

**#7. Proposal for a Contributed Paper Session
for the 2004 Joint Mathematics Meeting**

Title:

The Use of Hand-held Technology in College and University Developmental Algebra Classrooms

Organizers:

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Proposal Summary:

Developmental algebra courses at many two-year colleges constitute 50% and more of the sections offered. At four-year colleges and universities the average is closer to 20%. The 2002 AMS/CBMS *Comprehensive Survey of Undergraduate Mathematics* indicates that graphing calculators are used in 31% of the Intermediate Algebra courses, and 20% in the Elementary Algebra courses. A 1998 national survey by Laughbaum indicated that 24% of developmental faculty were using the graphing calculator in developmental algebra courses. Yet in other college courses (college algebra, pre-calculus, statistics, and calculus), 59% of the reporting faculty ($n = 8852$) were using hand-held graphing technology. Given these data, one can ask why developmental faculty are not taking advantage of the pedagogical value of hand-held technology in their teaching of beginning and intermediate algebra as are other college mathematics faculty.

We propose to invite exemplary developmental (remedial) mathematics professors to present papers on how they are using hand-held technology in the developmental algebra classroom. This will include invitations to Selina Vasquez (Southwest Texas State University), Dennis Donohue (Community College of Southern Nevada), Phil Lestmann (Bryan College), Vernon Kays (Richland Community College), Peg Green (Florida Community College @ Jacksonville), Martha Haehl (Penn Valley Community College), Ignacio Alarcon (Santa Barbara City College), Joe Fiedler (California State University at Bakersfield), Darrell Abney (Maysville Community College), Kathleen Heid (Penn State University), and Laura Shapira (Carnegie Learning Company.)

In addition, we will have an open call for papers that will demonstrate the value of hand-held technology as a tool in the teaching of developmental algebra.

In looking at recent MAA conferences, the number of sessions on developmental mathematics has been limited. Yet many of our four-year college colleagues teach one or more classes of remedial algebra per year, and most two-year faculty teach many more than this. Historically, these professors may have felt that developmental students **MUST** know the pencil and paper methods and must have memorized many algorithms before they are allowed to use hand-held technology. But what this implies is that hand-held has no value as a pedagogical tool. We hope to show that hand-held technology can be effectively used as a pedagogical tool by a series of quality presentations. In addition, we hope to bring more two-year faculty to the meeting. Many perceive MAA as being *only* an association for four-year mathematics faculty.

**#8. Focus on Graphing and CAS Handhelds
in Collegiate Mathematics-The Good/The
Bad/The Appropriate**

The appropriate use of technology, graphics calculators, palmtop computers, in the mathematics classroom is/has been the center of much debate. Few are neutral regarding the use of these devices in lectures, in laboratories, for student projects and for homework. The pervasive use by students complicates testing and opens the field to novel and focused assessment activities. Rarely are these issues discussed by the mathematical community at large. This session invites papers about the full range of devices and the full range of classroom uses of hand-held graphing technology. Presenters are encouraged not only to share their classroom activities but also to discuss how these activities fit into the overall structure of their courses and the curriculum.

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#12. Proposal for a Contributed Paper Session for the
National Mathematics Meetings
January, 2004
Phoenix, AZ

Title: **The Effective Use of Computer Algebra Systems in the Teaching of Mathematics**

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Summary:

Computer Algebra Systems (CAS) can change the way in which we teach Mathematics and the material that we emphasize. They can also provide an environment for experimentation and testing conjectures. Papers for this session may discuss classroom uses of Computer Algebra Systems, student projects where the CAS played a large role in the investigation, testing practices that allowed the use of a CAS, and evaluations of CAS projects at a particular institution. Note that this session is focused on the use of a CAS, not technology in general, in the teaching of Mathematics.

Papers dealing with the use of a CAS in any subject in undergraduate course in Mathematics are welcome for consideration to be included in the session. Preference will be given to papers dealing with courses other than those in the calculus sequence. In particular, papers on the use of a CAS in courses such as Applied Statistics, College Algebra, Quantitative Methods, and Mathematics for Prospective Teachers are particularly welcomed.

The platform, calculator or computer, or CAS used for a presentation is the choice of each presenter. It is expected that presenters will bring their own calculators, computers, and/or projection devices for making an effective presentation. An overhead projector and screen will be provided in the session room.

Expanded Rationale:

While there have been many presentations at Mathematics Meetings concerning the use of technology in the teaching of Mathematics, most of these have involved the use of numerical or graphical applications. A relatively small percentage of these presentations have involved Computer Algebra. Those that did were mainly centered on the use of a CAS in teaching calculus. It is our hope in this session to feature innovative uses of the CAS across the curriculum. We do not exclude calculus, but hope that instructors in other courses will make the majority of submissions to this session.

Our reason for encouraging submissions from instructors in courses such as the ones we specifically listed in the summary is twofold. We believe that the CAS can play an important

role in these courses and that students should be familiar with ways in which this tool can assist them in learning and appreciating Mathematics. With the availability of affordable hand held devices containing a CAS this need may be even more urgent. Using a CAS within the context of learning mathematics can help students to enhance their understanding of ideas and concepts. The effective use of a CAS can create an exciting learning environment within the Mathematics classroom!

Our second reason for this encouragement is that we wish to provide an outlet for instructors who are doing creative work while using a CAS within these courses. This session will give such teachers professional recognition for their work. It will also give them an opportunity to be of service to the Mathematical Community.

The only restriction we place on this session is that presentations address the title of the session. We will only accept presentations that discuss the use of a CAS. We will show no preference for the platform or the CAS that is used as long as the computational equipment and supplementary projection device (RGB projector or projection panel) are supplied by each presenter.

Contacts:

Submissions may be sent to either of the organizers by October 1, 2003. They should contain an abstract of the paper as well as the name, affiliation, and e-mail address of the presenter or in the case of a joint presentation, the contact person. Notification will be made by November 15, 2003.

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Dear Dr. Penn and MAA Committee on Sessions of Contributed Papers:

We wish to organize a contributed paper session for the 2004 Phoenix Joint Mathematics Meetings.

Proposal Title: **Mathlets for Teaching and Learning Mathematics**

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Our proposal is summarized on the following page.

Summary of Proposal for *Mathlets for Teaching and Learning Mathematics*

Tom Roby, former editor for the Mathlets section of MAA's *Journal of Online Mathematics and Its Applications* (JOMA), has described a Mathlet as a "small interactive platform-independent tool for teaching math." Currently, most Mathlets are Java Applets. We would like to organize a contributed paper session on Mathlets for the 2004 Phoenix Joint Mathematics Meetings.

Mathlets can be very useful tools for the teaching of mathematics. Among their advantages:

- They allow students to experiment with and visualize a variety of mathematical concepts.
- They are generally free and create and use, and are easily accessible to students.
- They can be custom-designed by a professor or a department to a specific course.
- They can be easily shared by mathematics instructors throughout the world.

In past meetings there have been sessions about using the WWW or technology in general in teaching mathematics. While these have been very useful, we feel that it is now appropriate to hold a session that focuses specifically on Mathlets for a number of reasons. In particular, last year we proposed a similar session for the upcoming 2003 Joint Meetings. It was decided that our session should be combined with the regular "Innovative Uses of the WWW in Teaching Mathematics" sessions, for which we three became co-organizers. As it turns out, a third "Innovative Uses" session was needed just to accommodate all of the Mathlets submissions (there will be eight speakers in this Mathlets session at the 2003 Meetings). Other reasons for a separate Mathlets session include:

- As described above, Mathlets are very useful in teaching and learning mathematics.
- There have been meetings held the past three summers that have focused on the use of Java to create Mathlets. The response to these meetings has been very positive.
- A section of JOMA is devoted to Mathlets.
- We would like to allow those who are working on Mathlets to exchange ideas to avoid a duplication of efforts and to facilitate better dissemination of work.
- We would like to encourage others to begin creating and using Mathlets.

We, personally, would like to organize the session because:

- We are extremely interested in the creation and the dissemination of more and better Mathlets.
- We have all written Mathlets and we have used them in our mathematics courses.
- We interact with and are in contact with others who write and use Mathlets.
- We have been involved in (both organizing and participating in) prior Mathlet meetings.

One final note. Although there hasn't previously been a separate Mathlets contributed paper session, another indication of the strong and growing interest in the creation and use of Java Applets and other Mathlets in teaching mathematics is the fact that at the upcoming 2003 Joint Meetings, the MAA minicourse "Java Applets in Teaching Mathematics" (being run by Yanik and Strong) was the first to sell out and is just one of two minicourses that to date has sold out.