Fall Newsletter

October 2004
Volume 26, Issue 2

Fall Meeting at Morgan State University

On November 5-6, 2004, Morgan State University will host the Fall 2004 MD-DC-VA Regional Meeting of the MAA.

On Friday afternoon, **Helaman Ferguson** will be conducting a workshop titled, "Ancient Algorithm: 29,000 Years Old."

Abstract: Helaman Ferguson, mathematician and sculptor, will teach everyone, hands on, a very old but profoundly important iterative algorithm. This algorithm can be found in many places, from the DNA double helix to modern textiles, and is a piece of mathematics that can be taught to young and old. This may be the oldest recorded iterative algorithm, probably even older than the Euclidean algorithm.

This exciting workshop is likely to be held at Helaman's studio in Baltimore and not too far from the Morgan State Campus.

- **Helaman and Claire Ferguson** will be our banquet speakers on Friday evening. Their illustrated lecture is titled, "Mathematics in Stone and Bronze.

- For Saturday, **Kenneth Massey**, visiting assistant professor at Hollins University, and **Holly Gaff,** assistant professor at the University of Maryland Medical School, will be giving talks titled, "Low-dimensional Approximations to Sparse Noisy Intransitive Relations - Rating College Football Teams" and "A Tick-Borne Disease Model - Spread and Control of Ehrlichiosis," respectively.

Registration forms are available at http://www.math.vt.edu/org/maa/fall04/#Reg

Dates to Remember:

- **Fall Meeting: November - 5-6**
- **Deadline for Contributed Talks – October 22**
- **Banquet Registration Ends –**
- **October 25**
- **Joint Meetings – January 5-8, 2005**

Lodging:

Comfort Inn Towson: $79/room Location: 8801 Loch Raven Blvd, Towson, MD 21286. Room rates are effective for reservations made before **October 8.**

Inn at the Colonnade: $129/room Location: 4 West University Parkway, Baltimore, MD**. 1- 410-235-5400**

Holiday Inn: $81/room Location: 1100 Cromwell Bridge Rd., Towson, MD 21286**, 1-410-823-4410**

Featured Speakers

Helaman and Claire Ferguson
Helaman Ferguson Sculpture

Title of Banquet Talk: Mathematics in Stone and Bronze

Abstract: Helaman Ferguson's mathematical sculptures in stone and bronze celebrate ancient and modern mathematical discoveries, melding the universal languages of sculpture and mathematics. Using slides and video, Helaman and Claire trace Helaman's creations from initial concept, mathematical design, computer graphics, diamond cutting and final form. Their lectures have fascinated audiences worldwide, bringing together multiple disciplines and stimulating dialogue among them.

Bios: Helaman Ferguson is both a sculptor whose work is located in institutions and collections worldwide and an internationally known mathematician whose algorithm has been listed as one of the top ten in the twentieth century. He enjoys a CRADA between his sculpture studio and NIST which is in the third generation of cable-based metrology systems. Claire Ferguson has written extensively on Helaman's work, including the Gold Ink and Ozzie Award winning book "Helaman Ferguson: Mathematics in Stone and Bronze". She is a graduate of Smith College where she was an Ada Comstock Scholar.

Apropos Quote:
"Claire and Helaman Ferguson together have dazzled the mathematical community and a far wider public with exquisite sculptures embodying mathematical ideas, along with artful and accessible essays and lectures elucidating the mathematical concepts." -- Citation from the Joint Policy Board for Mathematics 2002 Communications Award, Amer. Math. Soc., Math. Assoc. of Amer., Soc. of Indust. and Appl. Math.

Kenneth Massey
Visiting Assistant Professor, Mathematics, Hollins College

Title: Low-dimensional Approximations to Sparse Noisy Intransitive Relations - Rating College Football Teams

Abstract: Many modern applications, including information retrieval and recommender systems, are challenged with extracting useful information from large data sets collected from sprawling, and potentially unreliable networks. A strikingly similar task is to accurately rate college football teams, which play short disparate schedules, and whose performance may vary significantly from week to week. In this talk, rating systems, such as those used by the BCS, will be discussed and compared with information models from other disciplines. Conversely, we will see how IR model design can often be intuitively understood by an appeal to competitive sports.

Bio: Kenneth Massey is a visiting assistant professor of mathematics at Hollins University, completing his Ph.D. at Virginia Tech. As an undergraduate at Bluefield College, he began work on the rating system that since 1999 has been a component of college football's Bowl Championship Series.

Holly Gaff
Assistant Professor, Department of Epidemiology and Preventive Medicine, University of Maryland, Medical School

Title: A Tick-Borne Disease Model - Spread and Control of Ehrlichiosis

Abstract: Recent increases in reported outbreaks of vector-borne diseases throughout the world have led to increased interest in understanding and controlling epidemics involving transmission vectors. Ticks have very unique life histories that create epidemics that differ from other vector-borne diseases. The differential equations underlying our tick-borne disease model are designed for the lone star tick (Amblyomma americanum) and the spread of human monocytic ehrlichiosis (Ehrlichia chaffeensis). Analytical results show that under certain criteria for the parameters, the epidemic would be locally stable. The system was then expanded to multiple patches to evaluate the effect of spatial heterogeneity on the spread of the disease. The use of control measures was added, and it was found that the relative success of disease eradication was dependent upon the patch structure and location of control application. Results from simulations using a

twelve patch system are compared with field data from an outbreak of ehrlichiosis in eastern Tennessee, USA. Finally, optimal control techniques are used to evaluate the location and amount of control needed to eliminate the disease from different patch scenarios. There remain many open questions that can be addressed by using this model that we have just begun to explore.

Bio: I received my B.S. in math and environmental science from Taylor University in Upland, Indiana. I went on from there to complete my Ph.D. in mathematics with an emphasis in mathematical ecology from the University of Tennessee, Knoxville, working with Louis Gross. Half of my dissertation focused on a fish model which was part of the South Florida Everglades restoration project, and the other half focused on a tick-borne disease model. I have worked on many different research projects in both epidemiology and ecology as a postdoc at UCSF, Cal-Berkeley and University of Tennessee, Knoxville. I also worked as a research scientist for a government contractor developing models for a variety of infectious diseases. I am currently an Assistant Professor in the Department of Epidemiology and Preventive Medicine at the University of Maryland, Medical School.

Governor's Report

My term as Section Governor officially began at MathFest, the MAA summer meeting held this August in Providence. MD-DC-VA section members were well represented at Mathfest: Howard Penn, Carol Crawford, and T.S. Michael of the United States Naval Academy led a session on *Theory and Applications of Graph Theory*. Bill Hawkins of the University of the District of Columbia was a co-organizer for a *SUMMA Special Session on the MAA National Research Experiences for Undergraduates Program (NREUP)*. Martha Siegel of Towson University was a co-organizer of a *MAA/RUME Panel Discussion on the ICME-10 Meeting*. Kimber Tysdal of Hood College was a co-organizer for a session for graduate students on *Negotiating with the Dean*. Other members and students gave numerous presentations.

For those who attended the opening banquet, the most memorable item from Mathfest was the invited address by our own Dan Kalman of American University. Dan's talk on *Virtual Mathematics* was both inspiring and entertaining, and in addition served as a fitting tribute to the life and work of James White, creator of the *Mathwright*, whose untimely passing came a few weeks before the meeting. For an outline of Dan's talk, go to www.american.edu/academic.depts/cas/mathstat/ People/kalman/pdffiles/virtual.pdf

I am sure Dan would be pleased if readers of this newsletter would visit

www.mathwright.com

for more information about *Mathwright*. Members of the section may recall that James White was an invited speaker at our Fall 1998 section meeting at Towson University. You can find the program for the Towson meeting by following the appropriate links from our section web page.

We are pleased to welcome the following national Project NExT fellows:

Jerome Coombs-Reyes, Norfolk State U.
Katherine Gurski, The George Washington U.
Melissa Meehan, Bridgewater College
Keith Mellinger, U. of Mary Washington
Kathryn Trapp, U. of Richmond

New fellows participated in an extended Project NExT program in Providence, and will continue as fellows through next year.

At the Providence meeting, the Board of Governors heard reports from President Ron Graham, Executive Director Tina Straley, and other officers of the Association. The MAA has effectively been working on an overhaul of financial operations, and it is now possible to say that in terms of both assets/investments and accounting procedures, we are in very good shape. MAA publications have had a very successful year, and some fascinating new titles were announced at the Governor's meeting and were available at the meeting book display. The Board elected a Pólya Lecturer, Hedrick Lecturer, Leitzel lecturer, and approved various MAA awards. A report on plans for further development of MAA electronic services was quite interesting; those who have not done so already should visit the Mathematics Digital Library (MATH DL) site at www.mathdl.org.

I hope to see many of you at what promises to be a terrific meeting at Morgan State in November. And now is the time to make plans for the Atlanta Meetings, January 5-8. A great program is planned, and it should be an especially convenient national meeting in terms of both timing and travel.

David Carothers, Governor

Chair's Report

For me, one of the most important purposes of our section is to help us to be productive and happy mathematicians. That translates into enabling us to communicate with one another about our work and, for those of us who do some teaching, enhancing the classroom environment. Our next meeting will, as is typical, do much toward accomplishing both of those goals.

The meeting will occur on November 5 and 6 at Morgan State University. As usual, it will begin on Friday afternoon, when Helaman Ferguson will conduct a workshop entitled, "Ancient Algorithm: 29,000 Years Old." Helaman, who is a sculptor as well as a mathematician, will, in the words of the meeting's web-site www.math.vt.edu/org/maa/fall04/ "teach everyone, hands on, a very old but profoundly important iterative algorithm. This algorithm can be found in many places, from the DNA double helix to modern textiles, and is a piece of mathematics that can be taught to young and old. This may be the oldest recorded iterative algorithm, probably even older than the Euclidean algorithm."The workshop is likely to be held at Helaman's studio in Baltimore, not far from the Morgan State Campus.

Again from the web-site, "Helaman and Claire Ferguson will be our banquet speakers on Friday evening. Their illustrated lecture is entitled, 'Mathematics in Stone and Bronze.'"

On Saturday, Kenneth Massey, Visiting Assistant Professor at Hollins University, and Holly Gaff, Assistant Professor at the University of Maryland Medical School, will deliver the invited addresses. Professor Massey will speak on "Low-dimensional Approximations to Sparse Noisy Intransitive Relations - Rating College Football Teams." Professor Gaff will talk on "A Tick-Borne Disease Model - Spread and Control of Ehrlichiosis."

The presentations by the Fergusons, Professors Massey and

Gaff, and the presenters of contributed papers will do much to accomplish the goal of communication. The enhancement of the teaching-and-learning environment will be handled, at least in part, by The Gulick Committee. You might remember that, at the request of the section's executive committee, Professor Denny Gulick of the University of Maryland formed a committee to produce a statement on the mathematical preparedness which we section-members would like to see demonstrated by the freshmen entering into the colleges and universities within the section. On Saturday, one (unopposed) session will be devoted to a discussion of the committee's latest draft. I believe that the final version of the statement will serve as a valuable guide for high-school mathematics teachers, curriculum-planners, and guidance counselors, as well as for directors of admission at the colleges and universities within the section.

It is not too late for you to make your own contribution to the meeting.The deadline for submitting an abstract for a talk which you would like to deliver is Friday, October 22 (check the web-site for details).Whether you do this or not, please plan to attend the meeting. It will be well worth your while. I hope to see you there.

Lee May, Chair

New Section Officers

At the Spring 2004 meeting, our members elected three Section officers:

Chair-Elect: **Eve Torrence**, Randolph-Macon College, Ashland, VA. Eve received her Ph.D. in 1991 from the University of Virginia. From 1991 to 1994 she was Clare Boothe Luce professor and chair of the mathematics program at Trinity College in Washington D.C., before moving to Randolph-Macon. She is currently a member of the National Council of Pi Mu Epsilon. Eve has served the MD-DC-VA Section as liaisons coordinator, newsletter editor, a section NExT mentor, and has hosted a section meeting at R-MC.

Section NExT coordinator: **Jacqueline Hall**, Longwood University, Farmville, VA. Jackie Hall is Associate Professor of Mathematics at Longwood. She graduated from Furman University in 1975 with a B.S. in Biology. After a fourteen year hiatus which

included working in a bank, teaching high school math and science, studying undergraduate mathematics, and raising three children to school age, she returned to academia at the University of Virginia in 1989. She defended her Ph.D. thesis on specialty of non-associative Jordan algebras in 1994. She is a 1995/96 Project NExT fellow and particularly enjoys the stimulation and fellowship opportunities of MAA meetings – both Section and national.

At-large member of the Executive Committee: **Denny Gulick**, University of Maryland, College Park.
Denny was reelected to this position; he has been working hard for the past year, chairing a Section committee to study the high school preparation of Maryland mathematics students. He holds a Ph.D. from Yale, and is Professor of Mathematics and Associate Chair for the Undergraduate Program at College Park. He is interested in (alphabetically) calculus, chaos and fractals; he is also a cellist, and is involved in US-Japan relations through sending dolls to and visiting elementary schools in Japan. He serves the national Association as Chair of the CUPM Subcommittee on Service Courses.

In addition, **David Carothers** was elected Section Governor by a written election conducted by the national office. Dave is a Professor of Mathematics and department head in the Department of Mathematics and Statistics at James Madison University. He was previously a faculty member and department chair at Hope College in Holland, MI. Professor Carothers has a Ph.D. from Purdue University. He currently serves as a member of the MAA Committee on the Teaching of Undergraduate Mathematics (CTUM) and as Past Chair of the MD-DC-VA Section, having completed a term as Section Chair in the spring of 2003. He has served as local arrangements coordinator for the spring 1999 MD-DC-VA Section Meeting and was previously Secretary-Treasurer of the Michigan Section.

Betty Mayfield

Future National MAA Meetings
Joint Mathematics Meetings, January

MathFest, August

Treasurer's Report
September 30, 2004

General Account Balance March. 15, 2003	$ 9595.41

Receipts

Interest	$7.35
Meeting Registrations, Spring 04	$2283.25
Vendor Fees	$100.00
MAA Booksale	$137.10
MAA Subvention	$2400.00
Total Receipts	$ 4927.70

Expenses

Meals, Spring 04	$3363.35
Newsletter, Spring 04	$850.00
String Quartet	$400.00
George Mackiw Memorial Fund	$100.00
John Smith Teaching Award	$200.00
MCM Awards	$50.00
Badge Holders	$50.14
Bank Fee	$2.00
Total Expenses	$5015.49
General Account Balance, Sept.30, 2004	$ 9507.62

John G. Milcetich Memorial Student Achievement Fund Balance, March 15, 2004	$1450.14
Contributions	$63.75
Poster-session Prizes	($485.00)
Interest	$1.11
Balance, Sept, 30, 2004	$1030.00

Section NExT Fund Balance, March 15, 2004	$ 382.90
Meals, Spring 04 Meeting	($83.00)
Balance, September 30, 2004	$ 299.90

Robb T. Koether, Treasurer

News of the Section

Kathleen M. Shannon of **Salisbury University** reports that Harel Barzilai of Salisbury University was named by the Board of the Maryland Council of Teachers of Mathematics as one of the winners of the Maryland Outstanding Teacher Awards. They selected a total of ten winners from among faculty at the college, high school, middle school, and elementary levels, and teacher-mentors and non-classroom educators. The award recognizes individuals for demonstrating quality in mathematics instruction in Maryland.

Kimberly Tysdal of **Hood College** reports that at our spring meeting, the MD-DC-VA Section of the MAA will host a conference for undergraduates. This conference will run parallel to the regular spring meeting. Students will be invited to give a talk or poster, and to see other students present. There will be events and speakers specifically for the students. A student does not need to be presenting in order to attend. Please encourage your students to come! This conference is an MAA NSF-RUMC sponsored activity, funded by NSF grant DMS-0241090. Questions may be sent to Kimber Tysdal via email at tysdal@hood.edu.

April Astor of **American University** reports that **Melanie Wood**, the first woman to win the Morgan Prize for Mathematical Research will be speaking at American University this month in a talk co-sponsored by the MAA. Wood will talk about the fun and creativity she finds in professional mathematics, debunking the myth that mathematics is only about memorization, technicalities, and formulas. Winning the Morgan Prize is not the first breakthrough Wood has made in her scientific career. In 2002, she was the first American woman to be named a Putnam Fellow. In 1998, she became the first American woman to represent the United States in the International Mathematical Olympiad. "The science programs at American University are thrilled to be a part of highlighting the growing achievements of women in science," said Dr. Susan Solarz, an organizer for the event. The talk will be at 8:00pm Oct. 26 in Ward Room 1 at American University. Please RSVP to Dr. Susan Solarz: aa5070a@american.edu

MAA Math Prep Statement

During the summer of 2003 the Executive Board of the MD-DC-VA Section of the MAA recommended the creation of an ad hoc committee to formulate a statement concerning "what knowledge, skills, experiences, and attitudes the section would like to find in the possession of incoming first-year students at the colleges and universities in the Section." The committee would produce a final statement to offer to the membership of the Section for its acceptance. The end result would involve publicizing the statement to appropriate constituencies in Maryland, the District of Columbia, and Virginia.

When the ad hoc committee was formed, its membership consisted of the following mathematicians:

Dave Carothers, James Madison University
Annie Commito, Frederick Community College
Jerry Dancis, University of Maryland at College Park
Frances Gulick, University of Maryland at College Park
Patrick Lintner, Mathematics Coordinator, Harrisonburg City Public Schools
Gail Kaplan, Towson University
Jon Scott, Montgomery College at Germantown
Susan Schwartz Wildstrom, Walt Whitman High School, Montgomery County
Denny Gulick, University of Maryland at College Park -- chair of committee

After extensive discussion and editing, the committee offers the following statement to the MD-DC-VA Section membership for its approval at the Fall 2004 Section meeting.

Respectfully presented for the ad-hoc committee

Denny Gulick

STATEMENT ON MATHEMATICS PREPAREDNESS
MD-DC-VA SECTION OF THE MAA

Recently mathematics teachers from secondary schools and two- and four-year colleges in the Maryland-District of Columbia-Virginia region have been discussing issues relating to students as they enter

college. The issues relate both to students' attitudes toward mathematics and student success in college mathematics courses.

Large numbers of students are deemed unready (from placement test scores) to take college-level mathematics courses when they enter college. Moreover, to many students entering college, mathematics consists of obtaining answers, rather than understanding the concepts, reasoning out appropriate approaches to problems, and thinking about the validity of answers derived.

In light of these observations and concerns, we offer to the mathematical community, and especially to guidance counselors and to college and university admissions officers, the following thoughts concerning mathematical programs in pre-college classes.

1. Mathematics instruction should emphasize student understanding of mathematical concepts and lead the students to be able to adapt such concepts to different venues. In particular, mathematics programs should avoid pushing students ahead until they have mastered the appropriate material, and mathematics programs should also minimize teaching to tests.

2. Mathematics instruction should help students to develop enough sophistication and confidence to be able to perform basic calculations on their own, to recognize when and how to use technology to best effect, and to translate word problems (that is, problems given in sentence form) into mathematical entities.

3. In all mathematics courses, instruction should emphasize conceptual understanding and ownership of basic concepts. Moreover, each mathematics course (including algebra as well as geometry courses) should enhance logical thinking processes. In addition, mathematics instruction should enhance the appreciation of reasonableness of approach to solving a problem, and reasonableness of the result when it is obtained.

4. By the time students arrive at college, they should think of mathematics as relevant to their lives and as offering a very broad lens through which to view the world. They should see mathematics in the same way as they might think of music: important, beautiful, complex, worth time and effort to study, and capable of enriching their lives.

5. We have found that in terms of potential success in

college mathematics courses, there is no substitute for continuity of study of mathematics. Thus relevant mathematics during each year of high school should be regarded as a top priority when students register for classes. There are several mathematics courses that could be considered reasonable after students have achieved a strong background in algebra and geometry. Such courses include precalculus, statistics, probability, discrete mathematics, or calculus, among others.

From MAA Online

Nominations for the National Science Foundation Director's Awards for Distinguished Teaching Scholars Are Solicited

The purpose of the DTS Program is to recognize and reward individuals who are both meritorious scholars and exemplary teachers as evidenced by their ability to integrate their research and educational activities and to approach research and education in a scholarly manner.

The deadline for the optional letter of intent is September 22, 2004. The closing date for nominations is October 20, 2004.
 For more information check

http://maa.org/news/092104nsfdirectorsaward.html

Request for Information on College Algebra Courses

The MAA, in collaboration with AMATYC and NCTM, has initiated a major project to assess how well courses such as college algebra actually meet the needs of the students who take them. If you or your department has conducted any detailed studies on these issues and are willing to share your results, please contact Sheldon Gordon (gordonsp@farmingdale.edu), Bill Haver (wehaver@vcu.edu), Jack Bookman (bookman@math.duke.edu) or Susan Ganter (sganter@clemson.edu). Any information that you provide will be kept in the strictest confidence. For more information check

http://maa.org/news/083104collegealgebra.html

Morgan State University

Morgan State University, the host of the Fall section meeting, is a coeducational institution located in a residential section of Baltimore, Maryland. The campus covers an area of more than 143 acres.

The University offers a comprehensive range of academic programs through the doctorate. Morgan is also a founding member of the Mid-Eastern Athletic Conference (MEAC).

Officers of the Maryland-District of Columbia-Virginia Section

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