so much damage to mathematics education.

Sincerely,

Domenico Rosa
Associate Professor of Mathematics
Teikyo Post University
Waterbury, Connecticut

Keith Devlin replies:

Professor Rosa's ascription to me of an opinion on Japanese mathematics education (his first paragraph) is without foundation. Having never expressed such an opinion, and not holding one, I am somewhat at a loss as to how Professor Rosa came to such a conclusion. Perhaps he did so by misreading my introductory remarks on the front page of the December FOCUS, where I wrote:

"Are Japanese high school graduates better prepared in mathematics than their American counterparts? Or is it more the case that the Japanese school system produces students who can perform well at routine tests involving the regurgitation of facts learned by rote, but are unable to think originally? Both views are heard frequently. But what are the facts? . . . I suggest you read the report for yourself . . . and form your own opinion."

Moving on to Professor Rosa's second paragraph, I made absolutely no allusion to a "Japanese cram-school racket". The editor of the Japanese Examination document, Eileen Wu, did, in her introduction, make a passing, factual reference to optional, additional schooling for test-takers. And in his personal opinion article in the February FOCUS, Professor Richard Askey (whom Rosa mentions in his first paragraph) also acknowledges the existence of cram-schools. But I am not sure that either of these allusions is quite as "scandalous" as Professor Rosa seems to feel.

And no, Mr. Rosa, I have no involvement in the development of Computer Algebra Systems, though I do have considerable interest in that technology, and I do edit a column in the *AMS Notices* that deals with the use of computers in mathematics.

The remainder of Professor Rosa's letter expresses his own opinion, and it is not for an editor to comment on such.

The Eastern Pennsylvania & Delaware Section of the Mathematical Association of America

1993 Summer Workshops

A Mathematical Sampler: 1647-1900
Presented by William Dunham, Muhlenberg College
14-18 June 1993
Held on the campus of Messiah College, Grantham, PA

This five-day workshop examines a collection of significant theorems from a 250 year span of the history of mathematics. We will consider original work of Newton, the Bernoullis, Euler, Cantor, and other major figures as they addressed questions from the realms of analysis, number theory, algebra, geometry, and set theory. The theorems — all of which have relevance for the undergraduate classroom — will be amplified by biographical information and placed in historical context, but our primary focus will be on the genius of great mathematicians doing great mathematics.
The cost of this workshop, including room and board, is $270. The workshop will have an enrollment limit of 30 participants.

Symmetry and Group Theory
Presented by Doris Schattschneider, Moravian College
7-11 June 1993
Held on the campus of Gettysburg College, Gettysburg, PA

This workshop will emphasize a visual, hands-on approach to understanding the symmetry groups of two- and three-dimensional objects through the use of computer software, patterns and tilings, polyhedral models, and videotapes. Most abstract concepts encountered in group theory can be illustrated in a graphic manner using this approach. In addition, symmetry will be exploited to understand the structure of some well-known groups.
Room, board, and a modest stipend will be provided by the National Science Foundation grant #USE-9154183. The workshop is limited to 25 participants.

For further information or to enroll in these workshops contact: Dr. Marvin Brubaker,
Department of Mathematical Sciences, Messiah College, Grantham, PA 17027, (717)766-2511, ext. 71

Job Search Diary

Part 3

Edward F. Aboufadel

In the October and December issues of FOCUS, Edward Aboufadel started to describe his search for an academic position in last year's hiring round. At the time, Ed was a graduate student completing his PhD in mathematics at Rutgers University. The first two installments of his job search diary took us through the fall, up to early February 1992. This month's episode ends at the beginning of April 1992.

February 17: I received one new rejection letter in the past week, from the University of Maine at Farmington. I also received an acknowledgement postcard from Loyola-Chicago.

A Chinese student, Xiaoping, in my department has had a little better news. Although he too received a rejection from Maine this past week, and also received a notice from Auburn University that there is a hiring freeze there, he has gotten an interview with a school in Hong Kong. I guess the interview will be over the telephone.

Xiaoping has a theory that the method of selection by search committees this year is to only consider applicants who earned their PhDs at Harvard, MIT, or Princeton. This certainly would save these committees a lot of time. And there are probably just enough jobs available this year to hire everyone who is graduating from these three schools.

My area of specialization has been on my mind lately. I recently had an e-mail conversation with Keith Devlin, the editor of FOCUS and Chair of the Mathematics Department at Colby College. There is a temporary position open there. He said something to the effect that it was a pity that they were not looking for someone in my area.

Along those lines, I received a response to a letter I sent three weeks ago that reads, in part:

"Thank you for your letter of January 28. I apologize for the misunderstanding in my letter to you regarding your application. It is true that "ordinary differential equations" is one of our departmental strengths, however at this time ordinary differential equations is not necessarily the area in which we expect to recruit. We are required to list our departmental strengths in order to solicit applications from individuals within those strengths. I can understand that it could be misleading as one might assume that we would also be recruiting from within all of those areas. Unfortunately, that is not the case."

I can't help asking just what is this paragraph saying? Better yet, what is it not saying? It does not say "We are not hiring anyone in ordinary differential equations." Nor does it say "We would hire someone from ordinary differential equations if he or she were good enough for us, and you aren't good enough for us, Mr. Aboufadel," which I could accept. A suggestion: Next year, the institution should reword any job posting to read the following:

"We are especially interested in someone who works in topology [or whatever]. Other areas of departmental strength are universal algebra, differential equations, approximation theory, operator theory, mathematical biology, applied mathematics, and graph theory."

You will get fewer applications, and you will have fewer people continuing to wonder why they have been rejected.

I am starting to imagine that in spite of job announcements that say "We would like to hire someone in Discrete Mathematics, but will consider strong applicants from all specialties," the departments will have no problem finding someone in the specialty they want.

In spite of all my grousing, I am trying to keep in mind that, in many ways, it is still early. Many departments have just reached their dead-
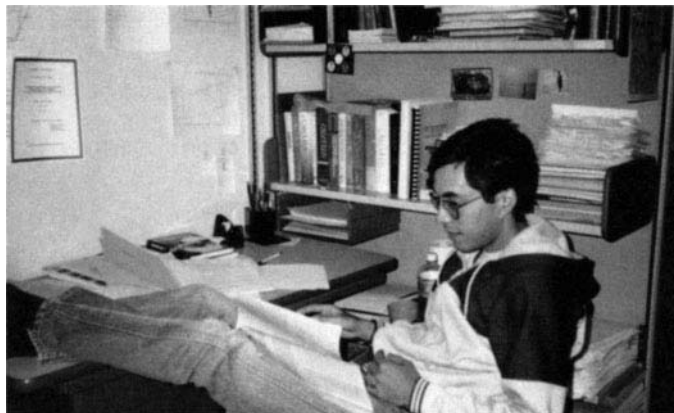
Edward F. Aboufadel in full student regalia.

lines for applications. It has not been uncommon for departments to delay their hiring activity to late spring. Nevertheless, if the rest of February turns out to be as negative as the first half has been, I may be taking a serious look at nonacademic employment come March.

February 23: My friends tell me that I need to relax a bit. This is an extremely stressful time, between completing my dissertation, waiting for rejection letters and maybe an interview, and paying attention to my teaching assignment.

I heard a rumor that a graduating student at Princeton recently received three job offers. Obviously, this person cannot accept all three. I recall being told that the process would work this way — first everyone would chase after the "stars." Once the cream of the crop decide which positions to take, departments begin looking farther down their lists.

Is this happening later this year than in the past? Perhaps it is my strained imagination getting the better of me.

My advisor told me again this week to put the whole matter out of my mind for a while. Worrying is not going to speed things up.

Linda Holt, who graduated from Rutgers last year and is now in California, told me this week that my current situation (ie: waiting) sounds normal to her for the third week in February. She imagined most of the rejections that I have received at this point are the ones where the department was not hiring in my specialty or there was some other clear-cut reason. There is some truth to that.

Good news for Xiaoping. He received a job offer from a university in Hong Kong. He doesn't seem very excited about it though. I recognize that, in many cases, Chinese students would like to remain in this country.

I have a relative who is a professor in the Mathematics Department at the University of Wisconsin in Madison, and my father told me a rumor, via the family grapevine of all sources, that Wisconsin may be soon announcing an open position. My father said, "You should send Dr. Fadell your resume, just in case." I replied that I understood that Wisconsin had about 900 applications already and that they never even posted a position. Nevertheless, I sent my resume to Dr. Fadell if, for no other reason, than to get acquainted.

March 1: I had expected to hear some good news during February, but I was disappointed. This being a new month, it is time to try to see where I am going with this process.

My rejection count is up to fourteen. I was mildly pleased with the letter from Brown University, since it suggested that in the future I could apply for a visiting position. (Oh, the little scraps we cling to at this point.)

Rumor update: I heard that the University of Minnesota has made offers to people, which I guess means that they interviewed somebody. The University of Kentucky allegedly has no money now. The University of Michigan has also made offers.

I have a confirmed rumor from a source at a Big 10 school. (I feel like I am writing for the Washington Post.) The hiring committee at this school has decided that this year is a wonderful opportunity to hire permanent people, as opposed to post-docs, so they will be focusing on candidates for tenure-track positions. (I wonder when this decision was made.) Then, once that process is completed, they will begin considering post-docs, if any money is left. Sounds like a wonderful opportunity to put this school on the "don't hold your breath" list.

Here at Rutgers, I've heard that a woman in Operations Research has been invited for three interviews. I also heard today that one of the Chinese students has gotten a one-year post-doc in Minnesota. Nigel told me this, and was surprised that I hadn't heard it. Strange how news travels. Other than that, no one else here has had anyone interested in them, as far as I can tell.

It is also difficult to be patient. I continue to struggle with whether or not to call some of the departments I applied to. What good will it do me? I might get some (unwanted) information a little quicker than if I waited.

Maybe better to wait.

So, where am I going with this process? It is difficult for me to believe that I am in the running for any position which had applications due before January 1. Is the fact that few other people have had interviews a good sign and I should just be patient, or a real bad sign and should I get ready to panic? I'm going to begin a serious look at non-academic employment. This is not to say that I am going to start sending out dozens of application letters, but I am going to try to find out where to look for non-academic jobs. My parents suggested the employment service for students on campus. As that office seems geared towards undergraduates, will they have much to offer me?

I came to graduate school six years ago because I wanted the training and credentials necessary to be a professor of mathematics. The trinity of research, teaching, and service seemed like a good life. I did not work at Rutgers for six years to go work for an insurance company or for big business and, to be honest, the idea of working for a major corporation frightens me a bit. I know what a university is like, and the people I have looked up to the past ten years have been faculty. I don't know any mathematicians who work for industry.

Maybe I just need to be more patient.

March 10: This past weekend was a marathon for me as I got much closer to completing my dissertation. My advisor has advised me to put the job search out of my mind for a while, and I did so with a vengeance. But now it is time to consider it again.

I recently took an informal poll of the graduating students to see how their job searches were going. All in all, not too well, although I learned today that Nigel has been offered a position at Michigan. I sent him e-mail asking when he found the time to interview, given that he has been working even more frantically than I have to complete his thesis.

Today I talked to the chairman of our department, Robert Wilson, about the situation. He did not know as much about the situation with the students here as I do, and he hoped that I could tell him about other students who had been offered positions. Unfortunately, I could not.

Last year, three students who graduated from here did not get jobs, so Rutgers hired them as instructors. Dr. Wilson is trying to work out a similar deal this year. I told him that I am not at all that excited about being hired as an instructor by Rutgers. I feel a position like that would

be a consolation prize (very much leaning on the meaning of the verb "to console").

I don't blame Rutgers or the department for the current situation. How were they to know that the value of a PhD in mathematics would diminish?

I took a look at the employment section of the *New York Times* recently. There were a few positions for people with mathematical training, including a position in finance that required a PhD in either finance or in mathematics. I am debating whether or not to contact this company.

The fact that Nigel was just hired is probably a good sign. It means that there is something going on, although the pace remains quite slow. Dr. Wilson told me that it has not been uncommon for students to be offered jobs in April or May. Given the current financial climate, perhaps next year departments should make their deadlines for applications on March 15.

Finally, I received a rejection letter by e-mail today from a good basketball school. All it said was: "Thank you for your application for a position. We have completed our search this year and will be making no further offers." Their deadline was November 15 and I sent my application on November 13. Things sure take a long time.

March 11: I talked to Nigel about his job offer. I asked him when he found the time to interview with the University of Michigan. He said that he didn't have an interview; they just called him up and offered him a three-year position. Nigel is a number theorist, and he told me that over the last few years he had gotten to know the number theorists at Michigan. Or should I say, they have gotten to know him.

We have at least 11 people here at Rutgers who are applying for jobs this year. Three of them have been offered positions.

March 13 (Friday): Thomas Hood (1799-1845) once wrote: "For one of the pleasures of having a rout, Is the pleasure of having it over." That is how I feel right now after the debacle of the last 48 hours.

On Wednesday, I received e-mail from Brenda Latka. Brenda was my officemate last year, and this year has a tenure-track position at Lafayette College in Easton, Pennsylvania. She wrote to say that last year at this time she had some interviews. She also told me that Lafayette College had interviewed a few people recently, had offered a position to someone, and that the offer was accepted.

This news upset me. If I were to rank the schools that I applied to in the order of "likelihood of getting an interview," Lafayette College would be in the top fifteen. Also, their application deadline was January 20, which wasn't that long ago. But, already, they are done with their search.

This news also convinced me that it was time to contact the schools on my "A-list" and find out what was going on with my application. Yesterday, I contacted seven schools either by phone or by e-mail.

The University of Scranton recently offered positions to two people and they both accepted. I had what I thought was a particularly positive interview in Baltimore with a representative from Scranton.

SUNY-Geneseo has just decided on three people to interview, and I am not one of the three.

Ditto Western Carolina.

George Berzsenyi from Rose-Hulman writes: "We have not yet made a decision, but we are in the process of interviewing those applicants whose area of interest matches our needs best. More specifically, we hope to find someone in statistics first. Your application is still on file, but not at the top of the file at this point. Your continued interest in Rose-Hulman is most appreciated."

H. J. Ludwig from Ball State writes "We are presently interviewing in

our priority areas: actuarial science and mathematics education. Interviews in other fields (if there are any) would not be earlier than the first full week of April."

I am still waiting to hear from Northern Illinois.

Then, last night, two new rejection letters from Elmhurst College and Oberlin College. Michael Henle, Chair of the Mathematics Department of Oberlin College, writes, "We are aware that this is an extraordinarily difficult year for job searches."

No kidding.

The only positive news in this disaster came from Union College in New York State. They have a three-year position available and, at this point, they have not begun their search in earnest. They are waiting for some of the other schools to hire people. I suspect they have had problems in the past with offering someone a position, only to have that person go somewhere else.

I talked to the head of the search committee there for about fifteen minutes in an attempt, as I told him, "to advertise myself." He promised to take a look at my application folder.

So where am I today? As I look over the seventy-eight departments that I have applied to, I figure that there are maybe ten left that I can seriously have some hope about. Maybe. I find it hard to believe that any department whose deadline was in December would be considering me at this point.

Maybe something will happen and I will get a visiting position for one year. Then I have to go through the whole process again next winter. This is not something I eagerly anticipate.

I start wondering if it is even worth it. It is hard to imagine myself being very happy as a gypsy the next few years, moving from department to department in search of some permanence. And if I am not going to be happy, I might as well figure out a way to make more than $25,000 a year.

Yesterday a couple of prospective graduate students visited my department. I told my friends in a low and threatening tone to keep them away from me. They would not like to hear what I had to say.

At least now I have a pretty good idea where I stand. That is the pleasure of the rout being over.

March 14: Northern Illinois writes: "Search is still in progress. Initial candidates have been invited to campus for interview. You were not among them. We will inform all candidates when the position has been filled."

March 20: The rejection letters arrived this week at a brisk pace. I have received seven in four days, which is a monsoon compared to the drizzle of one every four days that I had been experiencing up to this point.

All of these new rejection letters were from liberal arts colleges and smaller universities. There are a number of large, research universities that I applied to that I have not heard from, but I suspect that I will not hear from them.

The best of the seven was from Davidson College. The chair of the department there, L. R. King, writes in part: "Because you were one of our strong alternate candidates, we kept your file active until we could be sure our position was filled.... You have some real strengths to offer an academic institution and I hope that it works out that you will find the position that you want for next year.... I hope that some of us at Davidson will see you at professional meetings in the future."

One letter was particularly troubling, and what made it so was that I received it at this time. The deadline for applications had been March 1, yet by March 17, they had made their decisions. They certainly were efficient.

I continue to feel pretty lousy about my prospects. Looking over the seventy-eight departments that have I sent applications to, I figure that, at this point, there are ten that I still have a chance at. Tomorrow I will be sending out a half-dozen or so new applications for positions recently posted on e-math. Next week I plan to contact some recruiters for non-academic positions.

I continue to chafe at the idea of having a sequence of one year positions. It has always been my impression that there were two basic career paths to becoming a mathematics professor. One was to get a tenure-track position immediately after completing the doctorate, and to either remain at that institution for life, or else to move on to somewhere else after a few years.

The second was to have a postdoctoral position after graduate school, and then to proceed along the first path.

If the profession wishes to attract more young people, I don't think they want to advertise that, after six difficult years in graduate school, you have to wander from visiting position to visiting position for a number of years until you can get a permanent position.

To use the pipeline/pump/filter metaphor, they don't want to advertise that when you get to the faucet at the end of the pipeline, there aren't many thirsty people with empty cups; that instead, the water is splashing on to the earth and draining away.

Today I met with a number of high school mathematics teachers at the 1992 Precalculus Conference here at Rutgers. A few, whom I've known for a couple years, were shocked to hear that I was having such difficulty with the job market. The consensus comment was: "We keep hearing about this dire need for students trained in mathematics; so where is that need?"

I tell them that it is the recession, but is it just that? The job market for PhDs in mathematics has been difficult for a few years now. Why?

March 24: Over the past two weeks, my advisor, Jane Cronin Scanlon, has been trying to get some information about a position available at Seton Hall. She knows someone on the faculty there, and every little bit helps. Yesterday, she found out that the position had been filled. Seton Hall is hiring someone who is currently completing a "named" postdoc. Dr. Scanlon also relayed to me that the committee at Seton Hall was amazed at the number of highly qualified people who applied this year. (So maybe those paragraphs in those rejection letters are sincere after all.)

Today I started my non-academic job search. I contacted Analytic Recruiting in New York City. The woman I talked to suggested that with my background, I would be a good candidate for a position in technical analysis on Wall Street. I will be sending her my resume shortly.

When I told her that I wanted to start work in August, she said it was actually a bit early for me to be calling. This is a striking contrast to the academic job market, where you apply in November for a position which begins the following September.

This afternoon, I received the following cryptic e-mail from Michael Meck at Southern Connecticut State University: "You applied in November for a tenure-track position in our department. Are you still interested in being considered for the position?" I wrote back that I was and added "Why do you ask?" I am waiting for a response.

Three years ago, I worked with Gerald Goldin and Joe Rosenstein at the Center for Mathematics, Science and Computer Education, here at Rutgers. I worked on the Precalculus Project at the Center. Last week, I mentioned to Dr. Goldin that my job search has not been going well. Today, he and Dr. Rosenstein asked me if I would be interested

in a new postdoctorate position that they are going to try to put together. The position would include time for mathematical research and time to work on a project in mathematics education, and might be connected with DIMACS (The Center for Discrete Mathematics and Theoretical Computer Science at Rutgers). Of course I said I would love it if they could set a position like this up and hire me for it.

I think a postdoctoral position such as this would be an asset to the profession. It would also encourage graduate students to pay more attention to mathematics education.

March 29: Progress at last! On Friday, I received a phone call from Michael Meck at Southern Connecticut State University. For their available position in applied mathematics, they have narrowed their list of applicants to ten, and I am one of the ten. The next phase consists of telephone interviews by Professor Meck. He and his committee will then select a subset of the ten and invite these people to campus.

We talked for about forty-five minutes, primarily about teaching.

Southern Connecticut is looking for someone to work on their Numerical Analysis course and also to take a look at their Differential Equations course.

I am teaching Numerical Analysis this semester, using the same text in fact, so I had some opinions on the subject. We also talked about computers for faculty and for students and the availability of computers in the classroom itself. The position is primarily a teaching position, and the department assigns you twelve hours each semester. There is time and money for research in the summer, but research is not necessary for tenure. There must be something in your work to demonstrate professional growth, though, such as developing a new course.

I also sent my resume this weekend to Analytic Recruiting in New York. I had to spend some time considering which parts of my resume I should change for the business world. I doubt that businesses care about which courses I have taught, although they would probably like to know that I have been in charge of something. Conversely, mentioning that I have participated in the AT&T Collegiate Investment Challenge may make me marginally more marketable, while it probably would make no difference at all to a search committee in a Mathematics Department.

In the I-guess-I-didn't-leave-much-of-an-impression department, I received one rejection letter this week that said, in part, "I was sorry I was unable to talk to you personally, but we had over 380 applications for our positions." Unfortunately, the letter-writer forgets that I interviewed with him in Baltimore. I thought he was impressed by me. I recognize, of course, that no one is going to write over 379 personal rejection letters.

I also received a rejection letter from Salisbury State University. I received sort of a rejection letter from them in January, as I described before. This time, they actually found someone, and wanted to let me know.

And then there was the rejection letter from Michigan State, my *alma mater*. Ouch.

April 2: Next week I am going to Southern Connecticut State University in New Haven for a full day of interviews. The search committee there met on Tuesday and decided to invite me as one of their "finalists."

I will be giving a talk about my dissertation. The talk is to be aimed so that a junior or senior mathematics major can understand it. I think that I am up to the task.

I will also be meeting at least one dean, the mathematics faculty, and maybe some students, too. Southern Connecticut State will pay for all expenses (travel, hotel, food).

I am excited that finally some department has expressed an interest in me. But I also have mixed feelings about what is happening. I think it is related to my prejudices about the relative prestige of different schools.

It seems that the large research universities are the most prestigious. A few months ago, I began to accept the fact that I wasn't going to get a job at one of those schools.

The next level of prestige is the better liberal arts colleges and the better smaller universities. This is the level where I felt I had an excellent chance of getting a job.

I am not sure where Southern Connecticut State University fits into the hierarchy.

I have started to accept that I will not be hired by a better liberal arts college this year. I don't know exactly who they are hiring, but these places (e.g., Davidson, Franklin & Marshall, Dickinson, Oberlin) were not interested enough in me to invite me to their campuses or to even call. My advisor has talked to some people at the AMS, and the anecdotal evidence indicates that the rejection letters are true. There are a lot of very strong people looking for jobs this year. People from Russia and China, and more importantly, people with experience past the doctorate. If this is my competition, it is no wonder there has been scant interest in me. This suggests that if Southern Connecticut State University actually offers me a position (which is tenure-track), and if I want to remain in academia, I would be a fool to reject it in the hopes of receiving an offer from somewhere else.

I received a rejection letter today from Franklin & Marshall College. The Chair, Arnold D. Feldman, writes the following, which I thought was strange for a rejection letter, but was, nevertheless, consoling: "It concerns me and my colleagues greatly that at a time of obvious need for innovation and expansion of mathematics education in this country, many talented, hardworking mathematicians are finding the job market so inhospitable. I know that you are eager to apply your much needed talents and education, and wish you the best of luck in obtaining an opportunity to do so." I say amen to that.

To be continued...

MAA BESTSELLERS

The Lure of the Integer

Joseph Roberts

In some small way, this book is an introduction to a mythical book called THE BOOK OF INTEGERS. This mythical book has on page *n* ALL of the interesting properties of the integer *n*. This introduction stems from a collection of many years' casual accumulation of numerical facts. Most of the material presented belongs to elementary mathematics in the sense that no deep or profound mathematical background is required in order to follow most of what is said.

Many of the topics are drawn from research activities of contemporary workers. Most of the results are stated without proof. As a general rule, one cannot even tell from the statements of the results whether or not their proofs will be elementary. Indeed, this is a hallmark of mathematics and is one of the things that gives the subject a special flavor and interest. Until one knows that expert practitioners have been stumped by a problem, one does not know that the problem is difficult.

Some of the material will be familiar to people having even a small acquaintance with "the lore of mathematics." Even in these cases, the author provides something new to observe. On the other hand, much of the material is sufficiently out of the main stream of concern that even professional mathematicians will be unfamiliar with the results. In all cases, the many references to the literature will enable a reader to track down further information. In LURE OF THE INTEGER the author has presented a body of material that will prove interesting to the enlightened layman as well as to the professional.

300 p., Paperbound, 1992
ISBN 0-88385-317-5
List: $28.50 MAA Member: $19.50

Catalog Number LURE

Mathematical Cranks

Underwood Dudley

MATHEMATICAL CRANKS is about people who think that they have done something impossible, like trisecting the angle, squaring the circle, duplicating the cube, or proving Euclid's parallel postulate; people who think they have done something that they have not, like proving Fermat's Last Theorem, verifying Goldbach's Conjecture, or finding a simple proof of the Four Color Theorem; people who have eccentric views, from mild (thinking we should count by 12s instead of 10s) to crazy (thinking that second-order differential equations will solve all problems of economics, politics, and philosophy); people who pray in matrices; people who find the American Revolution ruled by the number 57; people who have in common something to do with mathematics and something odd, peculiar, or bizarre.

Cranks and their ideas come in great variety. The book is a collection of examples, designed to give readers an idea of what cranks do and how they do it. Contemplating the odd, peculiar, or bizarre can be entertaining or enlightening. There can be no solution to the problem of mathematical cranks—obsessive people we will always have with us, and some will become obsessed with mathematics—but perhaps viewing the futility of their efforts will turn some prospective cranks toward more fruitful endeavors.

This is a truly unique book, written with wit and style. Kenneth O. May calls the work of mathematical cranks part of folk mathematics that should not pass unrecorded.

300 pp., 1992, Paperbound
ISBN 0-88385-507-0
List: $25.00 MAA Member: $17.50

Catalog Number CRANKS

Excursions in Calculus: an Interplay of the Continuous and Discrete

Robert M. Young

Printed with eight full–color plates.

The purpose of this book is to explore, within the context of elementary calculus, the rich and elegant interplay that exists between the two main currents of mathematics, the continuous and the discrete. Such fundamental notions in discrete mathematics as induction, recursion, combinatorics, number theory, discrete probability, and the algorithmic point of view as a unifying principle are continually explored as they interact with traditional calculus. The interaction enriches both.

The book is addressed primarily to well-trained calculus students and their teachers, but it can serve as a supplement in a traditional calculus course for anyone who wants to see more.

CONTENTS:

• Infinite Ascent, Infinite Descent:
  The Principle of Mathematical
  Induction
• Patterns, Polynomials, and Primes:
  Three Applications of the Binomial
  Theorem
• Fibonacci Numbers:
  Function and Form
• On the Average
• Approximation: from Pi to the Prime
  Number Theorem
• Infinite Sums: A Potpourri

Order your copy now of this important new book.

408 pp., 1992, Paperbound
ISBN 0-88385-317

List: $39.00 MAA Member: $31.00

Catalog Number DOL-13

MAA VIDEO CLASSICS

Let Us Teach Guessing

George Pólya

"Teaching is not a method, it is not a system. Teaching is not a science—it is an art." With these words, Pólya reveals his approach to teaching mathematics. In a remarkable tour de force, Pólya shows us how to teach guessing. In this classic film, master teacher Pólya leads an undergraduate class to discover the number of parts into which 3—space is divided by five arbitrary planes.

1966, color, 61 minutes
List: $36.95 MAA Member: $29.95
Catalog LTG

John Von Neumann
A Biography

Rare footage and photographs of the legendary von Neumann are to be found in this film biography. Halmos, Morgenstern, Teller, Wigner and Ulam contribute insights about and memories of Johnny. Set theory, computing, game theory, quantum mechanics—how broad were his interests? After viewing this video classic, your picture of von Neumann will enlarge.

1966, b & w, 63 minutes
List: $36.95 MAA Member: $29.95
Catalog Number JVN

Courant in Göttingen and New York

Colleagues of Courant describe his great influence as mathematician, author, and administrator. Part of the film contains footage of Courant in action, lecturing on soap bubbles and minimal surfaces. A significant portion of the film consists of reminiscences of his work at New York University and Göttingen where he succeeded Felix Klein. Forced to flee Hitler's Germany, Courant came to New York University in 1934, where he worked tirelessly to develop the Courant Institute of Mathematical Sciences.

1966, b & w, 43 minutes
List: $36.95 MAA Member: $29.95
Catalog Number CIG

The Moore Method
A Documentary on R.L. Moore

The Moore Method of teaching is presented by Moore himself. In his long career at the University of Texas at Austin, R.L. Moore produced a long list of distinguished mathematicians, and all of them were Moore Method graduates. In this film shot in his classroom, Moore passionately explains his methods of teaching which placed preeminent value on students discovering mathematics on their own. Moore also reflects on the beginnings of his own mathematical education in 1877.

1966, color, 55 minutes
List: $36.95 MAA Member: $29.95
Catalog Number RLM

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1529 Eighteenth Street, NW
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Membership Code

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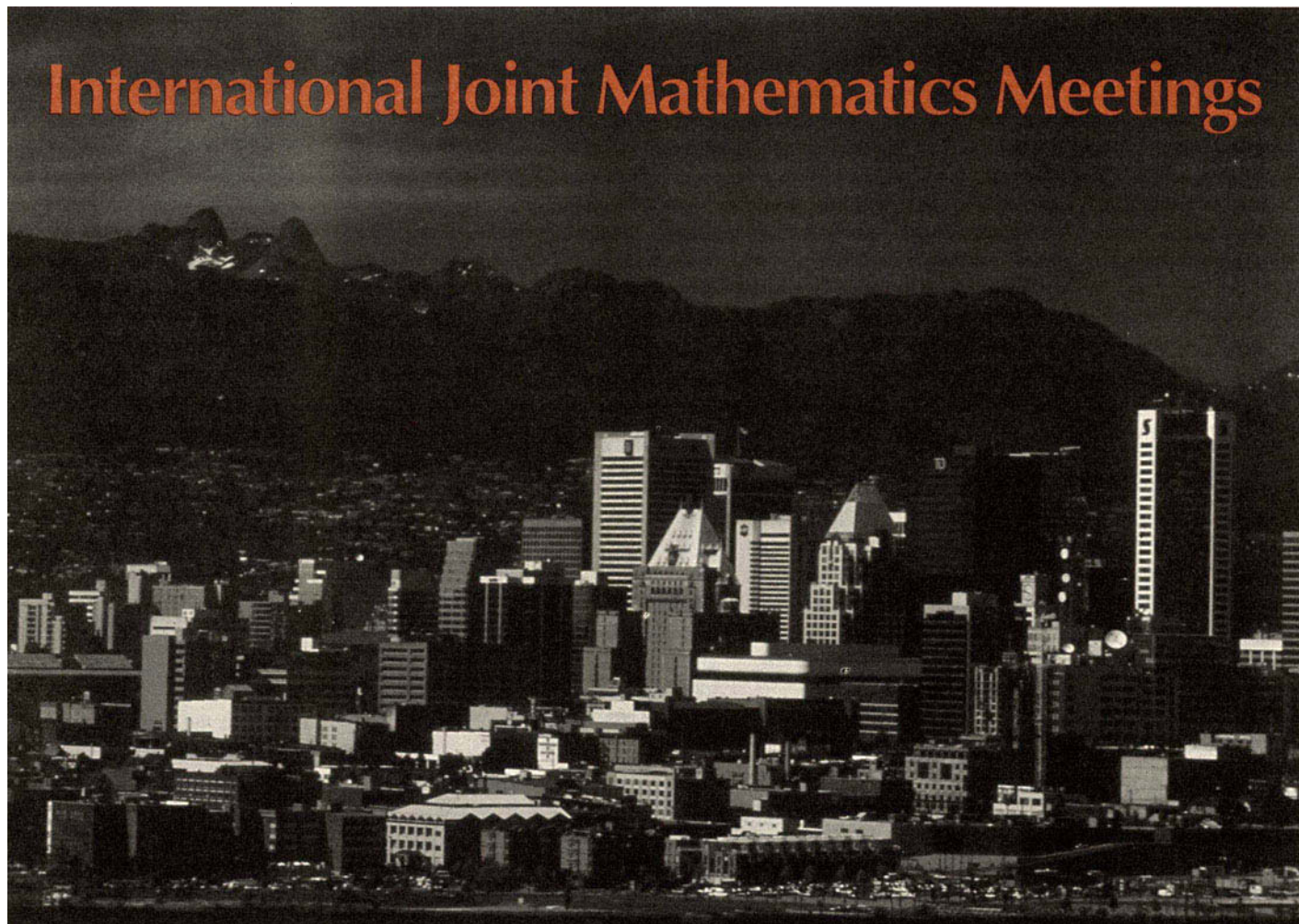
International Joint Mathematics Meetings

The MAA and the American Mathematical Society will meet jointly with the Canadian Mathematical Society in Vancouver, Canada, on 15–19 August this year. Meeting highlights include:

❑ Sir Michael Atiyah will give the three Hedrick Lectures. The title of Sir Michael's lecture series is *Recent Developments in Geometry and Physics.*

❑ Dr Aderemi O. Kuku, Professor of Mathematics at the University of Ibadan in Nigeria, and President of the African Mathematical Union, will give a special address entitled *Mathematical Research and Education in Africa—Problems and Prospects.*

❑ Three of the winners of the first MAA Awards for Distinguished College or University Teaching of Mathematics, presented at the San Antonio meeting in January, will give presentations. They are: V. Frederick Rickey, Doris W. Schattschneider, and Philip D. Straffin, Jr.

❑ Andrew Sterrett, the MAA's Assistant Director of Programs, is organizing a brainstorming session to investigate the possibility of MAA-arranged events for retired mathematicians.

Meetings Program Guide

Schedule of Events in Vancouver

SATURDAY, 14 AUGUST

8:30-4:00   **Board of Governors' Meeting**

SUNDAY, 15 AUGUST

9:15-9:25   Welcoming Address

9:35-10:25   **CMS-MAA Invited Address:** *Means, iterations, and experimentally induced identities,* Jonathan M. Borwein, Simon Fraser University

10:55-11:45 **AMS-CMS Invited Address**

1:25-2:15   **MAA Hedrick Lecture I:** *Recent developments in geometry and physics: history,* Sir Michael Atiyah, Trinity College, Cambridge University

2:30-6:30   **CMS-MAA Contributed Paper Session:** *Mathematics and industry interface,* organized by Brian Alspach, Simon Fraser University

2:30-3:50   **MAA Session for Teaching Award Winners:** V. Frederick Rickey, Bowling Green State University; Doris W. Schattschneider, Moravian College; Philip D. Straffin, Jr., Beloit College

2:30-4:30   **MAA Minicourse 1A:** *The Fibonacci and Catalan numbers,* organized by Ralph Grimaldi, Rose-Hulman Institute of Technology

2:30-4:30   **MAA Minicourse 2A:** *Teaching applied mathematics via Maple,* organized by Robert Lopez, Rose-Hulman Institute of Technology

4:00-6:00   **SUMMA Workshop:** *Intervention projects for minority pre-college students,* organized by William A. Hawkins, Director of SUMMA (Strengthening Underrepresented Minority Mathematics Achievement)

4:00-6:00   **MAA Section Officers' Meeting**

4:45-6:45   **MAA Minicourse 3A:** *Environmental modeling via the qualitative, visual, and computational,* organized by B. A. Fusaro, Salisbury State University

4:45-6:45   **MAA Minicourse 4A:** *Implementing the Harvard calculus curriculum,* organized by Wayne Raskind, University of Southern California

7:00   **Joint AMS-MAA Prize Banquet**

MONDAY, 16 AUGUST

8:30-9:20   **AMS-CMS-MAA-NAM Invited Address:** *Mathematical research and education in Africa—problems and prospects,* Aderemi O. Kuku, University of Ibadan, Nigeria, President of the African Mathematical Union

9:50-10:50   **AMS Colloquium Lecture I**

11:05-11:55 **AMS-CMS Invited Address**

1:25-2:15   **MAA Hedrick Lecture II:** *Recent developments in geometry and physics: 3-dimensions,* Sir Michael Atiyah, Trinity College, Cambridge University

2:30-5:15   **CMS-MAA Contributed Paper Session:** *History of mathematics,* organized by V. Frederick Rickey, Bowling Green State University, and James J. Tattersall, Providence College

             CMS-MAA Contributed Paper Session: *Research in undergraduate teaching,* organized by John Selden, Vanderbilt University

             CMS-MAA Contributed Paper Session: *Mathematics and industry interface,* organized by Brian Alspach, Simon Fraser University

2:30-3:20   **CMS-MAA Invited Address:** *To be announced,* Uri Treisman, University of Texas at Austin

2:30-4:30   **MAA Minicourse 1B:** *The Fibonacci and Catalan numbers,* organized by Ralph Grimaldi, Rose-Hulman Institute of Technology

2:30-4:30   **MAA Minicourse 2B:** *Teaching applied mathematics via Maple,* organized by Robert Lopez, Rose-Hulman Institute of Technology

2:30-4:30   **MAA Minicourse 5A:** *Teaching finite mathematics to a large class of arts and education students,* organized by J. Chris Fisher, University of Regina

3:30-4:30   **Association for Women in Mathematics Panel Discussion**

7:30-8:30   **CMS Jeffrey Williams Lecture:** James G. Arthur

TUESDAY, 17 AUGUST

8:30-9:20   **CMS-MAA Invited Address:** *The goals of curriculum reform: students, technology and mathematics,* Deborah Hughes Hallett, Harvard University

9:50-10:50   **AMS Colloquium Lecture II**

11:05-11:55 **AMS-CMS Invited Address**

1:25-2:15   **MAA Hedrick Lecture III:** *Recent developments in geometry and physics: 4-dimensions,* Sir Michael Atiyah, Trinity College, Cambridge University

2:30-6:00   **CMS-MAA Contributed Paper Session:** *History of mathematics,* organized by V. Frederick Rickey, Bowling Green State University, and James J. Tattersall, Providence College

             CMS-MAA Contributed Paper Session: *Less is more,* organized by Peter D. Taylor, Queen's University, and John Poland, Carleton University

             CMS-MAA Contributed Paper Session: *Research in undergraduate teaching,* organized by John Selden, Vanderbilt University

2:30-4:30   **MAA Minicourse 3B:** *Environmental modeling via the qualitative, visual, and computational,* organized by B. A. Fusaro, Salisbury State University

2:30-4:30	**MAA Minicourse 4B:** *Implementing the Harvard calculus curriculum,* organized by Wayne Raskind, University of Southern California
2:30-4:30	**MAA Minicourse 5B:** *Teaching finite mathematics to a large class of arts and education students,* organized by J. Chris Fisher, University of Regina
2:30-3:20	**MAA-MAT Invited Address:** *American high school mathematics—now and in the future,* Richard Rhoad, New Trier Township High School
3:30-6:00	**Pi Mu Epsilon Contributed Papers**
3:30-6:00	**MAA Student Contributed Papers**
8:45-9:45	**Regular-faced Polyhedra: An Introduction.** Video organized by Lorraine Foster, California State University, Northridge

WEDNESDAY, 18 AUGUST

8:30-9:20	**CMS-MAA Invited Address:** *Quantum cryptography.* Gilles Brassard, University of Montreal
9:50-10:50	**AMS Colloquium Lecture III**
11:05-11:55	**AMS-CMS Invited Address**
12:15-12:45	**MAA Business Meeting**
2:00-4:00	**MAA Minicourse 6A:** *Combinatorial design theory,* organized by Eric Mendelsohn, University of Toronto
2:00-4:00	**MAA Minicourse 7A:** *Lagrange multipliers,* organized by Edward Barbeau, University of Toronto
2:00-4:00	**MAA Minicourse 8A:** *Earth algebra: college algebra with applications to environmental issues,* organized by Christopher Schaufele and Nancy Zumoff, Kennesaw State College
2:10-6:00	**CMS-MAA Contributed Paper Session:** *Interacting with elementary school kids,* organized by Willard A. Parker, Kansas State University
	CMS-MAA Contributed Paper Session: *Less is more,* organized by Peter D. Taylor, Queen's University, and John Poland, Carleton University
2:10-3:00	**CMS-MAA Student Lecture:** *The unity of combinatorics,* Richard K. Guy, University of Calgary
2:10-3:40	**Quantitative Literacy Open Meeting:** organized by the MAA CUPM Subcommittee on Quantitative Literacy (Linda R. Sons, chair)
3:15-5:45	**CMS-MAA Panel Discussion:** *What is an interactive text? Four examples,* sponsored by the MAA Committee on Computers in Mathematics Education (L. Carl Leinbach, chair) and organized by J.S. Devitt, University of Saskatchewan
3:15-6:00	**Pi Mu Epsilon Contributed Papers (3)**
3:15-6:00	**MAA Student Contributed Papers (2)**
4:15-6:15	**MAA Minicourse 9A:** *Round-robin tournaments: an introduction,* organized by J. W. Moon, University of Alberta

4:15-6:15	**MAA Minicourse 10A:** *Iteration,* organized by Ronald Lancaster, St. Mildred's-Lightbourne School, Hamilton, Ontario
4:15-6:15	**MAA Minicourse 11A:** *Learning abstract algebra by programming in ISETL,* organized by Ed Dubinsky, Purdue University, Uri Leron, Technion-IIT, and Rina Zazkis, Simon Fraser University
6:30-9:00	**MAA 25-Year Member Banquet**
8:30-9:30	**Pi Mu Epsilon Frame Lecture:** *Ramanujan for students,* George E. Andrews, Pennsylvania State University

THURSDAY, 19 AUGUST

8:30-10:30	**MAA Minicourse 6B:** *Combinatorial design theory,* organized by Eric Mendelsohn, University of Toronto
8:30-10:30	**MAA Minicourse 7B:** *Lagrange multipliers,* organized by Edward Barbeau, University of Toronto
8:30-10:30	**MAA Minicourse 11B:** *Learning abstract algebra by programming in ISETL,* organized by Ed Dubinsky, Purdue University, Uri Leron, Technion-IIT, and Rina Zazkis, Simon Fraser University
8:30-10:40	**CMS-MAA Contributed Paper Session:** *Interacting with elementary school kids,* organized by Willard A. Parker, Kansas State University
8:30-10:30	**MAA Student Workshop:** *Using Maple to do mathematics*
9:00-10:40	**CMS-MAA Panel Discussion:** *Models for Cooperative Learning for Undergraduate Mathematics Classes,* organized by G. Joseph Wimbish and Keith E. Schwingdorf of Purdue University North Central.
9:30-10:30	**Retired Mathematicians:** Brainstorming session organized by Andrew Sterrett, Assistant Director of Programs for the MAA
10:55-11:45	**AMS-CMS Invited Address**
2:00-4:00	**MAA Minicourse 8B:** *Earth algebra: college algebra with applications to environmental issues,* organized by Christopher Schaufele and Nancy Zumoff, Kennesaw State College
2:00-4:00	**MAA Minicourse 9B:** *Round-robin tournaments: an introduction,* organized by J. W. Moon, University of Alberta
2:10-6:00	**Pi Mu Epsilon Contributed Papers**
2:10-6:00	**MAA Student Contributed Papers**
4:15-6:15	**MAA Minicourse 10B:** *Iteration,* organized by Ronald Lancaster, St. Mildred's-Lightbourne School, Hamilton, Ontario
4:15-6:15	**MAA Minicourse 11B:** *Learning abstract algebra by programming in ISETL,* organized by Ed Dubinsky, Purdue University, Uri Leron, Technion-IIT, and Rina Zazkis, Simon Fraser University

International Joint Mathematics Meetings

In the interest of furthering the exchange of mathematics worldwide, the AMS and MAA have accepted an invitation to join forces with the Canadian Mathematical Society to bring you one of the strongest mathematics programs ever assembled. All sessions and events will take place on the campus of the University of British Columbia in Vancouver. There will be conflict-free plenary talks each morning, and the program has a full five days designed to include something for everyone: special sessions, panels, education sessions, contributed paper sessions, and an enriching program for students. The University of British Columbia provides a scenically beautiful and appropriate venue for this first joint gathering of these U.S. and Canadian organizations.

Vancouver is truly a vacation-oriented region, and we encourage the families of participants to attend and take advantage of everything the area has to offer. Special family rates have been negotiated with the dormitories at UBC, and several whole and half-day trips have been arranged so that you may sample Canadian hospitality, entertainment, and discovery.

Attention Students!

Students should refer to the **Sessions for Students** section on page 325 for those sessions presented especially for them. In an attempt to make this announcement less overwhelming, other sessions that are thought to be of particular interest to students have been flagged with this symbol ♦ . Of course there may be several more, like some of the joint invited addresses, so students should take time to peruse the entire announcement to find other items of personal interest.

IMPORTANT DEADLINES

AMS-CMS Special Session Abstracts	Expired
AMS Abstracts	
For Consideration for Special Sessions	April 27
Of Contributed Papers	May 18
MAA Abstracts of Contributed Papers	May 7
ORDINARY Preregistration	June 11
Hotel Accommodations (MMSB)	June 11
Tickets through Preregistration	June 11
MAA Minicourse Preregistration (MAA)	June 11
Hotel Changes and Cancellations (MMSB)	July 1
Gage Residence Accommodations (UBC)	July 12
CMS General Meeting Notices of Motion	July 19
FINAL Preregistration (no hotel or tickets)	July 19
Cancellations for all Banquets and Tours (50% refund)	August 2
Gage Residence Accommodation Cancellations (less CDN$15 fee) (UBC)	48 hours before arrival
Preregistration Cancellations (50% refund)	August 11

Welcome Address

All participants are invited to the official commencement of this first joint meeting of the AMS, CMS, and MAA at the welcoming address on Sunday at 9:15 a.m.

Opening Banquet

On Sunday evening, the AMS, CMS, and MAA are honored to host a banquet where each organization's prizes will be awarded. All participants are invited to attend this festive event. Details on the banquet, including how to purchase tickets, can be found in the section on Social Events.

The Scientific Program

The August 1993 International Joint Mathematics Meetings, including the 71st Summer Meeting of the Mathematical Association of America, the 95th Summer Meeting of the AMS, the Canadian Mathematical Society Summer Meeting 1993, and the 1993 summer meetings of the Association for Women in Mathematics and Pi Mu Epsilon (ΠME), will be held August 15 – 19 (Sunday – Thursday) 1993, at the University of British Columbia, Vancouver, Canada. All sessions will take place on the campus of the university.

Joint AMS-CMS Sessions

By invitation of the AMS-CMS Joint Program Committee (Spencer Bloch, David W. Boyd, Carl Herz [Chair], Dusa McDuff, Victor P. Snaith, and Nancy K. Stanton), five speakers will address the AMS and CMS. The names of the speakers, their affiliations, the titles (where available), dates, and times of their talks follow:

Jill C. Pipher, Brown University, title to be announced, Sunday, 10:55 a.m.;

Curt McMullen, University of California, Berkeley, *Frontiers in complex dynamics*, Monday, 11:05 a.m.;

H. Blaine Lawson, State University of New York, Stony Brook, *Algebraic cycles and topology*, Tuesday, 11:05 a.m.;

Robert E. Gompf, University of Texas, Austin, *4-manifolds and symplectic topology*, Wednesday, 11:05 a.m.;

Louis Nirenberg, Courant Institute of Mathematical Sciences, New York University, title to be announced, Thursday, 10:55 a.m.

Also by invitation of the AMS-CMS Program Committee there will be Special Sessions of selected twenty-minute papers. The topics, the names and affiliations of the mathematicians arranging them, and the tentative days and times they will meet are:

3- and 4-manifolds, **David M. Austin**, University of British Columbia, Sunday and Monday at 2:30 p.m.;

Variational methods in partial differential equations, **Nassif Ghoussoub**, University of British Columbia, Tuesday and Wednesday at 2:30 p.m., and Thursday at 9:00 a.m. and 3:00 p.m.;

Conformal dynamics, **Linda Keen**, Herbert H. Lehman College, CUNY, Sunday, Monday, and Tuesday at 2:30 p.m.;

Meetings

Algebraic cycles, **James L. Lewis**, University of Alberta, and **Barry Mazur**, Harvard University, Sunday and Monday at 2:30 p.m.;

Number theory, **Rajiv Gupta**, University of British Columbia, and **Ram M. Murty**, McGill University, Tuesday and Wednesday at 3:00 p.m., and Thursday at 9:00 a.m.;

Harmonic analysis techniques in partial differential equations, **Gregory Verchota**, Syracuse University, Sunday and Monday at 2:30 p.m.

The AMS and CMS are grateful to the Natural Sciences and Engineering Research Council (NSERC) of the Government of Canada for its generous support of these sessions.

Speakers in these sessions should have followed the instructions for submission of abstracts to CMS as instructed by their organizers.

Contributed Papers: There will be sessions for contributed papers on Sunday, Monday, Tuesday, Wednesday, and Thursday afternoons, and Thursday morning. Anyone contributing should also examine the list of AMS Special Sessions to see if his or her paper may be considered appropriate for one of them, and then submit by the April 27 deadline.

Abstracts for AMS-CMS contributed papers and AMS Special Sessions should be prepared on the standard AMS form available from the AMS office in Providence or in departments of mathematics and should be sent to the Abstracts Coordinator, Meetings Department, American Mathematical Society, P. O. Box 6887, Providence, Rhode Island 02940, **so as to arrive by the abstract deadline of May 18, 1993.** A charge of $16 is imposed for retyping abstracts that are not in camera-ready form. **Late papers cannot be accepted.**

Participants planning to submit abstracts for AMS ten-minute contributed papers by the May 18 deadline should be sure to indicate on the abstract any special scheduling requests.

Electronic Submission of Abstracts: This service is available only to those submitting papers for AMS-CMS contributed paper sessions or AMS Special Sessions who use the TEX typesetting system. Requests to obtain the package of files may be sent by e-mail to **abs-request@math.ams.org** on the Internet. Users may also obtain the package on IBM or Macintosh diskettes available free of charge by writing to the Abstracts Coordinator at the address given above. **All** users should be sure to specify whether they want plain TEX, $\mathcal{A}_{\mathcal{M}}$S-TEX, or the LATEX package. Again, late papers cannot be accommodated.

Joint CMS-MAA Sessions

By invitation of the CMS-MAA Program Committee (Alan Cooper, Shirley A. Hill, Kenneth A. Ross (Chair), Peter D. Taylor, Alan C. Tucker, and Robert E. Woodrow), four speakers will address the CMS and MAA on some history or development of mathematics. The names of the speakers,

their affiliations, the titles (where available), dates, and times of their talks follow:

Jonathan M. Borwein, Simon Fraser University, *Means, iterations, and experimentally induced identities*, Sunday, 9:35 a.m.;

Uri Treisman, University of Texas, Austin, title to be announced, Monday, 2:30 p.m.;

Deborah Hughes Hallett, Harvard University, *The goals of curriculum reform: students, technology, and mathematics*, Tuesday, 8:30 a.m.;

Gilles Brassard, Université de Montréal, *Quantum cryptography*, Wednesday, 8:30 a.m.

Also by invitation of the CMS-MAA Program Committee, the following sessions will take place:

Contributed Papers: Contributed papers are being organized on five topics for presentation at the meeting. The topics, organizers, their affiliations, and the probable days they will meet are given below. The procedures and deadlines are given following the list of sessions. In particular, note that proposals should be sent directly to the organizer whose name is followed by an asterisk (*).

● *History of mathematics*, Monday and Tuesday afternoons.
♦ **V. Frederick Rickey***
Department of Mathematics and Statistics
Bowling Green State University
Bowling Green, OH 43403-0221
telephone: 419-372-7452
e-mail: rickey@andy.bgsu.edu

James J. Tattersall, Providence College
Papers on the history of any area of the mathematical sciences, including those dealing with the pedagogy of mathematics, are invited.

● *Interacting with elementary school kids*, Wednesday afternoon and Thursday morning.
Willard A. Parker*
Department of Mathematics
Kansas State University
Manhattan, KS 66506-2602
telephone: 913-532-6750
e-mail: parker@math.ksu.edu

Teaching mathematics to elementary school children sounds like a challenge, but it is one many mathematicians have been meeting in one form or another. Mathematicians have become involved with elementary school children in a variety of ways, including special one-time presentations in elementary school classrooms and in other settings, extended work with classes or with a selected group of students, participation in special events such as math days and math competitions, and communication with elementary classrooms via electronic media. This session invites papers describing experiences of mathematicians working with elementary school children as well as practical suggestions for how mathematicians may become involved in such activities.

● *Less is more*, Tuesday and Wednesday afternoons.

Meetings

Peter D. Taylor*
Department of Mathematics and Statistics
Queen's University
Kingston, Ontario K7L 3N6 Canada
telephone: 613-545-2434
fax: 613-545-2964
e-mail: taylorp@qucdn.queensu.ca
John Poland, Carleton University

We are so busy running around trying to cover all the material that our students "just have to know", and they are overburdened and frustrated because they never seem to have enough time to do anything really properly, even if they knew how, which they don't. With the cost crunch we all seem to be spinning faster and faster, and WHERE WILL IT ALL END?!

Submissions are encouraged from anyone who has had real success in getting their colleagues to agree to substantially cut down the amount of material in a course/program, thus freeing classroom time to talk/interact/explore/learn!

♦ ● *Mathematics and industry interface*, Sunday and Monday afternoons.

Brian Alspach*
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, B.C. V5A 1S6 Canada
telephone: 604-291-4815
fax: 604-291-4947
e-mail: alspach@cs.fsu.ca

This will be a session dealing with the interface between mathematics and industry, with emphasis on those topics that will interest students and assist them in making career decisions. For example, co-op education, industry recruiting, industrial perspectives, special joint university-industry programs, and so on, would be suitable topics. Presentations by students with industrial experience are welcome.

● *Research in undergraduate teaching*, Monday and Tuesday afternoons.

John Selden*
Vanderbilt University
mailing address: 1015 Melrose Drive
Cookeville, TN 38501
telephone: 615-526-1007
e-mail: js9484@tntech.edu

This session is sponsored by the Joint AMS-MAA Committee on Research in Undergraduate Mathematics Education, Ed Dubinsky (Chair). The organizing committee also includes Ed Dubinsky and Steve Monk. Presentations are invited that describe research on the teaching and learning of any aspect of undergraduate mathematics. Descriptions of courses taught must be in the context of investigations into such questions as how mathematics is learned, methods of teaching, effectiveness of the approach, and similar issues.

Presentations are normally limited to ten minutes, although selected contributors may be given up to twenty minutes. Individuals wishing to submit papers for any of these sessions

should submit a **one-page summary** of the paper, including the name(s) and address(es) of the author(s) directly **to the organizer whose address is given**. The purpose of this summary is to enable the organizer(s) to evaluate the appropriateness of the paper for the session, so this summary should be as detailed and informative as possible within the one-page limitation. This summary must reach the organizer by **April 27**. Summaries should NOT be sent to the MAA office in Washington.

The organizer will acknowledge receipt of the summary. If the paper is accepted for presentation, the organizer will send the author(s) a standardized abstract form to be used to prepare a brief abstract, which will be published in the journal *Abstracts* (copies will be available in the registration area).

Completed abstract forms must be returned to the organizer promptly and **no later than May 7. Do not send the abstracts to the AMS, and do not submit them electronically**. Abstracts not received by that date will not be published. An abstract form may be obtained in advance from either the AMS office in Providence or the MAA Washington office, and the abstract may be submitted along with the summary.

Rooms where CMS-MAA contributed paper sessions will be held are equipped with an overhead projector and screen. Please see the **Miscellaneous Information** section of this announcement for additional information on audio-visual equipment.

The following **panel discussions** will also take place:

How to Help Your Majors Get into Graduate School: This panel discussion, sponsored by the MAA Committee on the Participation of Women, is scheduled to take place from 3:45 p.m. to 4:45 p.m. on Tuesday.

What is an interactive text? Four examples: This panel discussion is sponsored by the MAA Committee on Computers in Mathematics Education (CCIME) (L. Carl Leinbach, Chair) and is organized by **J. S. Devitt**, University of Saskatchewan. Panelists include **William J. Davis**, Ohio State University, **Gerald J. Porter**, University of Pennsylvania, **Robert J. Lopez**, Rose-Hulman Institute of Technology, and **Jim Swift**, Institute of Academic Technology, University of North Carolina. The panel is scheduled from 3:15 to 5:45 p.m. on Wednesday.

Models for Cooperative Learning for Undergraduate Mathematics Classes: This panel, scheduled from 9:00 a.m. to 10:40 a.m. on Thursday, is a presentation of several possible modes of cooperative learning for college classes that have some basis in sound research. The organizers are **G. Joseph Wimbish** and **Keith E. Schwingdorf**, Purdue University, North Central.

Other Joint Sessions
By invitation of the AMS, CMS, MAA, and the National Association of Mathematicians, **Aderemi O. Kuku**, University of Ibadan, Nigeria, and President of the African Mathematical Union, will give an address on Monday at 8:30 a.m., on *Mathematical research and education in Africa—problems and prospects*.

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Sessions for Students

The AMS, CMS, MAA, and ΠME are rolling out the red carpet to welcome students, who should also refer to the sessions marked by ♦ . All students who attend are expected to register for the Joint Mathematics Meetings and to pay the normal student registration fee. Faculty members, bring your students! Students, bring your faculty members!

CMS-MAA Student Lecture: Richard K. Guy, University of Calgary, will speak on *The unity of combinatorics* at 2:10 p.m. on Wednesday.

MAA-Mu Alpha Theta (MAΘ) **Lecture:** This is the second in this series of summer lectures sponsored jointly by the MAA and the high school honorary society, MAΘ. This year's lecture will be given by **Richard Rhoad**, New Trier Township High School, on *American high school mathematics—now and in the future*, at 2:30 p.m. on Tuesday. The speaker was selected by the MAA-MAΘ Lecture Committee, consisting of Judith E. Broadwin, Leonard Gillman, Katherine P. Layton (Chair), and Paul See.

Student Workshop: *Using Maple to do mathematics* is scheduled from 8:30 a.m. to 10:30 a.m. on Thursday.

MAA Student Paper Sessions: These are scheduled on Tuesday, Wednesday, and Thursday afternoons.

The MAA Student Chapter Faculty Advisors' Breakfast will be held on Tuesday morning.

The ΠME **J. Sutherland Frame Lecture** will be delivered on Wednesday at 8:30 p.m. by **George Andrews**, Pennsylvania State University, on *Ramanujan for students*.

ΠME will hold sessions for contributed papers on Tuesday, Wednesday, and Thursday afternoons.

The ΠME Council will meet from noon to 1:00 p.m. on Tuesday, August 17.

Information on the ΠME banquet can be found in the **Social Events** section of this announcement.

A reception for students will be cosponsored by ΠME and MAA on Monday, August 16, at 6:15 p.m., where there will be a make-your-own sundae party.

ΠME prepares their own program for their sessions; copies will be available at the Registration Desk.

A **student hospitality/information center** will be open Sunday through Thursday from 8:00 a.m. to 6:00 p.m. This center will provide a place where students can meet and greet one another. You never know who may drop in!

71st Summer Meeting of the MAA
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♦ **Hedrick Lectures:** The 40th Earle Raymond Hedrick Lectures will be given by **Sir Michael Atiyah** of Trinity College, Cambridge, England. These lectures are scheduled at 1:25 p.m. on Sunday, Monday, and Tuesday, August 15–17. The title of the lecture series is *Recent developments in geometry and physics: 4-dimensions*. The first lecture will be on history, the second will focus on 3-dimensions, and the third will focus on 4-dimensions. The members of the Committee on Earle Raymond Hedrick Lectures who arranged

for this series include Andrew M. Gleason (Chair), Richard K. Guy, and Barbara Osofsky.

♦ **Minicourses:** Sign up now for one of the following Minicourses! The names and affiliations of the organizer(s), the topics, the dates and times of their meetings, and the enrollment limitations of each are indicated.

Minicourse #1: The Fibonacci and Catalan numbers, **Ralph P. Grimaldi**, Department of Mathematics, Rose-Hulman Institute of Technology. Part A: Sunday, 2:30 p.m.–4:30 p.m.; Part B: Monday, 2:30 p.m.–4:30 p.m. Enrollment limit: 80; registration fee: US$36.

In an introductory course in discrete or combinatorial mathematics one encounters the Fibonacci numbers—and sometimes the Catalan numbers. This Minicourse will review and then extend the first encounter as it examines some of the properties these numbers exhibit as well as applications where these sequences arise. A survey of applications dealing with chemistry, physics, computer science, linear algebra, set theory, graph theory, and number theory will show why these sequences are of interest and importance.

Minicourse #2: Teaching applied mathematics via Maple, **Robert J. Lopez**, Rose-Hulman Institute of Technology. Part A: Sunday, 2:30 p.m.–4:30 p.m.; Part B: Monday, 2:30 p.m.–4:30 p.m. Enrollment limit: 30; registration fee: US$45.

Computer algebra systems support a new approach to teaching classical applied mathematics, one that uses a "just-in-time" delivery of information and skills. This perspective is presented via examples taken from the list: Laplace transforms interactively, resonance by example, Fourier approximation to oscillator, Bessel and Legendre equations, fractionating columns, vector calculus, linear systems of ODEs, series solution of an ODE at an irregular singular point, the Calculus of Variations, car-following models.

Minicourse #3: Environmental modeling via the qualitative, visual, and computational, **B. A. Fusaro**, Salisbury State University. Part A: Sunday, 4:45 p.m.–6:45 p.m.; Part B: Tuesday, 2:30 p.m.–4:30 p.m. Enrollment limit: 30; registration fee: US$45.

This Minicourse can be used as the basis for a six-week module in a general education course or it can serve as an introduction to an emerging field. The core notion is a five-stage modeling process. Beginning with a verbal description of direct observation of an environmental situation, the first stage constructs a diagrammatic energy model. Then a qualitative graph is made of an energy variable versus time. The third stage develops a *flow equation* (a differential equation in disguise). An approximate solution of this equation is then found via an Execution Trace (if only calculators are on hand) or simple BASIC code. The fifth stage uses the numbers obtained to plot a graph of energy versus time.

Minicourse #4: Implementing the Harvard calculus curriculum, **Wayne Raskind**, University of Southern California. Part A: Sunday, 4:45 p.m.–6:45 p.m.; Part B: Tuesday, 2:30 p.m.–4:30 p.m. Enrollment limit: 40; registration fee: US$45.

This Minicourse will familiarize the participants with the philosophy and the materials being developed under

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the Harvard Calculus Reform Project. It will describe the philosophy behind the project and its implementation at a variety of institutions. The project is based on the *Rule of Three* in which most topics are presented geometrically, numerically, and symbolically to enhance student understanding of the concepts of calculus. Participants will be provided sample materials to examine, try out, and take home to incorporate into their own classes.

Minicourse #5: *Teaching finite mathematics to a large class of arts and education students*, **J. Chris Fisher**, University of Regina. Part A: Monday, 2:30 p.m.–4:30 p.m.; Part B: Tuesday, 2:30 p.m.–4:30 p.m. Enrollment limit: 40; registration fee: US$45.

My approach to large classes of nonscience students: hand out a list of several hundred problems and take all exam questions from that list. These problems include many that require insight and ingenuity. For the Minicourse I shall describe my course, exchange problems with the participants, and discuss a couple of topics in detail that are not readily found in mathematics books: (a) chronology (featuring modular arithmetic to solve problems arising from the Christian, Jewish, and Moslem calendars); and (b) equal temperament (featuring Farey series to explaining the 12-tone scale). Each participant should send a favorite problem or two to the organizer so that these may be added to the handouts.

◆ *Minicourse #6*: *Combinatorial design theory*, **Eric Mendelsohn**, University of Toronto. Part A: Wednesday, 2:00 p.m.–4:00 p.m.; Part B, Thursday, 8:30 a.m.–10:30 a.m. Enrollment limit: 80; registration fee: US$36.

The aim of this course is to open the world of design theory so that participants may go on to explore it by themselves. Combinatorial design theory is a field with ancient roots. However, the combinatorial explosion of results in the last twenty years has left most of this field unknown except to experts. There are applications in fields ranging from algebraic geometry to computer architecture. The modest aims of this course are to expand upon the 12-page introduction to *Contemporary Design Theory–A Collection of Surveys*, J. Dinitz and D. Stinson, John Wiley and Sons, ISBN 0-471-53141-3 (1992), so that remaining chapters or other surveys in design theory will be accessible.

◆ *Minicourse #7*: *Lagrange multipliers*, **Edward J. Barbeau, Jr.**, University College, Toronto. Part A: Wednesday, 2:00 p.m.–4:00 p.m.; Part B: Thursday, 8:30 a.m.–10:30 a.m. Enrollment limit: 40; registration fee: US$36.

The optimization technique of Lagrange Multipliers is often superficially and pragmatically covered in an advanced calculus course. We will explore the conceptual basis of multipliers, considering such matters as geometry, duality, convexity, and penalty functions. How are multipliers conceived in different contexts? Following a review of Lagrange's work, we will examine their appearance in physics and economics and look at developments over the last forty years after the Kuhn-Tucker theorem made it a branch of functional analysis. Participants should be familiar with standard applications of Lagrange Multipliers and with the material of an undergraduate course in modern analysis that includes linear functionals.

Minicourse #8: *Earth algebra*: *College algebra with applications to environmental issues*, **Christopher Schaufele** and **Nancy E. Zumoff**, Kennesaw State College. Part A: Wednesday, 2:00 p.m.–4:00 p.m.; Part B: Thursday, 2:00 p.m.–4:00 p.m. Enrollment limit: 80; registration fee: US$36.

This Minicourse is a presentation of the content and methodology of a freshman mathematics course developed by the presenters. *Earth Algebra* uses elementary equations to build models which can be used to study environmental problems. The course is focused on greenhouse gas emission and global warming; brief modules are being developed which can be used independently. The Minicourse provides an overview, and participants will work through two of the modules. Graphing calculators are required.

◆ *Minicourse #9*: *Round-robin tournaments*: *an introduction*, **John W. Moon**, University of Alberta. Part A: Wednesday, 4:15 p.m.–6:15 p.m.; Part B: Thursday, 2:00 p.m.–4:00 p.m. Enrollment: 40; registration fee: US$45.

A round-robin tournament T_n consists of n nodes $1, 2, ..., n$ such that each pair of nodes i and j is joined by exactly one of the arcs $\overrightarrow{ij}$ or $\overrightarrow{ji}$. Our object is to discuss certain structural properties of tournaments and to consider various applications to the method of paired comparisons, voting schemes and choice functions, and dominance relations in sociometric groups. A copy of the author's monograph *Topics on Tournaments* will be distributed to participants.

◆ *Minicourse #10*: *Iteration*, **Ronald J. Lancaster**, St. Mildred's-Lightbourne School. Part A: Wednesday, 4:15 p.m.–6:15 p.m.; Part B: Thursday, 4:15 p.m.–6:15 p.m. Enrollment limit: 36; registration fee: US$36.

This Minicourse will take an iterative look at solving equations and systems of equations, shuffling playing cards, Rubik's Cubes, number theory problems, financial mathematics, and transformations. TI-85 and TI-81 graphics calculators will be provided and instructions on how to use them will also be given. There will be something here for everyone, and the style of the course will be "hands-on". This Minicourse will be of particular value to college teachers who are interested in doing workshops for high school students.

Minicourse #11: *Learning abstract algebra by programming in ISETL*, **Ed Dubinsky**, Purdue University, **Uri Leron**, Technion-IIT, and **Rina Zazkis**, Simon Fraser University. Part A: Wednesday, 4:15 p.m.–6:15 p.m.; Part B: Thursday, 8:30 a.m.–10:30 a.m.; Part C: Thursday, 4:15 p.m.–6:15 p.m. Enrollment limit: 30; registration fee: US$45.

The organizers believe that undergraduates' difficulty in learning abstract algebra has less to do with the complexity of the theorems than with the abstract nature of the mathematical objects involved. Programming in a mathematical language can help by getting students to construct those objects on the computer, allowing mathematical operators to be, for them, activities about meaningful objects. The Minicourse is a hands-on experience in doing this with *ISETL*. No previous programming background is necessary.

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Participants interested in attending should complete the MAA Minicourse Preregistration Form found at the back of this issue and **send it directly to the MAA office** so as to arrive **by June 11**. Please note that **prepayment is required** and can be made by check payable to MAA (Canadian checks must be marked "in U.S. funds") or Visa or MasterCard. After the deadline, potential participants are encouraged to call the MAA headquarters at 800-331-1622 or 202-387-5200 to check on availability.

MAA Minicourses are open only to persons who register for the International Joint Mathematics Meetings and pay the regular registration fee. If the only reason for registering for the meetings is to gain admission to an MAA Minicourse, **this must be indicated by checking the appropriate box on the MAA Minicourse Preregistration Form**. Then, if the Minicourse is fully subscribed, a full refund can be made of the joint meetings preregistration fee. Otherwise, the meetings preregistration will be processed and the 50% refund rule will apply. If you must cancel your Minicourse preregistration, please make clear your intention as to meetings preregistration. If no instruction is given, the meetings registration will also be cancelled. Preregistration forms for the Joint Mathematics Meetings should be mailed to Providence or Ottawa, while **MAA Minicourse forms should be sent to the MAA office in Washington prior to the deadline of June 11.**

Other MAA Sessions

> **Teaching Award Presentations:** Seven outstanding teachers received the first MAA Awards for Distinguished College or University Teaching of Mathematics at the San Antonio meeting in January 1993. Four of them made wonderful presentations in San Antonio on "the secrets of their success". The other three winners of this prestigious award, **V. Frederick Rickey**, Bowling Green State University; **Doris W. Schattschneider**, Moravian College; and **Philip D. Straffin, Jr.**, Beloit College, will make similar presentations in Vancouver on Sunday from 2:30 p.m. to 3:50 p.m.

SUMMA Workshop: *Intervention projects for minority precollege students* is scheduled from 4:00 p.m. to 6:00 p.m. on Sunday and will be directed by **William A. Hawkins**, Director of SUMMA (Strengthening Underrepresented Minority Mathematics Achievement).

◆ **Regular-faced polyhedra: an introduction:** This 47-minute video, scheduled for 8:45 p.m. on Tuesday, is a study of various families of regular-faced polyhedra with many animations and a model of the Yog Sothoth. This showing is organized by **Lorraine Foster**, California State University, Northridge.

◆ **1993 Micro-inequities Skits:** From 8:45 p.m. to 10:45 p.m. on Tuesday, the Committee on the Participation of Women is presenting its seventh program of skits about the incidents reported by mathematicians that reveal the current relationship between the sexes within our community. Individually, many of these are funny in retrospect, but cumulatively they chip away at women's professional strength like drops of water on a rock. The acting is by mathematicians. There will be a brief opportunity for response between the skits. Formal discussion groups, led by specially prepared mathematicians, will follow the set of skits. Suggestions for skit material and volunteers for acting are welcomed by the committee Chair, Carol B. Lacampagne, National Science Foundation.

Quantitative Literacy Open Meeting: From 2:10 p.m. to 3:40 p.m. on Wednesday individuals will have an opportunity to discuss informally with members of the CUPM Subcommittee on Quantitative Literacy (Linda R. Sons, Chair) their questions, ideas, and problems regarding a quantitative literacy program at their institution. The committee is prepared to explain its views on what quantitative literacy is and why and how it should be fostered in colleges and universities.

Retired Mathematicians: Might the Washington office of the MAA, possibly working with the sections, promote events that would enrich the professional lives of retired mathematicians? To determine whether there is interest, a brainstorming session is scheduled from 9:30 a.m. to 10:30 a.m. on Thursday and is organized by **Andrew Sterrett**, Assistant Director of Programs for the MAA.

Other MAA Events

Business Meeting: The MAA Business Meeting is scheduled on Wednesday at 12:15 p.m. This meeting is open to all members of the Association. Note that MAA prizes, which traditionally have been awarded at this meeting, will be given at the Opening Banquet on Sunday. Please see more details in the Social Events section.

Board of Governors: The MAA Board of Governors will meet from 8:30 a.m. to 4:00 p.m. on Saturday, August 14. This meeting is open to all members of the Association.

Section Officers: There will be a Section Officers' meeting on Sunday from 4:00 p.m. to 6:00 p.m.

95th Summer Meeting of the AMS
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Colloquium Lectures: A series of three Colloquium Lectures, *On the regularity properties of Gauge Fields in Minkowski space-time*, will be given by **Sergiu Klainerman**, Princeton University. The lectures will be given at 9:50 a.m. on Monday, Tuesday, and Wednesday.

Progress in Mathematics Lectures: This series of lectures provides a forum for the exposition of mathematical topics that have come into prominence in the past five years. The members of the Progress in Mathematics Selection Committee for these lectures are Hyman Bass, Michael Crandall, John Friedlander, Peter Li, Haynes Miller (Chair), and James Serrin.

The names and affiliations of the speakers and their titles are as follows:

Meetings

Armand Borel, Institute for Advanced Study, *Values of indefinite quadratic forms at integral points and flows on spaces of lattices*, Wednesday at 1:15 p.m.;

Avner Friedman, University of Minnesota, Minneapolis, *PDE based models arising from industrial problems*, Thursday at 1:15 p.m.

Special Sessions: By invitation of the AMS Program Committee for National Meetings (Spencer Bloch, Hermann Flaschka, H. W. Lenstra, Dusa McDuff, Nancy K. Stanton [Chair], and Mary F. Wheeler), there will be eight Special Sessions of selected twenty-minute papers. The topics of these Special Sessions, the names and affiliations of the mathematicians arranging them, and the tentative days and times they will meet are:

Problems in number theory in memory of E. G. Straus, **Joseph Arkin** and **David C. Arney**, United States Military Academy, and **Mathukumalli V. Subbarao**, University of Alberta, Sunday, Monday, and Tuesday at 2:30 p.m.;

Geometric methods in mathematical physics, **John K. Beem**, University of Missouri, Columbia, and **Krishan L. Duggal**, University of Windsor, Wednesday at 2:30 p.m. and Thursday at 8:30 a.m. and 2:30 p.m.;

Topological methods in group theory, **Alan B. Brownstein**, Rutgers University, and **Ronnie Lee**, Yale University, Wednesday at 2:30 p.m. and Thursday at 8:30 a.m. and 2:30 p.m.;

Discrete geometry and convexity, **Jacob E. Goodman**, CUNY, Sunday, Monday, and Tuesday at 2:30 p.m.;

Symplectic geometry, **Mark J. Gotay**, University of Hawaii, Sunday, Monday, and Thursday at 2:30 p.m.;

Exponential families in mathematical statistics, **Gerard G. Letac**, Université de Toulouse III, and **Paul Sabatier**, Université de Sciences et Techniques du Languedoc, Montpellier, Sunday, Monday, and Tuesday at 2:30 p.m.;

Algebraic and geometric methods in control theory, **En-Bing Lin**, University of Illinois at Chicago, Sunday, Monday, and Tuesday at 2:30 p.m.;

Random knotting and linking, **Kenneth C. Millett**, University of California, Santa Barbara, Wednesday at 2:30 p.m., and Thursday at 8:30 a.m. and 2:30 p.m.

Most of the papers to be presented at these Special Sessions will be by invitation; however, anyone contributing an abstract for the meeting who feels that his or her paper would be particularly appropriate for one of these sessions should indicate this clearly on the abstract, **and should submit it by April 27, 1993, three weeks earlier than the normal deadline for contributed papers**, in order that it be considered for inclusion.

See the instructions for AMS abstracts submission given at the end of the **AMS-CMS Joint Sessions** section.

Other AMS Events

Council Meeting: The Council of the Society will meet at 2:00 p.m. on Friday, August 13.

Business Meeting: The Business Meeting of the Society will take place at 12:15 p.m. on Monday. The Secretary notes
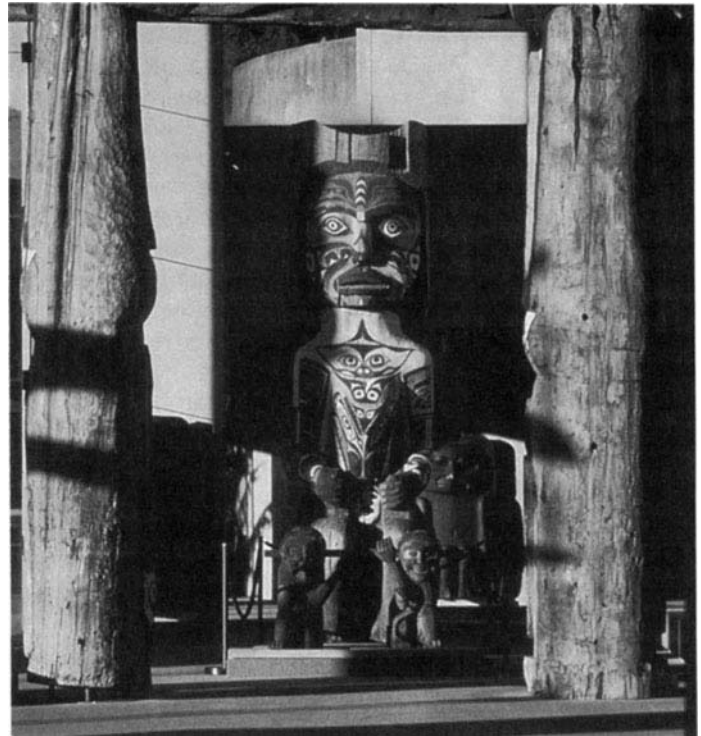
the following resolution of the Council: Each person who attends a Business Meeting of the Society shall be willing and able to identify himself as a member of the Society. In further explanation, it is noted that *each person who is to vote at a meeting is thereby identifying himself as and claiming to be a member of the American Mathematical Society.*

CMS Summer Meeting 1993
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Jeffery-Williams Lecture: The Jeffery-Williams Lectureship was inaugurated in 1968 to recognize mathematicians who have made outstanding contributions to mathematical research and is presented in conjunction with the Society's Summer Meeting. This year the Jeffery-Williams Lecture will be delivered by **James G. Arthur**, University of Toronto, on *Trace formulas and automorphic representations*, on Tuesday, August 17 at 7:00 p.m.

There will be a reception immediately preceding the lecture. Please see the Social Events section for details.

Other CMS Events

Board of Directors' Meeting: The Boards of Directors' Meeting will take place on Saturday, August 14, at 2:30 p.m.

General Meeting: The General Meeting of the Society will take place on Monday, August 16 from 5:30 p.m. to 6:30 p.m. All members are invited to attend.

Committee Meetings: Most standing and ad-hoc committees will hold meetings in Vancouver. Members are encouraged to contact committee members regarding any items for inclusion in committee agendas. Room assignments for all

CMS committee meetings will be made by the Administrative Coordinator in Ottawa.

Notices of Motion: In accordance with the existing by-laws, notices of motion must be received at the Executive Office at least four weeks before the meeting at which this notice of motion is to be considered. Notices of motion should include the mover and seconder and should be sent to the CMS Secretary, Executive Office, 577 King Edward, Suite 109, POB 450, Station A, Ottawa, Ontario, Canada K1N 6N5. In order to be considered at the General Meeting, all notices of motion must be received in Ottawa before July 19, 1993.

Activities of Other Organizations

The **Association for Women in Mathematics** (AWM) and the CMS Committee on Women in Mathematics are cosponsoring a panel discussion on *Affirmative action* on Monday, from 3:15 p.m. to 4:30 p.m.

The Fourth Annual Alice T. Schafer Mathematics Prize for excellence in undergraduate mathematics will be presented at the AWM Prize Session and Membership Meeting beginning at 4:35 p.m. on Monday, August 16.

An open reception is planned from 9:30 p.m. to 11:00 p.m. on Monday. See the Social Events section for details.

Blumenthal Award and Address: The AMS is honored to have this meeting selected as the venue at which the quadrennial Leonard M. and Eleanor Blumenthal Award for the Advancement of Research in Pure Mathematics will be given. The terms of the award stipulate that a distinguished panel chooses the awardee on the basis of an outstanding Ph.D. thesis. Immediately after the prize is announced, the awardee will address the audience on the subject of the prizewinning work. The award is scheduled to be given on Sunday at 4:00 p.m.

Joint Policy Board for Mathematics (JPBM) will hold a public policy address on Tuesday evening at 8:15 p.m. This event is cosponsored by the AMS Committee on Science Policy (Frank W. Warner, III, Chair), the CMS, and the MAA Science Policy Committee (T. Christine Stevens, Chair). **John Gibbons**, Assistant to the President for Science and Technology, has been invited to speak.

The **National Science Foundation** (NSF) will be represented at a booth in the exhibit area. NSF staff members will be available to provide counsel and information on NSF programs of interest to mathematicians. The booth will be open the same days and hours as the exhibits. Times that staff will be available will be posted at the booth.

Please see the details of the ΠME sessions in the **Sessions for Students** section of this announcement.

Other Events of Interest

Book Sales and Exhibits

Information Booths: All meeting participants are invited to visit the three organizations' membership information booths during the meetings. A representative will be available at each organization's booth to answer questions about membership, publication and other programs. Complimenatry coffee will be available at the AMS and CMS booths.

Book Sales: Books published by the AMS, CMS, and MAA will be sold at discounted prices somewhat below the cost for the same books purchased by mail. **These discounts will be available only to registered participants wearing the official meetings badge.** Visa and MasterCard will be accepted for book sale purchases at the meetings. The book sales will be open the same days and hours as the commercial exhibits.

Exhibits: The book and educational media exhibits are open from 1:00 p.m. to 5:00 p.m. on Sunday, 9:00 a.m. to 5:00 p.m. Monday through Wednesday, and 9 a.m. to noon on Thursday. Participants are encouraged to visit the exhibits to see what's new.

As part of Canada's *Science and Technology Week*, the CMS invites universities, colleges, schools, and community associations to sponsor and participate in activities designed to promote a greater interest in and better understanding of science and its importance. The CMS sponsors an activity titled **Math in the Malls**, where organizers plan various activities inviting passersby of all ages to participate in mathematics events that are fun and captivating. Participants are invited to the Math in the Malls booth in the exhibit area for a special exhibit presented by **Ed Williams**, Memorial University of Newfoundland, and **Malgorzata Dubiel**, Simon Fraser University.

The AMS, CMS, and MAA are grateful to the participating exhibitors who have agreed to sponsor a Coffee Hut in the exhibit area. Look for it in the afternoons.

Joint Books, Journals, and Promotional Materials Exhibit: This exhibit will be open the same hours as the book sales and affords participants the opportunity to order publications from various commercial publishers not represented at the meetings.

Social Events

It is strongly recommended that tickets for these events be purchased through preregistration, since only a very limited number of tickets will be available for sale on-site. Tickets purchased through preregistration will be mailed with your badge and program from Providence. Should participants wish to pick up their ticket(s) at the meeting at the same time as their badge and program, they must indicate this on the Preregistration/Hotel form. To get a 50% refund, **returned tickets must be received by the Mathematics Meetings Service Bureau by August 2**. After that date no refunds can be made. Special meals are available upon request at all banquets, including vegetarian and kosher, but this must be indicated on the Preregistration/Hotel Form in advance.

Lounges available for socializing: Participants should note that the Gallery Lounge and The Pit in the Student Union Building are open until late evening for the sharing of snacks and beverages and working out that elusive theorem with their peers.

Meetings

Opening Banquet: The special feature of this banquet will be the awarding of AMS, CMS, and MAA prizes. Recipients of three Leroy P. Steele Prizes (AMS): one for writing a truly fundamental paper, one for a work or sequence of works that has been shown to be of lasting value, and one for an outstanding career; the Jeffery-Williams Lectureship (CMS); the Merten M. Hasse Prize, and various awards for outstanding journal articles, namely the Carl B. Allendoerfer, Lester R. Ford, and George Pólya Awards (MAA) will be announced at this banquet. Attendees will have the opportunity to meet with each of them on Sunday, August 15 at 7:00 p.m. The banquet will be preceded by a cash bar reception at 6:15 p.m. on the patio outside the west windows of the Totem Park Ballroom.

Dinner will be served at 7:00 p.m. in the Totem Park Ballroom. The menu consists of Pacific shrimp cocktail; chicken breast stuffed with Camembert cheese and topped with orange sauce; green beans almondine; parmesan broiled tomatoes; rice pilaf; French crusty rolls and butter; sacher torte with raspberry coulis; and coffee and tea. Vegetarian meals are available upon request. Tickets are US$27 (CDN$33) per person, including gratuity and all taxes. Since this event occurs the evening of the first day of the meetings and **seating is very limited**, very few, if any, tickets will be available for purchase on-site, so be sure to purchase your ticket when you preregister.

Children's Reception: A reception for children of participants attending the Opening Banquet will be held concurrently in the Unit Lounge in the Totem Park Complex from 6:30 p.m. to 9:30 p.m. on Sunday. It is anticipated that amateur entertainment will be provided. Licensed personnel will provide child care. The cost for this event is US$5 (CDN$6) per child and participants must reserve places for their children in advance on the Preregistration/Hotel form. Children must be over three years of age.

Jeffery-Williams Reception: This complimentary wine and cheese reception, open to all participants, will take place on Tuesday, August 17, from 6:00 p.m. to 6:45 p.m. (Please see the CMS program section for more information on the Jeffery-Williams Lecture.)

Salmon Barbecue: Participants will have an opportunity to taste world-famous Pacific salmon at a cookout to be held on Monday, August 16, from 7:00 p.m. to 9:30 p.m. There will be a cash bar where participants can relax and mingle with their colleagues and guests.

The menu will include barbecued whole Pacific salmon with lemon wedges and tartar sauce; wild rice casserole; three sisters vegetables (a medley of corn, green beans, and squash); garden green salad; platters of sliced tomato and cucumbers; marinated carrots; onions and green pepper salad; red cabbage and apple salad; fresh seasonal vegetables with dip; marinated new potato salad; Waldorf salad; traditional bannock; platters of fresh melon; Okanagan apple and hazelnut crisp; Canadian cheddar cheese; mocha java coffee; orange pekoe tea, and lemonade. Vegetarian and kosher meals are available through advance request. Tickets are US$27 (CDN$33), including all

taxes and gratuity. Tickets for children ten and under are 1/2 price.

This event will take place at the Museum of Anthropology, and admission is included as part of the evening. There may be special exhibitions in addition to the research collection. See art and artifacts from around the world and marvel at the great achievements of the First Peoples of the Northwest Coast. Wander through the Masterpiece Gallery with its dramatic views and exquisitely carved works in gold, silver, argillite, and wood. Guides will be present throughout the evening.

AWM Reception: The mouth-watering salmon barbecue and the museum are not enough to make a completely enjoyable evening on Tuesday! The AWM will top off the night with one of their spectacular parties. Held at the historic Cecil Green Park House on campus, all participants are invited for camaraderie, music, and refreshments.

MAA 25-Year Member Banquet: The MAA is planning its sixteenth annual banquet on Wednesday for those individuals who have been members of the Association for twenty-five years or more. There will be a cash bar reception from 6:30 p.m. to 7:30 p.m. on the south patio of the Long House Great Hall. Dinner will be served at 7:30 p.m. in the Long House Great Hall. The menu includes garden green salad with chopped papaya, sliced almonds, Spanish onion and raspberry vinaigrette; sole paupiette with lobster sauce; honey-glazed squash; medley of cauliflower, carrots, and snow peas; multigrain rolls with butter; fresh apple flan with cinnamon whipped cream; coffee and tea. Tickets are US$26 (CDN$31.50) each including all taxes and gratuity. Vegetarian and kosher meals are available through advance request.

ΠME Banquet: This popular annual event will take place on Wednesday, August 18, at 6:30 p.m., at Trekkers Restaurant. The menu includes Italian lasagne, garlic bread, garden green salad with herb vinaigrette, relish trays, fresh fruit platters, dessert, coffee and tea, served buffet style. Tickets are US$12 (CDN$14.50) including gratuity and all applicable taxes. Tickets for ΠME members are US$8 (CDN$10). Vegetarian meals are available through advance request.

Tours

Because of its many attractions and marvelous climate, Vancouver is a premier vacation destination. The following tours have been recommended as typical of the area in the summer. These tours are available exclusively to mathematicians and their families (with the exception of the Steamtrain/Boat Tour). Tickets should be purchased through preregistration as seats are limited and many tours may sell out early. Please indicate preference for tour(s) on the Preregistration/Hotel Form and include applicable payments. NOTE: Should these tours not meet the minimum, they will be canceled and full refunds issued. All tours will take place as scheduled, rain or shine, and no refunds will be made because of weather. No food is included in the prices of the tickets listed below. Unless

where noted, childrens' fares apply to those aged twelve and under.

City Tour: (3.5 hours) Vancouver and its environs are truly captivating! A motorcoach will leave from the UBC campus after lunch and take you to see the 1,000 acre Stanley Park, exotic Chinatown, historic Gastown (where Victoria had its humble beginnings), and Queen Elizabeth Park Sunken Gardens. You will also go through the city center shopping district, the prestigious Shaughnessy residential area, the financial district, English Bay Beach Drive, and see a panoramic view of the city from Little Mountain. This tour is offered on Sunday and Tuesday afternoons at US$24 (CDN$29) per adult and US$14 (CDN$17) per child.

North Shore Tour: (4 hours) Nature lovers and anyone who appreciates the grandeur Mother Nature has to offer shouldn't miss this tour. A motorcoach will leave the UBC campus after lunch. Awaiting you is the Grouse Mountain Superskyride with panoramic views of the lower mainland. A trip across the swaying 750-foot long, 250-foot high Capilano Suspension Bridge is an adventure you won't forget! Also included are logging shows, *Our Spirit Soars* and *The Best of Times* film presentations in the Theatre in the Sky, Peak Chair Rides, a visit to the Capilano salmon hatchery, and the quaint shops at Lonsdale Quay. The tour ends with a voyage across Vancouver's harbor on the unique SeaBus. This tour is offered on Monday and Wednesday afternoons at US$36 (CDN$43.50) per adult and US$21 (CDN$25.50) per child.

Victoria Tour: This all-day tour (12 hours) leaves the UBC campus early in the morning by bus to connect with the ferry to Victoria Island, home of the capital of British Columbia. After a 90-minute ferry ride through the Gulf

The sea wall at Stanley Park is one of the beautiful parks in Vancouver

Islands (keep an eye out for a playful seal or two), participants will take in the limitless colors and fragrances of the world-renowned Butchard Gardens and continue on to see the University of Victoria, the Royal Victoria Yacht Club, and Beacon Hill Park. A Victoria city tour, as well as the uplands, Oak Bay residential areas, and scenic Beach are included, and time on your own to explore the attractions of Victoria's inner harbor. This tour is offered on Friday, August 20, at US$61.50 (CDN$75) per adult and US$33 (CDN$40) per child.

Whistler Tour: A motorcoach will depart from the UBC campus for the resort town and alpine village of Whistler, with its many sports activities, shops, bistros, and galleries. On the way enjoy spectacular views of Howe Sound. See Shannon Falls in the Squamish Forest Reserve. Don't forget to bring your camera! This all-day tour (9.5 hours) is offered on Saturday, August 14, at US$36 (CDN$44) per adult and US$17.50 (CDN$21) per child.

Steamtrain/Boat Tour: ALL ABOARD for a whistle-blowing, clickety-clacking, good old time!! Let the authentic steam train Royal Hudson take you back to another era. Wind through the British Columbian wilderness along Howe Sound to take in seascapes, snow-capped peaks, rock cliffs, waterfalls, forests, tunnels, and trestles. You'll stop at the quaint logging town of Squamish in the Garibaldi Mountains at midday to browse in shops, picnic in the park, or visit nearby Shannon Falls (the truly adventurous can opt for a glacier tour by air at extra cost). Pack a picnic, take advantage of the buffet on board the return trip at CDN$12.50, or purchase lunch in Squamish. Your return trip will be aboard the M.V. Brittania where you will observe the scenery from a decidedly different perspective from the waters of Howe Sound. This all-day tour is offered on Friday, August 20, at US$50.50 (CDN$61.50) per adult; US$43.50 (CDN$53) for seniors (60+)/youths (ages twelve to eighteen); and US$19 (CDN$23) for children, ages five to eleven.

These tours have been chosen as the best sampling the Vancouver area has to offer and give you the opportunity to enjoy them with your colleagues. Many other activities are available, such as deep-sea or salmon fishing, kayaking, bicycle touring, sailing expeditions, and tours of historic mansions and botanical and classical Chinese gardens. For children a visit to Science World, offering hands-on exploration and an OMNIMAX theater, is a must. Information on other tours, including self-guided tours of areas like Granville Island, will be available at the Local Information section of the Registration Desk at the meeting. To arrange for pre- and postconference tours, please contact your travel agent. Those desiring more information on recreation within the area should call the British Columbia Bureau of Tourism at 604-683-2000.

How to Preregister

The importance of preregistration cannot be overemphasized. Those who preregister pay fees considerably lower than those who register at the meeting (on-site registration fees will be 30% higher than the preregistration fees listed below). There are two separate preregistration deadlines, each with its own

Meetings

advantages and benefits. **The same deadlines apply to all participants, regardless of choice of payment bureau.**

ORDINARY Preregistration
(and hotel accommodation)   June 11
FINAL Preregistration
(no hotel or tickets)   July 19

Canadian and U.S. Payment Bureaus

Participants choosing to pay in Canadian funds must send their preregistration forms to the **CMS Executive Office** in Ottawa. Participants choosing to pay in U.S. funds must send their preregistration forms to the **Mathematics Meetings Service Bureau** (MMSB) in Providence.

Please note that the same deadlines apply to all participants, regardless of choice of payment bureau.

Tickets purchased through preregistration will be mailed with your badge and program **from Providence**, regardless of choice of payment bureau. Should participants wish to pick up their ticket(s), badge, and program at the meeting, they must indicate this on the Preregistration/Hotel Form.

Cancellations and/or changes to hotel reservations made through the MMSB, preregistration, or tickets must be sent to Providence regardless of where the original payment was sent.

On-site registration can be made using Canadian currency only!

Ordinary Preregistration: Those who preregister by the **ordinary** deadline of **June 11** may make hotel reservations at special rates offered only through the MMSB. They will receive formal acknowledgments prior to the meetings, as well as their badges, programs, and appropriate tickets by mail two to three weeks before the meeting (unless the appropriate box signaling the contrary was checked on the Preregistration/Hotel Form). **All material will be sent from the AMS office in Providence.**

There will be a special Registration Assistance desk at the meeting to assist individuals who either do not receive this mailing or who have a problem with their registration. Please note that a **CDN$3 replacement fee** will be charged for programs and badges that are mailed, but are not brought by participants to Vancouver.

Final Preregistration: Those who preregister by the **final** deadline of **July 19** must pick up their badge and program at the meeting. Unfortunately, it is not possible to provide final preregistrants with hotel accommodations or tickets to special events in advance. **Please note that the July 19 deadline is firm and any forms received after that date will be returned!**

It is essential that the Preregistration/Hotel Form (found at the back of this issue) be completed fully and clearly. **Each** person must complete a separate copy of the Preregistration/Hotel Form, but all preregistrations from one family may be covered by one payment. Please print or type the information requested and be sure to complete all sections. Absence of information (missing credit card numbers, incomplete addresses, etc.) will cause a delay in processing.

If you wish to be included in a **list of individuals sorted by mathematical interest**, please provide the one *Mathematical Reviews* classification number of your major area of interest on the Preregistration/Hotel Form. (A list of these numbers appears on the back of the AMS and MAA abstract forms.) The master copy of this list will be posted on the meetings' bulletin board near the registration area.

Preregistration Fees: The AMS-MAA Joint Meetings Committee, with additional guidance from the Canadian Mathematical Society for this meeting, is responsible for maintaining a sound fiscal position for these meetings and keeping the deficits at a reasonable level, while still providing the very best meeting facilities and services to the participants. Registration fees only partially cover the expenses of holding meetings. While fees for this meeting are somewhat higher than usual, participants will note that this ground-breaking international meeting is five days long (two days longer than a Mathfest, and one day longer than the usual Joint Mathematics Meetings). A complimentary coffee break will be served each morning in the Woodward Instructional Services Center (IRC). Also, there is a complimentary reception on Tuesday evening.

The registration fees at the meeting will be 30% higher than the preregistration fees listed below. One-day registration fees will also be available at the meeting (these fees are not available through preregistration).

International Joint Mathematics Meetings

	US$	CDN$
Member of AMS, CMS, MAA, and ΠΜΕ	$135	$165
Emeritus Member of AMS, MAA, and Retired CMS	35	43
Nonmembers	210	256
Student/Unemployed	35	43
Librarian/High School Teacher	30	37
High School Student	2	2

MAA Minicourses

Minicourses #1, 6, 7, 8, 10	$ 36
#2, 3, 4, 5, 9, 11	45

All mathematicians who wish to attend sessions are expected to register and should be prepared to show their badge, if so requested. Badges are required to obtain discounts at the AMS, CMS, and MAA Book Sales and to cash a check with the meeting cashier. If preregistrants arrive too late in the day to pick up their badges, the acknowledgment of preregistration received from the MMSB acts as proof of registration.

Preregistration forms accompanied by insufficient payment either will be returned, therefore delaying the processing of any hotel housing request, or a US$5 (CDN$6) charge will be assessed if an invoice must be prepared to collect the delin-

quent amount. Overpayments of less than US$2 (CDN$2.50) will not be refunded.

All **full-time students** currently working toward a degree or diploma qualify for the student registration fees, regardless of income.

The **unemployed** status refers to any person currently unemployed, actively seeking employment, and who is not a student. It is not intended to include any person who has voluntarily resigned or retired from his or her latest position.

Persons who qualify for **emeritus** membership in either the Society or the Association may register at the emeritus member rate. The emeritus status refers to any person who has been a member of the AMS or MAA for twenty years or more, and is retired on account of age or on account of long-term disability from his or her latest position. This rate is also extended to any CMS member who has retired from his or her position.

The **high school teacher** status refers to any person whose primary employment is teaching in any high school or secondary school.

The **librarian** status refers to any person who has a degree in library science and whose primary employment is working in a library.

Nonmembers who register at the nonmember fee will receive mailings from AMS, CMS, and MAA after the meeting is over, containing information about a special membership offer.

There is no extra charge for members of the families of registered participants, except that all professional mathematicians who wish to attend sessions must register independently.

Participants should check with their tax preparers for applicable deductions for education expenses as they pertain to this meeting.

Electronic Preregistration: This service is available for preregistration, and hotel accommodation if desired, by requesting information via e-mail from **meet@math.ams.com**. Residence Hall accommodations cannot be requested via e-mail. Requests will be acknowledged within 24 hours with the electronic form and instructions on how to complete it. **VISA or MasterCard is the ONLY method of payment which will be accepted for electronic preregistration**, and charges to credit cards will be made in U.S. funds. These forms will be treated in the same manner as forms received through U.S. mail. Receipt of the completed form and payment will be acknowledged by the MMSB. Participants are advised to bring a copy of this acknowledgment with them to Vancouver. The same deadlines apply as for preregistration by mail.

How to Get a Room
In view of the distance from the city of Vancouver to UBC, the extensive scientific program and numerous evening social events (all of which are taking place on the UBC campus), participants may find it more convenient to choose university residence accommodation. The Walter Gage Residence at UBC is of a very high quality and is recommended for those who do not wish to make the trip back and forth to the city center every day.

Participants should be aware that all payments for housing must be made in Canadian currency, and balances paid through credit cards will be reflected as such.

The Canadian government imposes a 7% Goods and Services Tax (GST) on most goods and services. Meetings' participants visiting Canada for the International Joint Mathematics Meetings may file for a refund for some GST expenditures. GST charged on residence accommodations or hotels is refundable, while charges on food, beverages, entertainment, tours, and taxis are not. Participants must fill out the GST rebate form (available at the front desk of Gage as well as duty free shops and the airport), and attach all pertinent receipts, verifying the amount spent. The form is filed when leaving the country (or, you have up to one year to file). Revenue Canada auditors will inspect your documents to make decisions on the eligibility of expenses and send out a check within six to eight weeks. **Participants should be sure to save all receipts.**

In the interests of keeping costs down, UBC and the Holiday Inn have agreed to collect an extra CDN$5 per night to help defray the cost of meeting room rental.

How to Obtain University
Residence Accommodations
All reservation requests for university accommodations will be handled by the University of British Columbia (UBC). It is essential that the UBC Accommodation Form (found at the back of this issue) be completed fully and clearly and mailed or faxed (604-822-1001) to the UBC Reservations Office, along with payment where appropriate, by **July 12**. Telephone requests cannot be accepted. Housing payments for residence accommodations sent to Providence or Ottawa **cannot** be forwarded to the UBC Reservations Office on your behalf, but must be returned, thereby delaying your reservation request.

Participants may occupy residence hall rooms at UBC during the period August 14 to August 21. A limited number of rooms may be available either before or after these dates on a space-available basis. Participants are advised to make reservation requests early. A limited number of rooms on campus will be available for those participants who do not preregister but plan on attending the meetings and registering on-site.

All check-ins and room assignments will be done beginning at 2:00 p.m. daily at the reception desk in the Walter Gage Complex. This is located in the northeast corner of the UBC campus and accessed from Wesbrook Mall at Gate 2. Reservations **for suites only** must be guaranteed by payment of a one-night deposit; the balance is due upon check-in. No deposit is required for rooms with shared baths. All payments to UBC for housing must be made in Canadian currency, CDN$ traveler's checks, Visa or MasterCard. Personal checks are not accepted. A one-night cancellation charge applies if cancellation is not received in writing 48 hours prior to the check-in date. **Refunds of deposits will incur a CDN$15 administration charge.**

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Walter Gage Complex combines three 17-story towers and two adjacent lowrise buildings. The towers offer apartment-style accommodations in which you share the washroom and pleasant living area with five of your colleagues and enjoy the panoramic view of the ocean and the mountains. Every floor is divided into four apartments, each containing six single bedrooms, one large shared washroom, a lounge area with refrigerator, and a balcony. Some private suites are available in the lowrise buildings, each building having three floors. The private single suite includes a private washroom and bed-sitting area. The double-occupancy suite includes a private washroom, living room, and bedroom. Deluxe suites are ideal for families up to a maximum occupancy of four persons. All suites are equipped with sinks and refrigerators. The number of suites is limited and single bedrooms or adjacent single bedrooms will be provided when requests for suites cannot be satisfied.

Smoking is permitted only in the participant's private bedroom. As all other areas are considered public, smoking is not permitted anywhere else (including the lounge area, bathrooms, hallways, etc.). Alcohol is permitted in the private bedrooms of participants over 19 years of age.

Rooms in the Totem Park Complex will be substituted when rooms in the Walter Gage Residence are no longer available. This complex, located on the southwest corner of the UBC campus, consists of six separate houses providing both single and double accommodations, and a central common building where the front desk is located. Each floor contains shared washroom facilities, pay telephones, and a lounge with a color television and refrigerator.

Clean towels, bedroom freshening, and washroom cleanup will be provided on a daily basis. Bed linen will be changed every four days. Refreshments, snacks, cigarettes, and news-papers are available in the lobby of each complex. A limited number of irons and alarm clocks is available for your use from the reception desk. Coin-operated washers and dryers are located in the housing complex. Participants are advised to bring their own alarm clocks and clothes hangers in addition to essential items such as toothpaste, etc.

All participants who stay in a campus residence may take advantage of the Aquatic Center next to the Student Union Building. To use the pool, participants need only to present their badge and room key; use is during the same hours and at the same rate (approximately CDN$2.75) as faculty and staff.

With the exception of the Gage Court Lowrise, all rooms are accessible for the physically challenged by elevator. There are a very limited number of rooms that are equipped for the physically challenged, so those with special requirements should book early. Physical limitations or any other special requirements should be noted on the reverse of the UBC Accommodation Form.

Check-In/Check-Out Locations and Times: Check-in time is 2:00 p.m. Check-out time is before 11:00 a.m. Luggage storage is available for late departures.

Room and Board Rates: The following rates apply for residence accommodations at UBC (quoted in Canadian dollars):

Single room with shared washroom	$34

Rooms with private baths:

Single room (single bed)	$55
Suite (double bed)	$73
Deluxe suite (twin beds, etc.)	$85

How to Obtain Hotel Accommodations

As an alternative to university housing, the MMSB lists the following hotels/motels with group rates. All hotels are located in downtown Vancouver and are approximately five to twelve miles from the university. Participants are urged to plan their transportation accordingly.

Participants must make their own arrangements with the following hotels by **July 15** (unless a different deadline is indicated) and should identify themselves as being with the International Joint Mathematics Meetings to take advantage of group rates. Rates are subject to change after these deadlines. Those who preregister by the ordinary deadline of June 11 may opt to make reservations at the Holiday Inn through the MMSB. To do so, please complete the hotel portion of the Preregistration/Hotel Form.

Group rates quoted are in Canadian funds and are subject to a 10% Provincial Rooms Tax and a 7% GST. The GST on the hotel room will be returned to nonresidents of Canada if rebate procedures are followed.

Holiday Inn Vancouver Centre - Headquarters Hotel
711 West Broadway
Vancouver, B. C., Canada V5Z 3Y2
Telephone: 604-879-0511
Single $110   Double $120
Reservation deadline: **June 11** (through MMSB)
Reservation deadline: **July 8** (directly)

Hotel Vancouver
900 West Georgia Street
Vancouver, B. C., Canada V6C 2W6
Telephone: 604-662-1907
Single or Double $145

Hyatt Regency Vancouver
655 Burrard Street
Vancouver, B. C., Canada V6C 2R7
Telephone: 604-683-1234
Single $140   Double $160

Sheraton Inn Plaza 500
500 West 12th Avenue
Vancouver, B. C., Canada V5Z 1M2
Telephone: 604-873-1811
Single $105   Double $110

Ramada Vancouver Centre
898 West Broadway
Vancouver, B. C., Canada V5Z 1J8

Meetings

Telephone: 800-663-5403
Single or Double $105

Quality Inn
1335 Howe Street
Vancouver, B. C., Canada V6Z 2R7
Telephone: 604-682-0229
Single or Double $96

Campus Food Service

Full-course meals can be purchased in the SUB Cafeteria in the Student Union Building from 7:00 a.m. to 7:00 p.m. daily. A widely varied menu includes an extensive salad and fruit bar, a deli custom sandwich counter, vegetarian entrees, an in-house bakeshop, and, of course, the world famous UBC Cinnamon Bun. Other smaller cafeterias open on a limited basis in the Student Union Building are the Pit Pub, Gallery Lounge, and Tortellini's Restaurant. Across campus are Trekkers, The Barn, and the Ponderosa Cafeteria. Others are located in the University Village, a five-minute walk from the Walter Gage Complex.

Miscellaneous Information

Audio-Visual Equipment: Standard equipment in all session rooms is one overhead projector and screen. (Invited 50-minute speakers are automatically provided with two overhead projectors.) **Blackboards are available only in rooms where they currently exist and cannot be produced upon request.**

Speakers in CMS-MAA sessions requiring additional equipment may make written requests for one additional overhead projector/screen, 35mm carousel slide projector, or VHS video cassette recorder with one color monitor. Such requests should be addressed to the MAA Associate Secretary (Kenneth A. Ross, Department of Mathematics, University of Oregon, Eugene, OR 97403). These requests should be received **by June 1**.

All other speakers requiring additional equipment should contact the Audio-Visual Coordinator for the meetings at the AMS office in Providence at 401-455-4140, or electronic mail to wsd@math.ams.com **by June 1**.

Requests for equipment made at the meeting most likely will not be satisfied because of budgetary restrictions.

Banking/currency exchange: Payments for all goods and services on campus must be made in Canadian currency or by credit card where indicated; some commercial establishments may accept U.S. currency or travelers' checks at a less favorable rate than banks. The Bank of Montreal, located in the basement of the Student Union Building, provides currency exchange from 9:00 a.m. to 3:30 p.m., Monday through Thursday, and 9:00 a.m. to 5:00 p.m. on Friday. An automatic teller machine (MasterCard, Interac, Circuit, and Cirrus networks) is also located here. A Canadian Imperial Bank of Commerce branch is located in the University Village and is open from 9:30 a.m. to 5:00 p.m., Monday through Friday. This bank also has an automatic teller (Visa, Interac,

and Plus networks). These banks are closed on Saturday and Sunday, although some city banks may be open on Saturday. Currency exchange may also be made at Vancouver International Airport from 5:45 a.m. to 11:00 p.m. daily.

Camping and RV Facilities: There are several campgrounds, most with RV facilities, in the general area. Participants should contact the individual campground for rates. Advance reservations are strongly advised.

Burnaby Cariboo RV Park, 8765 Cariboo Place, Burnaby, B.C. V3N 4T2, 604-420-1722.

Capilano RV Park, 295 Tanahauk Avenue, North Vancouver, B.C. V7P 1C5, 604-982-4722.

KOA Vancouver/Surrey, 14601 40th Avenue, Surrey, B.C. V4P 2J9.

Richmond RV Park and Campground, 6200 River Road, Richmond, B.C. V6Y 2A2.

Tynehead RV Campground, 16275 102nd Avenue, Surrey, B.C. V4N 2K7, 604-589-1161.

Park Canada RV Innis Campground, 4799 Highway Number 17, Delta, B.C. V4M VT2.

Dogwood Campground of BC, 15151 112th Avenue, Surrey, B.C. V3R 6G8, 604-583-5585.

Car Rental: Avis has been named the official car rental company for the meeting. Special rates are available in either Vancouver or Seattle (driving time to the UBC campus from Seattle is approximately three hours). To rent a car at the special rates for this meeting, call 1-800-331-1600 and use the meeting number Y595303, if the rental city is Vancouver; if renting out of Seattle, us the meeting number B571010. These rates are applicable one week prior to and one week after the meetings and include unlimited mileage. Rates need not be guaranteed by reservation; however reservations are strongly advised. Rates are in Canadian dollars, with rates available in Seattle in U.S. dollars.

Car Class	Daily 1–4 days	Weekly 5–7 days
A Subcompact	$37 (US$37)	$205 (US$123)
B Compact	$37 (US$40)	$205 (US$139)
C Intermediate	$39 (US$42)	$213 (US$165)
D Fullsize 2-door	$41 (US$45)	$223 (US$185)
E Fullsize 4-door	$41 (US$47)	$223 (US$192)
H Luxury	$52 (US$48)	$310 (US$209)
V Minivan	$46 (US$59)	$260 (US$209)

Applicable charges for taxes, optional refueling service, PAI (Personal Accident Insurance), PEC (Personal Effects Coverage), and LIS (Liability Insurance protection for third party) are extra. Optional LDW (Liability Damage Waiver) may be purchased if renting in Vancouver at CDN$12.95 per day, or for US$12 per day if renting from Seattle. Rentals are subject to Avis age, driver's license, and credit requirements as well as car availability at the time of rental. Cars must be returned to the rental location or additional charges apply. Weekend rentals are available between Thursday at 4:00 p.m. and Monday at 4:00 p.m.

Children's Activities: A parent-child lounge will be furnished with casual furniture, a crib, a changing area,

and a VCR and monitor for viewing videotapes. The tapes, appropriate for children, can be checked out at the Telephone Message section of the registration desk. Any child using this lounge must be accompanied by a parent (not simply an adult) who must be responsible for supervision of the child. This lounge will be unattended and parents assume all responsibility for their children. This lounge will be open only during the hours of registration, and all persons must leave the lounge at the close of registration each day.

Please refer to the section on **Social Events** for information on the Children's Reception on Sunday evening.

Citizenship Requirement: U.S. citizens must bring proof of citizenship with them. This is defined as a birth certificate, passport, or voter registration card. Other foreign participants should check with the nearest Canadian embassy for documentation applicable for their country.

E-mail: Computer terminals will be available for contacting your university's computer using the Internet. Participants are advised to check with technicians at their own college or university to identify the numerical address of their machine, as well as its name, and bring this information with them. Not all locations can be contacted by name alone.

Electricity: Throughout Canada electricity is 120V, 60Hz.

Employment Opportunities: Instead of a formal Employment Register as is traditional at January Joint Mathematics Meetings, there will be an opportunity for the posting of both applicant résumé forms and employers' announcements of open positions in a designated area on the meetings' bulletin board. No provisions will be made for holding interviews; while interviews are encouraged, arrangements will be the responsibility of each employer and applicant. Messages may be left on the meetings message board. A very limited number of rooms will be available for short periods for informal interviews. Interested participants should check with the Logistics Coordinator at the Registration Desk.

Applicant and employer forms will be available at the Transparencies Section of the Registration Desk both for applicants to post résumés and for employers to post forms announcing positions. There is no charge for this service. Please note that no printed lists of employers or applicants who fill out forms will be published.

Information Distribution: A table is set up in the registration area for dissemination of information of possible interest to the members.

A second table is set up in the book sale area for the dissemination of information of a **mathematical** nature **not** promoting a product or program for sale.

If a person or group wishes to display information of a mathematical nature promoting a product or program for sale, they may do so in the book sale area at the Joint Books, Journals, and Promotional Materials exhibit for a fee of US$35 (CDN$43) per item.

If a person or group would like to display material in the book sale area separate from the Joint Books table, the proponent must reimburse the meeting for any extra furnishings requested (tables, chairs, easels, etc.) **in addition**

to payment per item. (This latter display is also subject to space availability.)

The administration of these tables is in the hands of the Exhibits Coordinator. The following rules and procedures apply.

1. Announcements submitted by participants should ordinarily be limited to a single sheet no more than 8½" × 14".
2. A copy of any announcement proposed for either table is to be sent to the Exhibits Coordinator, Canadian Mathematical Society, 577 King Edward, Suite 109, POB 450, Station A, Ottawa, Ontario, Canada K1N 6N5, to arrive at least one week before the first day of the scientific sessions.
3. The judgment on the suitability of an announcement for display rests with the Joint Meetings Committee. It will make its judgments on a case-by-case basis to establish precedents.
4. Announcements of events competing in time or place with the scheduled scientific program will not be accepted.
5. Copies of an accepted announcement for either table are to be provided by the proponent. Announcements are not to be distributed in any other way at the meetings (for example, not by posting or personal distribution of handbills).
6. It may be necessary to limit the number of events or the quantity of announcements distributed at a meeting.
7. At the close of registration, both tables will be swept clean. Therefore, a proponent who wishes the return of extra copies should remove them before the close of registration.

Insurance: Liability insurance is the responsibility of each individual delegate. Visitors are not covered by the Canadian Medical Health Insurance Plan. Participants should have their own coverage.

Mail: All mail and telegrams for persons attending the meeting should be addressed as follows: Participant's name, International Joint Mathematics Meetings, UBC Conference Centre, 5961 Student Union Boulevard, Vancouver, British Columbia, Canada, V6T 2C9. Those received will be posted on the message board near the registration area. Mail not picked up will be forwarded after the meeting to the mailing address given on the participant's registration record.

Parking: Limited free parking is available for participants staying in the Walter Gage Residence. Ample paid parking is provided in visitor parking lots and parkades on campus for CDN$1.20 each hour or portion thereof, CDN$10 maximum per day (Monday through Friday). Fifteen-minute loading/unloading permits can be obtained at any kiosk free of charge. Overnight parking of recreational vehicles is not permitted on campus.

AMS Petition Table: At the request of the AMS Committee on Human Rights of Mathematicians, a table will be made available in the registration area at which petitions on

behalf of named individual mathematicians suffering from human rights violations may be displayed and signed by meetings participants acting in their individual capacities.

Signs of moderate size may be displayed at the table, but must not represent that the case of the individual in question is backed by the AMS Committee on Human Rights unless it has, in fact, so voted. Volunteers may be present at the table to provide information on individual cases, but notice must be sent at least seven days in advance of the meetings to the Director of Meetings in Providence (telephone 401-455-4137). Since space is limited, it may also be necessary to limit the number of volunteers present at the table at any one time. The Committee on Human Rights may delegate a person to be present at the table at any or all times, taking precedence over other volunteers.

Any material that is not a petition (e.g., advertisements, résumés) will be removed by the staff. **At the end of registration on Saturday, any material on the table will be discarded**; individuals placing petitions on the table should be sure to remove them prior to the close of registration.

Registration Desk: This will be located in the Student Union Building. Those who did not want their badges, programs, and tickets mailed should pick them up here. A list of services provided by Registration staff will be provided in the program.

Telephone Messages: A telephone message center will be located in the registration area to receive incoming calls for participants. **The center will be open from August 14 through August 18 during the hours that the registration desk is open.** Messages will be taken and posted on the meetings' message board. In the case of a bona fide emergency every attempt will be made to contact the participant as soon as possible; otherwise, each participant must take responsibility for checking the message board. Once the Joint Meetings Registration Desk has closed for the day there is no mechanism for contacting participants other than calling them directly at their hotel or campus residence. The telephone number of the message center is 604-822-9502. Messages for participants staying in the Walter Gage Complex may be left at the Complex's front desk at 604-822-1020. It will be open 24 hours per day.

Travel

AIR CANADA and UNITED AIRLINES have been selected as the official airlines for the meeting for their generally convenient schedules to Vancouver. Participants should refer to the full page advertisement on the next page for procedures on how to take advantage of specially negotiated rates available only for this meeting.

Participants traveling from U.S. cities may find it more economical to fly into Sea Tac or Bellingham Airport, then take the Quick Shuttle to Vancouver (approximately three and one-half to four hours), and then bus or taxi to the university. As an example, the current round trip shuttle fare from Sea Tac to Vancouver is US$51 (CDN$60) for an adult. There are discounted fares for seniors and children. Participants

should call 604-244-3744 for details on all fares and schedule information.

Travel from the airport: A taxi from Vancouver International Airport to UBC costs approximately CDN$24 (US$18), a limousine (maximum 7 persons) costs CDN$26 (US$20) plus tax. A shuttle bus (CDN$8.25, US$7) leaves the airport every 30 minutes for downtown Vancouver hotels. City buses #4 and #10 connect UBC directly with downtown Vancouver. To use public transport, the current fare is CDN$1.50; exact change is required. When boarding the bus at Vancouver Airport, request a "transfer" from the driver. Take the bus to Granville Street and 41st Ave. and transfer to the #41 to UBC.

Automobile approaches to UBC Walter Gage Residence, 5959 Student Union Boulevard:

From Vancouver International Airport: Follow Grant McConachie Way over the Arthur Laing Bridge, take the Granville Street exit ramp, continue north on Granville Street to West 70th Avenue, turn left onto West 70th Avenue which becomes Southwest Marine Drive, continue on Southwest Marine Drive to the UBC campus (10–15 minutes), turn right onto 16th Avenue, turn left onto Wesbrook Mall (Gate 10), turn left onto Student Union Boulevard (Gate 2), turn right immediately into the Walter Gage Complex.

From Washington State: Drive north on U.S. Interstate 5 (through Seattle, Bellingham). Interstate 5 becomes Highway 99 at the Canada/U.S. border. Take Highway 99 through the George Massey Tunnel and over the Oak Street Bridge, continue north on Oak Street to West 49th Avenue, turn left onto West 49th Avenue which becomes Southwest Marine Drive; follow the directions mentioned above from Southwest Marine Drive.

From Central British Columbia: Drive west on Trans-Canada Highway 1 (through Hope, Abbotsford), continue on Trans-Canada over the Port Mann Bridge, follow the highway to the Grandview exit west, continue west as Grandview Highway becomes West 12th Avenue, West 12th Avenue become West 10th Avenue at MacDonald Street, West 10th Avenue becomes University Boulevard at Blanca. Follow University Boulevard to the UBC campus, turn right onto Wesbrook Mall (Gate 1), turn left onto Student Union Boulevard (Gate 2), turn right immediately into the Walter Gage Complex.

On the UBC campus, bus passes can be purchased at the Student Union Building Ticket Office. Day passes are available for CDN$4 (usable only from 9:30 a.m. onwards). Multiple passes are also available.

Weather: During August, day-time temperatures are usually in the range 20°C (68°F)–25°C (77°F). Occasional rain should be expected. For evenings, sweaters or jackets may be needed.

Local Arrangements Committee

The members of the Local Arrangements Committee are Monique L. Bouchard (ex-officio), David Boyd, Afton Cayford (Cochair), Alan Cooper, William H. Jaco (ex-officio), Katherine Heinrich, David Leeming, Dale Rolfson, Kenneth

A. Ross (ex-officio), Dennis Sjerve (Cochair), and Marcia P. Sward (ex-officio).

The AMS and MAA are especially grateful for the free spirit of collaboration and the diligence of the CMS staff and the Local Arrangements Committee.

Corollary Conferences

1993 CRM-UBC Summer School on
Mathematical Biology
July 19–August 13, 1993

This summer school held by the Centre de Recherches mathétiques (CRM) of l'Université de Montréal will be jointly sponsored by CRM and UBC, and held on the UBC campus in Vancouver. The school is under the scientific direction of Robert M. Miura, (UBC).

There will be courses on a number of different themes in mathematical biology, with lectures by C. W. Clark (UBC), A. Dobson (Princeton), L. Keshet (UBC), S. Levin (Princeton), D. A. Ludwig (UBC), M. Mangel (UC, Davis), J. Milton (Chicago), R. M. Miura, S. Pimm (Tennessee), J. Rinzel (NIH), L. A. Segel (Weizmann), and J. J. Tyson (Virginia Tech). The lectures are intended for an audience of graduate students, and, in keeping with this objective, only graduate students and postdoctoral fellows are invited to attend. Note: prior experience in mathematical biology is not an absolute prerequisite.

Funding is being provided by CRM via NSERC, le Fonds FCAR du Québec, and l'Université de Montréal. Additional funding is being provided by the Deans of Graduate Studies of Western Canadian Universities; the Mathematical Sciences Research Institute, Berkeley, California; and the Deans of Graduate Studies and Science and the Department of Mathematics at UBC.

Application forms can be obtained from Louis Pelletier, CRM Summer School, Université de Montréal, C.P. 6128, succ. "A", Montréal, Québec H3C 3J7, Canada, fax: 514-343-2254, e-mail: pelletl@ere.umontreal.ca.

1993 CMS Annual Seminar
Mathematical Quantum Theory
August 4–8, 10–14, 1993

This is a Canadian Mathematical Society annual seminar supported by the NSERC and the Centre de Recherches Mathématiques of the Université de Montréal and will be held at the University of British Columbia, Vancouver, B.C., Canada.

This meeting is designed to be a research level summer school concentrating on two related areas of contemporary mathematical physics. The subject for the first session (August 4–8) is mathematical quantum field theory and many-body theory, while the second session (August 10–14) will deal with Schrödinger operators. Each session will feature a series of minicourses of approximately four hours each. The minicourse lecturers will be D. Brydges, J. Feldman,

J. Fröhlich, K. Gawedzki, and V. Rivasseau in the first session; and S. Agmon, W. Hunziker, I.M. Sigal, and B. Simon in the second session. In addition, about thirty speakers have been invited to give one hour lectures. Short contributions will be accommodated as time permits.

For more information please contact R. Froese, Department of Mathematics, University of British Columbia, Vancouver, B.C. V6T 1Z2, e-mail: rfroese@unixg.ubc.ca.

Symposium on Mathematics of Computation
August 9–13, 1993

Under the auspices of the AMS and in celebration of the 50th anniversary of the journal *Mathematics of Computation*, an international symposium will take place at the University of British Columbia, Vancouver, Canada, August 9–13, 1993. The symposium will be held immediately prior to the joint AMS/MAA/CMS summer meeting. As part of the symposium, there will be a two-session minisymposium on computational number theory dedicated to the memory of D. H. Lehmer. Invited speakers will be presenting survey and state-of-the-art lectures in plenary sessions. There will also be poster sessions and 15-minute contributed paper sessions. It is anticipated that the symposium will be partially supported by grants from U.S. federal agencies.

Abstracts and requests for information regarding the scientific program should be addressed to Walter Gautschi, Department of Computer Sciences, Purdue University, West Lafayette, IN 47907. The abstract deadline is April 1, 1993. Requests for registration and housing information should be sent to Mathematics Meetings Service Bureau, PO Box 6887, Providence, RI 02940-6887, or by e-mail: jlm@math.ams.org.
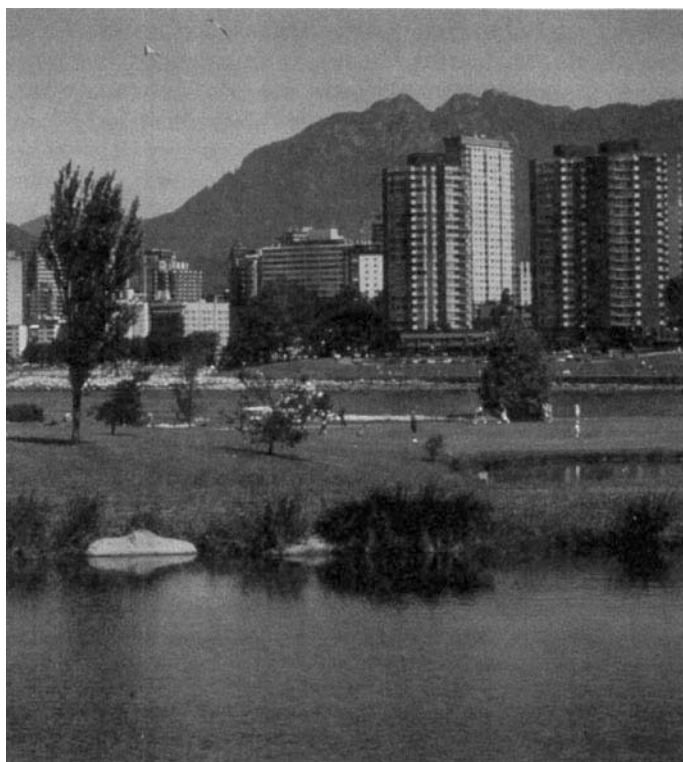
Preregistration/Hotel Form, Vancouver, Canada
International Joint Mathematics Meetings
August 15–19, 1993

Based on form of payment, please complete this form and return to:

In U.S. Funds: Mathematics Meetings Service Bureau (MMSB) **In Canadian Funds:** CMS Executive Office
P. O. Box 6887   577 King Edward, Suite 109
Providence, Rhode Island 02940 U.S.A.   P. O. Box 450, Station A
401-455-4143   Ottawa, Ontario Canada K1N 6N5
613-564-2223

DEADLINES

Ordinary Preregistration (including tickets)	June 11, 1993
Hotel Reservations through MMSB	June 11, 1993
Final Preregistration (no hotel or tickets)	July 19, 1993
Hotel Changes/Cancellations through MMSB*	July 1, 1993
50% Refund on Banquets & Tours*	August 2, 1993
(no refunds after this date)	
50% Refund on Joint Meetings Preregistration*	August 11, 1993
(no refunds after this date)	

*Cancellations and/or changes to preregistration, tickets, and reservations at the Holiday Inn must be made through the MMSB, regardless of where the original payment was sent.

REGISTRATION FEES
Preregistration by
July 19, 1993

JOINT MATHEMATICS MEETINGS		US$	CDN$
	Member of AMS, CMS, MAA, IIME	135	165
*	Emeritus Member of AMS or MAA and Retired CMS	35	43
	Nonmember	210	256
*	Students:		
	High School	2	2
	Graduate or Undergraduate	35	43
*	High School Teachers or Librarians	30	37
*	Unemployed	35	43

(N.B.: A separate form appears in this issue for preregistration for MAA Minicourses)

* See the section on "How to Preregister".

PREREGISTRATION SECTION:

1) _____ Telephone: _____
   (Please print)   Surname   First   Middle

2) _____   _____
   (Mailing address)   (e-mail address)

   ☐ **I do not wish my badge and program to be mailed; however, the mailing address for my acknowledgment is given above.**

3) Badge information: Affiliation _____   MR Classification # _____

4) Member of AMS ☐ CMS ☐ MAA ☐ IIME ☐ Nonmember ☐   Member of other organizations: AWM ☐ NAM ☐

5) Students: Grad ☐ Undergrad ☐ High School ☐ 6) Emeritus/CMS Retired member ☐ Unemployed ☐ Librarian ☐ High School Teacher ☐

7) Joint Meetings fee US$_____ CDN$ _____ 8) Hotel Deposit (if applicable) US$_____CDN$ _____

9) Subtotal of Payments for Social Events (see other side) US$_____CDN$ _____

10) **Total amount enclosed for 4 through 9 US$_____CDN$_____Method of Payment:** ☐ Credit Card (Visa or MasterCard only)
    ☐ Purchase Order (original institutional PO attached)   ☐ Check (payable to AMS or CMS)

    Credit card type: _____ Card number: _____ Expiration date: _____
    If this is your credit card, please print your name as it appears on the credit card on the line below and sign your name.
    If this is not your credit card, please print card holder's name as it appears on the credit card on the line below and have the card holder sign:

    See reverse for registration for social events and/or hotel reservations.

For office use only:

Codes:	Options:	Hotel:	Room type:
Dates:	Hotel Deposit	Total Amt. Paid:	
Special Remarks:			

PREREGISTRATION/HOTEL FORM, Vancouver, Canada

August 15–19, 1993

SOCIAL EVENTS SECTION:

Event	Tickets	US$ / CDN$	Options
Opening Banquet:	_____ tkts @ US$27/CDN$33 each =	US$ _____CDN$ _____	Vegetarian ☐ Kosher ☐
Salmon Barbecue:	_____ adult tkts @ US$27/CDN$33 each =	US$ _____CDN$ _____	Vegetarian ☐ Kosher ☐
	_____ children tkts @ US$13.50/CDN$16.50 each = (10 years & under)	US$ _____CDN$ _____	Vegetarian ☐ Kosher ☐
Children's Reception:	_____ children @ US$5/CDN$6 per child =	US$ _____CDN$ _____	
MAA 25-Year Banquet:	_____ tkts @ US$26/CDN$31.50 each =	US$ _____CDN$ _____	Vegetarian ☐ Kosher ☐
IIME Banquet:	_____ tkts @ US$12/CDN$14.50 each =	US$ _____CDN$ _____	Vegetarian ☐
	_____ IIME member tkts @ US$8/CDN$10 each =	US$ _____CDN$ _____	Vegetarian ☐
City Tour:	_____ adult tkts @ US$24/CDN$29 each =	US$ _____CDN$ _____	8/15 Tour ☐ 8/17 Tour ☐
	_____ children* tkts @ US$14/CDN$17 each =	US$ _____CDN$ _____	8/15 Tour ☐ 8/17 Tour ☐
North Shore Tour:	_____ adult tkts @ US$36/CDN$43.50 each =	US$ _____CDN$ _____	8/16 Tour ☐ 8/18 Tour ☐
	_____ children* tkts @ US$21/CDN$25.50 each =	US$ _____CDN$ _____	8/16 Tour ☐ 8/18 Tour ☐
Victoria Tour:	_____ adult tkts @ US$61.50/CDN$75 each =	US$ _____CDN$ _____	
	_____ children* tkts @ US$33/CDN$40 each =	US$ _____CDN$ _____	
Whistler Tour:	_____ adult tkts @ US$36/CDN$44 each =	US$ _____CDN$ _____	
	_____ children* tkts @ US$17.50/CDN$21 each =	US$ _____CDN$ _____	
Steam Train/Boat Tour:	_____ adult tkts @ US$50.50/CDN$61.50 each =	US$ _____CDN$ _____	
	_____ seniors/youths* tkts @ US$43.50/CDN$53 each =	US$ _____CDN$ _____	
	_____ children* tkts @ US$19/CDN$23 each =	US$ _____CDN$ _____	
Total enclosed for social events:		US$ _____CDN$ _____	

(Enter this amount in item #9 on the reverse)

*Where indicated, children's fares apply to those aged 12 years and under. For the Steam Train/Boat Tour, senior/youth fares apply to those aged 12 to 18 years, or 60+ years, children's fares apply to those aged 5 to 11 years, and there is no charge for children four years and under.

☐ I plan to attend the Jeffery-Williams Reception on Tuesday, August 17.   Number of people: _____

ACCOMMODATION SECTION:

For statistical purposes, please check one of the following:

☐ I will be residing on campus at UBC.

☐ I will make reservations at a local hotel/motel directly.

☐ I live in the area or will be staying privately with family or friends in the area.

☐ I will be sharing a room with someone that has made reservations at the Holiday Inn through the Service Bureau.

If you wish to make a reservation(s) at the Holiday Inn through the Service Bureau, please complete the information below. For further information on housing and instructions on how to get a room, see the section on "How to Get a Room".

Group rates quoted below are in Canadian funds and are subject to a 10% Provincial Rooms Tax and a 7% GST.

GUARANTEE REQUIREMENTS: US$41/CDN$50 by check, or supply your VISA, MasterCard, or American Express number on the reverse, together with mailing address for confirmation of room reservation.

Holiday Inn Vancouver Centre

Please circle room type requested: Single: CDN$110   Double(one/two beds): CDN$120   Triple: CDN$130 Quad: CDN$140
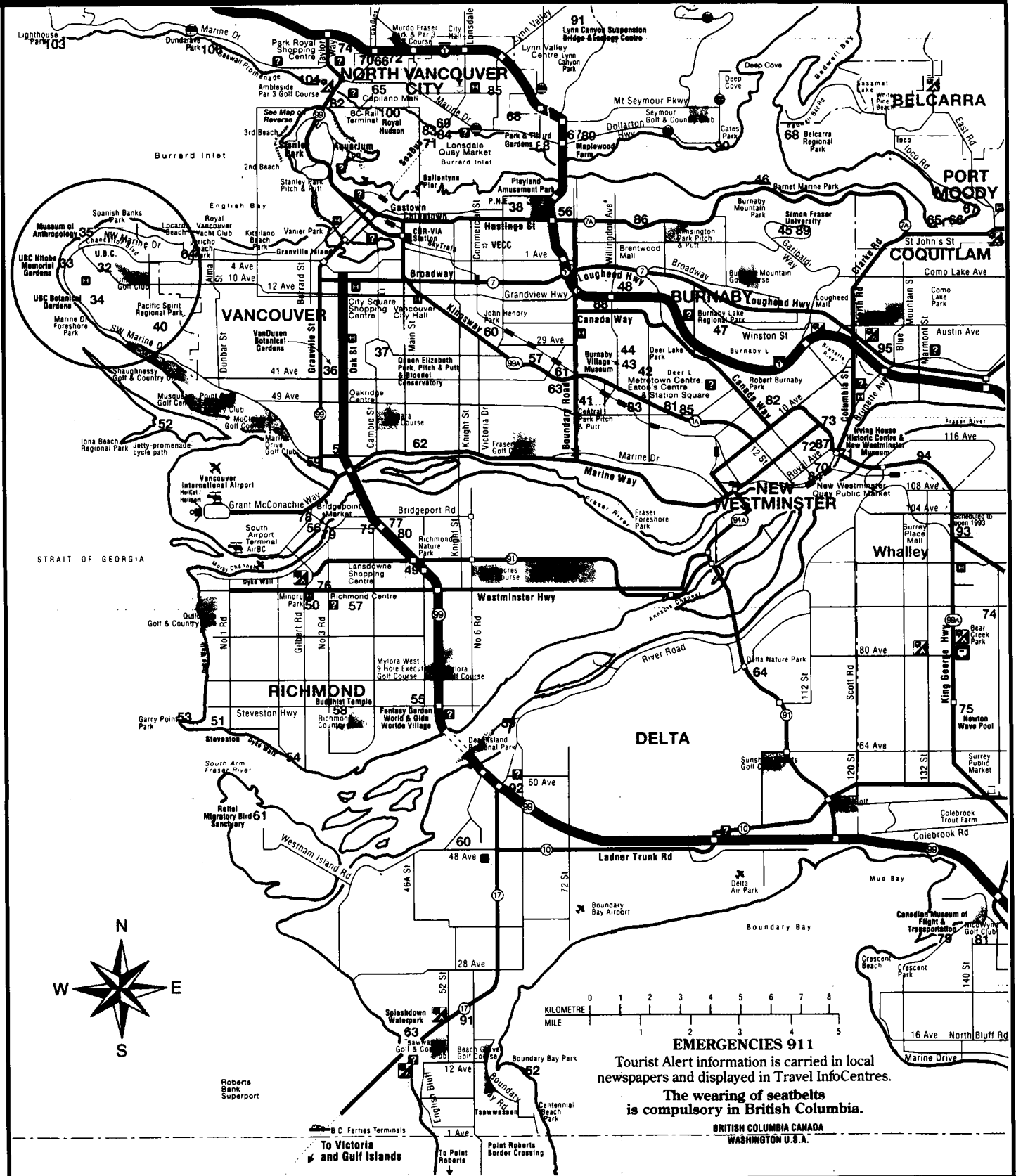
I will arrive on (date) _____ at _____ a.m./p.m., and depart on (date) _____ at _____ a.m./p.m.
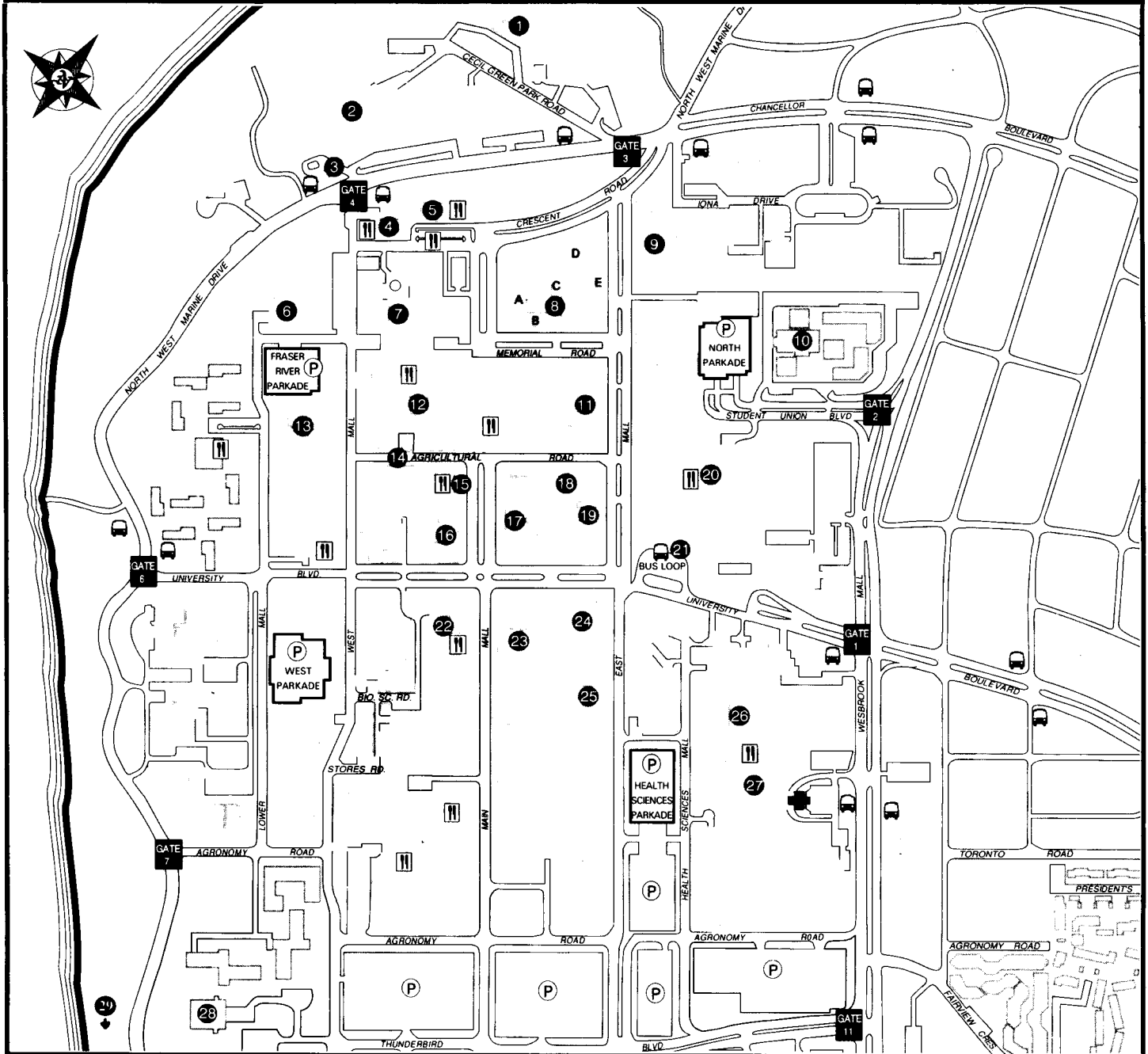
Please list other room occupants

FULL NAME	ARRIVAL DATE	DEPARTURE DATE

Please list any special requests below:

Vancouver area

EMERGENCIES 911

Tourist Alert information is carried in local newspapers and displayed in Travel InfoCentres.

The wearing of seatbelts is compulsory in British Columbia.

BRITISH COLUMBIA CANADA
WASHINGTON U.S.A.

University of British Columbia

VISITOR PARKING Ⓟ   FIRST AID ✚   BUS STOP 🚌   CAFETERIAS ⑪

6. Asian Centre	13. First Nations House	26. Woodward Instructional	25. School of Family and
23. Biological Sciences	of Learning	Resources Centre (IRC)	Nutritional Sciences
24. Bookstore	10. Gage Residence	9. Law Theatre	22. Scarfe Bldg
29. Botanical Gardens	(housing registration)	11. Main Library	20. Student Union Bldg
21. Bus Loop	4. Graduate Student Centre	12. Mathematics Bldg	(meeting registration)
8. Buchanan Bldg	19. Hebb Theatre	14. Microcomputer Lab	27. UBC Hospital Emergency
1. Cecil Green Park House	18. Hennings Bldg	2. Museum of Anthropology	Service & First Aid
17. Chemistry	16. Henry Angus Bldg	7. Music Bldg	28. Totem Park Dining Room
5. Faculty Club		3. Parking and Security	15. Trekkers Cafeteria

UNIVERSITY OF BRITISH COLUMBIA
REQUEST FOR ACCOMMODATION AT WALTER GAGE COMPLEX
Joint AMS/CMS/MAA Mathematics Meeting
August 15 - 22, 1993

LAST NAME:	FIRST NAME:

ADDRESS1:

ADDRESS2:

CITY:	STATE/PROVINCE:	ZIP/POSTCODE:

COUNTRY:	TELEPHONE NUMBER:

Month	Day	CHECK IN after 2:00 pm	Month	Day	CHECK OUT before 11:00 am
Arrival Date			*Departure Date*		

Shared Washroom   **Room/Night**

☐ Single room with shared washroom (SS) $34.00

Private Washroom

☐ Single room (single bed) (SP) $55.00

☐ Suite (double bed) (ST1) $73.00

☐ Deluxe suite (twin beds; living room $85.00
  with TV, telephone, sofa-bed; kitchenette) (DS)

If requesting a Suite, please advise number of people: ☐

Single rooms with shared washroom will be substituted when requests for private washroom cannot be accommodated.
All rates quoted in Canadian funds and subject to applicable taxes.

PAYMENT INFORMATION:

•Full payment in Canadian funds is due at check-in by cash, travellers' cheques, VISA or MasterCard (no personal cheques).
•There is no guarantee required for shared washroom accommodation. However, private washroom accommodation has to be guaranteed with VISA or MasterCard or with a deposit by bankdraft in Canadian funds for the equivalent of one night.
•A one-night cancellation charge applies if cancellation in writing is not received 48 hours prior to check-in date.
•Refunds of deposits will incur a $15.00 administration charge.

☐ VISA   ☐ MASTERCARD   Expiry Date: ☐☐
                                                     Month   Year

CARD NO.   X
                                      CARDHOLDER'S SIGNATURE

                                      DATE SIGNED

Please mail or fax this request no later than July 12, 1993
UBC CONFERENCE CENTRE, RESERVATIONS OFFICE
5961 Student Union Blvd., Vancouver, BC V6T 2C9 Canada
Tel: (604) 822-1010   Fax: (604) 822-1001

Group Code G30815A

Additional Information

If you are planning to stay in a room with a shared washroom, please indicate here if you are

❑ Male   or   ❑ Female.

Other Room Occupants/Accompanying Persons

Please list accompanying persons by name, indicating ages of children.

_____

_____

_____

Special housing requests:

_____

_____

_____

Special Services (physically challenged):

❑   Please check here if you require special accommodation.

Comments: _____

_____

_____

_____

MAA Minicourse Preregistration Form, Vancouver, Canada
August 15–19, 1993

To register for MAA Minicourse(s), please complete THIS FORM or a PHOTOCOPY OF THIS FORM and return it with your payment to:

Minicourse Coordinator
Mathematical Association of America
1529 Eighteenth Street, N.W.
Washington, DC 20036
Telephone: 202-387-5200

Telephone: _____

(Please print)   Surname   First   Middle

_____
Street address   City   State   Zip

- Deadline for MAA Minicourse preregistration: June 11, 1993 (After this date, potential participants are encouraged to call the MAA headquarters at 800-331-1622 or 202-387-5200.)
- Deadline for cancellation in order to receive a 50% refund: August 2, 1993
- Each participant must fill out a separate Minicourse Preregistration form.
- Enrollment is limited to two Minicourses, subject to availability.
- Please complete the following and send both form and payment to Minicourse Coordinator at the above address:

    I would like to attend ☐ 1 Minicourse   ☐ 2 Minicourses

    Please enroll me in MAA Minicourse(s):   #____ and #____

    In order of preference, my alternatives are: #____ and #____

- PAYMENT

    Check enclosed: US$ _____   Credit card type: ☐ MasterCard ☐ Visa

    Credit card # _____   Expiration date: _____

_____   _____
Your Employing Institution   Signature (as it appears on credit card)

Minicourse Number and Name	Organized by	Fee
1. The Fibonacci and Catalan numbers	Ralph P. Grimaldi	US$36
2. Teaching applied mathematics via *Maple*	Robert J. Lopez	US$45
3. Environmental modeling via the qualitative, visual, and computational	B. A. Fusaro	US$45
4. Implementing the Harvard calculus curriculum	Wayne Raskind	US$45
5. Teaching finite mathematics to a large class of arts and education students	J. Chris Fisher	US$45
6. Combinatorial design theory	Eric Mendelsohn	US$36
7. Lagrange multipliers	Edward J. Barbeau, Jr.	US$36
8. Earth algebra: College algebra with applications to environmental issues	Christopher Schaufele & Nancy E. Zumoff	US$36
9. Round-robin tournaments: an introduction	John W. Moon	US$45
10. Iteration	Ronald J. Lancaster	US$36
11. Learning abstract algebra by programming in ISETL	Ed Dubinsky & Rina Zazkis	US$45

☐ I plan on preregistering for the Vancouver, Canada meetings **ONLY** in order to attend the MAA Minicourse(s) indicated above. It is my understanding that, should the course(s) of my choice be filled, full refund of the Vancouver meetings preregistration fee will be made.

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ᐧ THE AMERICAN UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS

One Assistant Professor position beginning fall 1993 is available for the 1993-94 academic year. This is a tenure-track appointment in the Department of Mathematics and Statistics.

Qualifications: PhD in mathematics, previous college teaching experience preferred with evidence of strong commitment to teaching undergraduate liberal arts mathematics, and evidence of excellence in research and scholarship. Field open.

Responsibilities: Undergraduate (and graduate) teaching, advising, scholarship, participation in departmental and university activities. Particular efforts expected in the coordination and development of the undergraduate mathematics curriculum.

Competitive salary depending on qualifications and experience. Position subject to final budgetary approval. Consideration of applications will begin April 1 and continue until position is filled. Send CV and names of three references to:

Robert W. Jernigan, Chair
Department of Mathematics and Statistics
The American University
Washington, DC 20016
An EEO/AA University. Minority and women candidates are encouraged to apply.

UNIVERSITY OF WISCONSIN, OSHKOSH

The Department of Mathematics, University of Wisconsin, Oshkosh, invites applications for two anticipated tenure-track assistant professor positions starting September 1993.

MATHEMATICS EDUCATION

PhD in Mathematics Education required. Teaching experience and familiarity with NCTM Standards highly desirable. Good teaching is essential. Primary responsibility is teaching undergraduate Mathematics for secondary, middle, and elementary education majors. Usual teaching load is 12 credits per semester. Advising, research, and grant writing in Mathematics Education expected.

APPLIED MATHEMATICS

PhD required. Preference given to candidates with interest in Numerical Analysis, Combinatorics/Graph Theory, or Operations Research. Good teaching is essential. Primary responsibility is undergraduate teaching with usual load of 12 credits per semester. Scholarly activity required; pursuit of external funding, where appropriate, expected.

Closing date: 19 April 1993. Send application, resume, 3 letters of recommendation, and transcripts to: Dr. Hosien S. Moghadam, Department of Mathematics, University of Wisconsin Oshkosh, Oshkosh, WI 54901-8631.

The University of Wisconsin Oshkosh is an affirmative action/equal opportunity employer.

MCNEESE STATE UNIVERSITY

The Mathematical Sciences: Two or more positions at the Instructor or Assistant Professor level available in Fall, 1993. PhD in the Mathematical Sciences preferred. Proof of eligibility to work in the United States in required. Salary and rank is negotiable. Review of applications will begin immediately. Position open until filled. Send a letter of application, a detailed resume, transcripts, and the names, addressed, and telephone number of three references to Dr. William F. Denny, Chairperson, DMCS Faculty Search Committee, Department of Mathematics, Computer Science, and Statistics, McNeese State University, P.O. Box 92340, Lake Charles, LA 70609-2340. MSU is an affirmative action/equal opportunity employer.

The Mathematical Sciences: One position at the Instructor or Assistant Professor level available in Fall 1993, subject to funding approval. PhD in the Mathematical or Computing Sciences preferred. Position will include duties as assistant director of the College of Science Computing Center. A strong computing background and knowledge of Vax Ultrix a plus. Proof of eligibility to work in the United States is required. Salary and rank is negotiable. Review of applications will begin immediately. Position open until filled. Send a letter of application, a detailed resume, transcripts, and the names, addresses, and telephone numbers of three references to Dr. William F. Denny, Chairperson, DMCS Faculty Search Committee, Department of Mathematics, Computer Science, and Statistics, McNeese State University, P.O. Box 92340, Lake Charles, LA 70609-2340. MSU is an affirmative action/equal opportunity employer.

PENNSYLVANIA COLLEGE OF
TECHNOLOGY

Located in North Central PA, the Pennsylvania College of Technology is a coeducational, publicly supported institution with a national reputation for the quality and diversity of its advanced and emerging technology programs. Penn College is an affiliate of the Pennsylvania State University, but maintains its own mission, goals, and board of directors.

Faculty, Mathematics - Reporting to the Assistant Dean for Integrated Studies, this person

will teach a full load in mathematics and perform other faculty duties. Specific courses may include , but will not be limited to: Basic Algebra, Technical Algebra and Trigonometry, College Algebra and Trigonometry, Career Mathematics, Statistics, and Calculus. Qualifications include Master's Degree in Mathematics, or one of the mathematical sciences; excellence in college-level teaching; and effective organizational, interpersonal, and communication skills. Familiarity with computer-aided instruction and background / interest in teaching statistics, calculus, and other upper-level undergraduate courses desired. Emphasis for faculty positions at Penn College is on teaching rather than research, and finalists for position will be required to present a sample lesson. Excellent insurance and educational benefits. Salary and academic rank are commensurate with credentials. Starting date: 16 August 1993. Submit letter of application, resume, and names, addresses, and phone numbers of three professional references to: Human Resources (142), Pennsylvania College of Technology, One College Avenue, Williamsport, PA 17702. Applications must be received by 12 April 1993; however screening of applications will commence upon receipt. AA/EOE.

MARIAN COLLEGE

MATHEMATICS

Marian College invites applications for a nine-month, tenure-track faculty position beginning August 1993, pending budget approval. Teaching responsibilities include developmental mathematics, assistance to secondary teacher preparation /supervision and as needed: College Algebra, Pre-Calc, Intro to College Geometry, Business Math and Computer Science. Qualifications include a demonstrated ability to provide high quality undergraduate teaching and commitment to campus service and professional development. PhD or EdD preferred. Send original transcripts and three letters of recommendation to: Director of Human Resources, Marian College, 45 S. National Ave., Fond du Lac, WI 54935. AA/EO Employer-Educator.

SOUTHERN ILLINOIS UNIVERSITY AT EDWARDSVILLE

SIUE, a state University 20 miles from downtown St. Louis, MO, a major cultural and educational center, invites applications for one or possibly two anticipated tenure-track positions with rank open, and an anticipated one-year instructor position beginning August 1993. Applicants for tenure-track positions should have a doctorate, or equivalent experience, or will complete PhD requirement by August 1993. We seek applicants with a strong

commitment to teaching and excellent research accomplishments/ potential. The instructor position requires a Master's degree. Industrial or consulting experience is desirable. Salary is competitive and based on qualifications and experience. Send application, including CV, transcript, 3 letters of reference (at least one of the letters should address candidate's teaching ability) to Search Committee, Department of Mathematics & Statistics, SIUE, Edwardsville, IL 62026-1653. Closing date for applications is 1 April 1993, or until positions are filled. Women and minorities urged to apply. AA/EOE.

GOLDEY-BEACOM COLLEGE

COMPUTER INFORMATION SYSTEMS / MATHEMATICS DEPARTMENT

Goldey-Beacom College is a small private college emphasizing teaching excellence. A full-time faculty position at the assistant/associate professor level is available for Fall 1993. Qualifications for the position include: PhD required in Computer Information Systems or Mathematics; proven excellence in teaching required; business experience preferred; good communication skills essential; ability to teach undergraduate computer and mathematics courses required. Salary is negotiable.

Applicants should send a letter of intent, up-to-date resume, copies of transcripts and three letters of reference to Mrs. Denise I. Griffiths, Search Committee Chair, CIS/Mathematics Department, Goldey-Beacom College, 4701 Limestone Road, Wilmington, DE 19808, (302) 998-8814. Applications should be received by April 25, 1993. Goldey-Beacom College is an equal opportunity employer.

LECTURER IN MATHEMATICS

COMPREHENSIVE STUDIES PROGRAM THE UNIVERSITY OF MICHIGAN

The Comprehensive Studies Program (CSP) is a part of the COllege of Literature, Science and the Arts at the UNiversity of Michigan. The Comprehensive Studies Program promotes academic excellence among minority students underrepresented in higher education and other students who plan, study, learn, and share experiences in a unique educational setting. CSP seeks a Lecturer in Mathematics for a three-year appointment (renewable) to teach intensive sections of introductory mathematics (pre-calculus and calculus). The successful candidate will have a commitment to student learning and a record of successful teaching. Doctorate preferred. Send cover letter, resume, and names and addresses of three references to: William Collins, Director, Comprehensive Studies Program, 1017 Angell Hall, The UNiversity of Michigan, Ann Arbor, MI 48109-1003

Calendar

National MAA Meetings

15-19 August 1993 Sixty-eighth Summer Meeting, Vancouver, British Columbia (Board of Governors, 14 August 1993)

12-15 January 1994 Seventy-seventh Annual Meeting, Cincinnati, Ohio (Board of Governors, 11 January 1994)

Sectional MAA Meetings

Allegheny Mountain Penn State-Behrend Campus, Erie, PA, 16-17 April 1993

Eastern PA & Delaware Villanova University, Villanova, PA, 3 April 1993; Cedar Crest College, Allentown, PA, 13 November 1993.

Florida University of Central Florida, Orlando, FL, 5-6 March 1993

Illinois St. Mary's College, Notre Dame, IN, 23-24 April 1993 (Joint meeting with Indiana & Michigan Sections)

Indiana St. Mary's College, Notre Dame, IN, 23-24 April 1993 (Joint meeting with Illinois & Michigan Sections)

Intermountain University of Utah, Salt Lake City, Utah, 9-10 April 1993

Iowa Luther College, Decorah, IA, 16 - 17 April 1993

Kansas Emporia State University, Emporia, KS, 19-20 March 1993

Kentucky Centre College, Danville, KY, 16-17 April 1993

Louisiana-Mississippi University of Southern Mississippi, Biloxi, MS, 5-6 March 1993

Maryland-District of Columbia-Virginia Christopher Newport College, Newport News, VA, 16-17 April 1993

Metropolitan New York York College, Jamaica, NY, 1 May 1993

Michigan St. Mary's College, Notre Dame, IN, 23-24 April 1993 (Joint meeting with Indiana & Illinois Sections)

Missouri Westminster College, Fulton, MO, 2-3 April 1993

Nebraska University of South Dakota, Vermillion, SD, 16-17 April 1993

New Jersey Middlesex County College, Edison, NJ, 20 March 1993 (Joint meeting with MATYCNJ)

North Central Riverwood Conference Center, Monticello, MN, 30 April-1 May 1993

Northeastern University of Massachusetts/Dartmouth, No. Dartmouth, MA, 11-12 June 1993; Westfield State College, Westfield, MA, 5-6 November 1993.

Ohio Kent State University, Kent, OH, 16-17 April 1993

Oklahoma-Arkansas Oral Roberts University, Tulsa, OK, 26-27 March 1993

Pacific Northwest University of Puget Sound, Tacoma, WA, 6 March 1993

Rocky Mountain Colorado School of Mines, Golden, CO, 2-3 April 1993

Seaway SUNY at Binghamton, Binghamton, NY, 23-24 April 1993.

Southeastern University of South Carolina-Conway, Conway, SC, 2-3 April 1993

Southwestern New Mexico Institute of Mining & Technology, Socorro, NM, 16-17 April 1993

Southern California California State University, San Marcos, CA, 6 March 1993

Texas Abilene Christian University, Abilene, TX, 1-3 April 1993

Wisconsin University of Wisconsin - Fox Valley, Menasha, WI, 16-17 April 1993

Other Meetings

23-25 April 1993 The 1993 Annual Meeting of New York State Mathematics Association of Two-Year Colleges (NYSMATYC) will be held at the Radisson Hotel, Utica Centre, Utica, NY. For additional information contact: Judy Cain, NYSMATYC President-Elect, Tompkins Cortland Community College, 170 North Road, Dryden, NY 13053.

2-4 July 1993 The Global Awareness Society International Annual Meeting, "Global Interdependence" at the Marriott Marquis in New York City. Abstract deadline was December 1, 1992. For additional information please contact Jim Pomfret, Department of Mathematics and Computer Science, Bloomsburg University, Bloomsburg, PA 17915.

22-24 April 1993 Twenty-ninth Biennial Kappa Mu Epsilon (KME) National Convention, Niagara University, New York. For additional information contact Harold Thomas, Pittsburg State University, Pittsburg, Kansas 66762, (316) 231-7000.

23-24 July 1993 The Fourth Annual Conference on Technology hosted by San Jacinto College Central will be held at Hotel Sofitel, Houston, Texas. For more information contact: Sharon Sledge, San Jacinto College Central, 8060 Spencer Highway, P.O. Box 2007, Pasadena, TX 77505-2007.