



IMP

SPRING 2002

# IMPressions

A NEWSLETTER ABOUT THE INTERACTIVE MATHEMATICS PROGRAM®

## IMP Graduates in Math and Science Speak About Program's College Benefits

by Edward F. Wolff, Ph.D.

**A**uthor's note: I chair the Department of Computer Science and Mathematics at Arcadia University, located just outside Philadelphia. From September 1993 through June 1997, I took a partial leave from Arcadia in order to pilot *IMP* at Central High, Philadelphia's oldest and most prestigious public special-admission secondary school. While teaching all four years of the program, I thoroughly enjoyed both the curriculum and the opportunity to work with a wonderful group of students. I knew that at the time they graduated from Central,

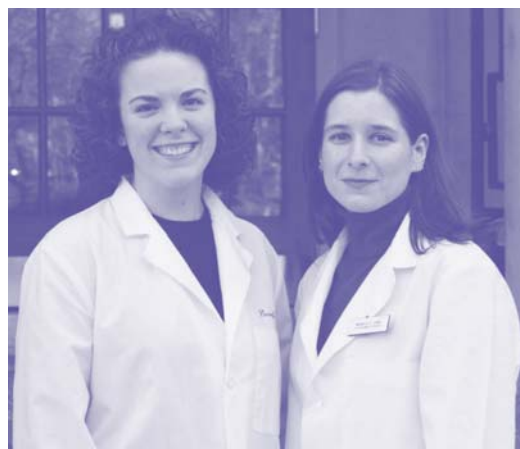
a good many of my "*IMPsters*" planned to pursue math and science-related programs at well-known colleges and universities. Realizing that by now they had either just graduated or were completing combined undergraduate/graduate programs, I contacted five of these students and asked them to reflect on how their *IMP* background had influenced their collegiate academic experiences. What they told me follows.

Dorothy Holt and Monica Labb, former Central *IMP* students, decided to pursue careers in pharmacology and both are now excelling in their six-year Doctorate in Pharmacy programs at the University of the Sciences in Philadelphia. Both also are very appreciative of how well *IMP* prepared them for their studies.

Writes Dorothy, "Did *IMP* help me in my classes? Definitely! First, all the probability and statistics from *IMP* helped me enormously in my statistics classes. Beyond that, several of my classes, including my pharmaceutical calculations class, require that we give detailed explanations about how you get an answer—the *POWs* definitely prepared me for that!"

Monica agrees. "Compounding medications and performing

*continued on page 2* ▶



Dorothy Holt and Monica Labb, former Central High IMP students

## Stanford Teaching and Learning Study

**A** team of researchers at Stanford University, directed by Dr. Jo Boaler, is conducting a research study on the mathematics teaching and learning in different curricula approaches, including *IMP*. The following extracts come from their first published report of the study.

### Introduction

*The study is based in three high schools, including Greendale (pseudonym) High School. Greendale offers students (and parents) a choice between the Interactive Mathematics Program (IMP) and the traditional algebra-geometry sequence....*

### Results & Analyses Algebra Achievement

*When the students started their different approaches there were no significant differences between the achievement of students choosing to take Algebra 1 or*

*continued on page 2* ▶

Interactive Mathematics Program is a registered trademark of Key Curriculum Press. IMP is a trademark of Key Curriculum Press. ©Key Curriculum Press, 2002.

## INSIDE

**3** **ACTIVITY:**  
Linear Nim

**4** **Regional IMPressions**


**7** **IMP National and  
Regional Centers  
Contact List**  
IMP Summer 2002  
Inservice dates

**8** **Key Comments**

PUBLISHED BY

 **Key Curriculum Press**  
Innovators in Mathematics Education

Key Curriculum Press grants teachers the right to reproduce these pages for use in their own classroom and teaching community. For any other uses of this material, please contact Key Curriculum Press. For information about *IMPressions*—or for a free subscription—write Key Curriculum Press or call toll-free at (800)995-MATH.

 *IMPressions* is published by Key Curriculum Press each Fall and Spring. We invite readers to send *IMP*-related ideas and comments to us at:  
**IMPressions**  
1150 65th Street, Emeryville, CA 94608  
Publisher: Steve Rasmussen  
Editor: Lynne Alper  
Production and Layout: Tamara Spence

[www.mathimp.org](http://www.mathimp.org)

## IMP Graduates in Math and Science Speak

*continued from page 1*

pharmaceutical calculations require one to think about different ways to reach a solution. *IMP* gave me the confidence and experience to do that. Also, in my advanced classes, instructors emphasize working in groups to solve problems and evaluate patient cases. *IMP* taught me how to work effectively within a team and, if necessary, lead a team.”

Summing up the impact of her *IMP* education, Monica states, “I’ve come to realize that the most important aspect of *IMP* is not the mathematics. *IMP* taught me to think outside the box when attempting to solve a problem, to use multiple methods and tools, and to effectively gather and evaluate the ideas of other people.”

Gina Marie Calderaio matriculated at Bryn Mawr College, where she enjoyed great success as a math major. After graduating in May 2001, Gina wanted to continue her math studies and was invited to enroll in Bryn Mawr’s Master of Arts in Mathematics program. She now particularly enjoys working on her research project investigating

properties of geodesics on a torus. She cites several ways that she feels her *IMP* background helped her in her mathematical studies.

“I recall that in my first calculus course, the instructor expected us to read from the text on our own. Many of the traditionally taught students in the class didn’t know how to go about doing this. They were used to waiting for the professor to explain everything to them so they could simply mimic the professor when they did the homework. *IMP* students, though, are used to reading texts for meaning and attempting new problems on their own.”

Gina also found her *IMP* background to be helpful in her upper level math courses. “In higher math, we write proofs all the time. This emphasis on writing was a shock to some of my classmates, but *IMP* students write all the time. The *Problems of the Week (POWs)* were especially relevant since they gave us lots of practice explaining our thought processes.”

Gina has also become a very effective *IMP* ambassador. “At a math department function, I chatted with the math department

*continued on page 6* ▶



*Gina Marie Calderaio, a Master of Arts in Mathematics candidate at Bryn Mawr College*

## Stanford Teaching and Learning Study

*continued from page 1*

*IMP 1. In the algebra test administered to all the students one year later, there were again no significant differences in achievement.... The similarity in achievement of the students was a particularly positive result for the IMP students, who spent the year learning about algebra, geometry, probability, and data handling, but performed as well on a test of algebra as students who had learned algebra all year....*

### **Students’ Attitudes Towards and Interest in Mathematics**

*Despite the similarity in achievement of students taught in different approaches, our research indicates that some important differences in mathematical beliefs and attitudes are developing among the students. Students’ attitudes towards mathematics are extremely important—they play a large part in determining students’ motivation towards*

*lessons, and their subsequent achievement, as well as influencing the number of courses they take in mathematics, and their ultimate relationships with a subject that they will continue to use throughout their lives....*

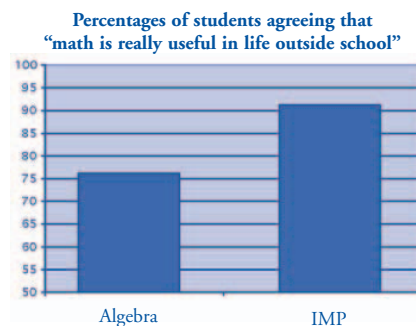
*These differences suggest that the contrasting curricula are having an effect upon students’ interest, and it will be important to monitor these differences as students continue with their different approaches....*

### **Summary**

*The early stages of our research suggest that there is a large degree of overlap between the test achievement of students in the different curricula approaches, but also that the different programs are producing differences in attitude and interest towards mathematics and approaches to learning and using mathematics. These differences are important and they are likely to affect the students’ subsequent learning of mathematics. We will continue to monitor these as we follow students through high school....*

The full version of this report, and further details of the study, are available on Professor Boaler’s Web site:

<http://www.stanford.edu/~joboaler>. ■



## ACTIVITY



### Linear Nim Activity

There are many strategy games in which two players take turns removing objects from one of several piles according to certain rules, with the winner being the person who removes the last object. The Year 1 *Problem of the Week*, *Linear Nim*, describes a particular case in which there is only one pile, with 10 objects. We can represent the objects by a single row of marks on a piece of paper, as shown below.



Each player, in turn, crosses off 1, 2, or 3 of the marks. Play continues until all of the marks have been crossed out. The player crossing off the last mark is the winner.

#### Part I: Finding a Strategy

Before proceeding, you should find a winning strategy for this particular game. The question of who wins may depend on which player goes first. So one element of your strategy is to decide whether you want to go first or second. Be sure that the strategy you develop is complete. That is, you should take into account every possible move that your opponent might make.

#### Part II: Simple Variations

The *POW* also asks students to investigate how the strategy would have to change if the game were to vary in certain ways. For instance, suppose you start with 15 marks instead of 10, or allow a player to cross out up to 4 marks at a time instead of 3? In other words, suppose you change the initial number of marks or the maximum per turn that a player can cross out.

How would your strategy change if you varied the game? Are there some cases where you should choose to go first and others where you should choose to go second? What does it depend on?

#### Part III: More Variations

Here's a variation that the *POW* does not mention: Suppose you are allowed to cross off 2 or 3 items, *but not 1*. One interesting feature is that if there is only 1 mark left, no one can move. In that case, the game is considered a tie.

Suppose you start with  $N$  marks. What is the best strategy for each of the two players (and how does it depend on the value of  $N$ )? In particular, answer these questions:

- For which values of  $N$  can player 1 force a win?
- For which values of  $N$  can player 2 force a win?
- For which values of  $N$  can one of the players force at least a tie?

For example, if  $N = 4$ , then player 1 can force a tie by crossing off 3 marks.

Once you've answered these questions, try to generalize this to the case where the number of marks you can cross off is "any number from  $a$  up to  $b$  (inclusive)" for different choices of  $a$  and  $b$ . (The game just described is the case  $a = 2$ ,  $b = 3$ .)

# Regional IMPressions

## CALIFORNIA

California *IMP*'s NSF grant, COME ON! (California's Outstanding Mathematics Educators Ongoing Network), is up and running. Meetings with teacher-leaders have already taken place at the California Mathematics Council's two major statewide conferences. Coming out of those meetings were a request, and then a plan, to develop an *IMP* recruiting video for 8th grade students.

Teachers from around the state were contacted and asked to videotape classroom action, student interviews, student presentations, and student work for use in this recruitment video. Varre Cummins, an *IMP* teacher at Hueneme High School in Oxnard, California, has used his video production experience to good effect in producing an exciting recruitment tool. The video will be distributed to all interested schools in California.

Last summer's inservices were expanded beyond *IMP* 1, 2, 3, and 4 to also include week-long institutes on AP Calculus and AP Statistics. This summer, another institute will be offered that will focus on effective teaching of algebraic concepts. The three major goals are to:

- promote better teaching of mathematics by helping teachers find better ways to build student understanding.
- raise understanding of the *IMP* curriculum.
- help teacher-leaders replicate this inservice or components of the inservice in their districts.

Additional funding from the California Professional Development Institute grant program provides teachers a stipend for their participation in these summer institutes and the school year follow-up program.

In early March, there was a two-day retreat for *IMP* teacher-leaders from around the state. At the retreat, plans for the summer institutes were finalized and all activities for the coming year were outlined.

## HAWAII

Aloha from Hawaii! We've been going through many exciting changes: a new Superintendent (Patricia Hamamoto), a new Assistant Superintendent (Katherine Kawaguchi), a new name (Office of Curriculum, Instruction, and Student Support), and renewed efforts to get all schools to be standards-based.

Freshmen entering King Kekaulike High School on the island of Maui, are enrolled in either Honors Geometry, *IMP* 1, or Algebra 1. They have had to face many challenges with this initiative but they still manage to have smiling faces because they believe that the range of mathematics in *IMP* should be for all students.

Last month, teachers across the state were fortunate to have Michael Serra, author of *Discovering Geometry: An Investigative Approach*, teach some of their classes as well as work with them on *The Geometer's Sketchpad*®. Farrington High, Moloka'i High and Intermediate, and Waiakea High (*IMP* sites) hosted these sessions for teachers from all islands. Teachers were excited and felt rejuvenated as they worked alongside the students and on the computers. One teacher said she'll use the *Patty Paper Geometry*® ideas with the constructions in *Orchard Hideout*.

## ILLINOIS

The Illinois region continues to offer curriculum and pedagogy workshops for *IMP* teachers from the Chicago region and neighboring states. This year's summer workshops will expand to offer pedagogical support to Chicago schools using another of the NSF-supported high school curricula. With this strategy we hope to expand the pool of like-minded professionals and gain support from the Chicago Public Schools.

Four Chicago all-*IMP* schools are experimenting with a staff-development strategy called "lesson study." Within a school, math teachers spend two hours discussing and preparing a single lesson. Then, one of these teachers presents the lesson to students, while the rest of them observe the students' reactions. The observers focus on the impact of the lesson on student learning and write about the observations. After everyone in the group has read each others' writings, a two-hour follow-up discussion focuses on possible modifications to increase student learning.

We have a wonderful curriculum that already does much to increase student learning of mathematics. Lesson study is a way to make teachers more aware and reflective of the ways their students are learning, and to help them improve their teaching. It opens up the possibility of an intellectual exchange based on very practical considerations.

## NEW ENGLAND

During the past nine years, the New England Regional Center has trained 275 teachers in 40 schools. One of the most successful implementations has been at Brattleboro High School in Brattleboro, Vermont. Emily Goldsmith, Kevan O'Donnell, Mary Kmet-Campbell, and Gene Whitney have developed a solid program that is held in high esteem by the students, teachers, administrators, and parents.

Brattleboro High School uses a semester block schedule. This has allowed them to divide the four-year *IMP* curriculum into five different courses. Years 1 and 2 are taught in grades nine and ten, but in grades eleven and twelve, students often double up on *IMP* classes and take one course in each semester. Many *IMP* students take Calculus in their senior year.

When asked to explain the reason for *IMP*'s success at her school, Emily said, "Each of us regularly works at making the program a success. We are always marketing the program to the administration, the students, and the parents." One of their marketing devices is a parents' newsletter that Emily writes. She produces a welcoming newsletter for the Year 1 parents in the fall and another newsletter for all parents in the spring.

The most recent edition of the newsletter includes a collage of pictures of all the *IMP* classes. One of the pictures in this collage depicts students who have completed the *High Dive* unit. Each of them is wearing a T-shirt with a cartoon of the Ferris wheel and cart on the front. On the back of the shirt is the equation that is used to solve the unit problem.

Each spring, Emily takes her students to the junior high school to recruit new *IMP* students. The students answer questions and proudly show off the *IMP* collage and the T-shirts that they have earned. In just a few years, some of these eighth grade students will be earning their own *High Dive* T-Shirts.

## NORTHWEST

The submission below includes a teacher's reflection on her first year of teaching *IMP*. We hope this reflection will refresh and renew your teaching spirit.

### *A teacher's perspective*

*My first experience with the Interactive Mathematics Program curriculum was at a summer institute. I had just recently been hired in the district, and was interested in this "other" math route for our students. Initially, I was a bit hesitant with some of the philosophies of the program. The idea of letting a classroom full of students run loose and discover their way into conjectures and rules seemed truly frightening. During this first summer institute, we were asked to take a survey regarding our ideals about teaching math. I found myself agreeing that students need a connection to the material, and that it should relate to their needs and daily life. However, I could not let go of the idea that they need to be guided or told how to do things.*

*From the get go, I was really into the material and found it valuable information to learn, and very exciting. I knew that my own enthusiasm would be contagious and that kids would enjoy participating in the activities as well. The curriculum and the way the lessons are structured around a long-term goal, often with a story or fun situation, were enough to lure me into wanting to attempt teaching it.*

*Since having taught the *IMP* curriculum for six months, I have found my level of job satisfaction has greatly increased. I look forward to the next day and can hardly wait to share the new, fresh material with my students. They constantly tell me how much they enjoy the class. The students' positive attitudes toward the class truly make it a*

*joy to teach. I have also learned to allow for independent learning. I have found that I do not have to tell them how to perform certain algorithms or what approach to use. These students are finding excitement in realizing a new concept all by themselves for the first time. It makes them feel smart to find something out or discover a property all on their own (or with the help of a group).*

*Nicole Barker, first year *IMP* teacher  
Tigard High School, Tigard, OR*

## NOVA SCOTIA

Through our five years of experience in supporting the Francophone and the French immersion schools implementing *IMPacts Mathématiques IMP*, we have learned that a focus on developing teachers who are knowledgeable in mathematics and pedagogy, while necessary, does not guarantee the successful implementation of a reform mathematics program. Issues such as ongoing professional development and support from school principals, counselors, parents, and the school community are all part of keeping reform alive.

The Department of Education in Nova Scotia, *la Direction des Services Acadiens et de Langue Française*, is continuing to support teachers of the French mathematics program to make sustainable improvements in mathematics education. Through inservices and summer institutes, teachers are learning ways to integrate technology tools, such as graphing calculators, CBL, CBR, and geometry and graphing software, with their mathematics lessons.

The alignment of *IMPacts Mathématiques* (for grades 9–12) to the French mathematics curriculum has raised our mathematics standards and is helping our students to develop the knowledge, skills, and attitude about mathematics that contribute to a full and productive life.

## PENNSYLVANIA

Pennsylvania's latest graduating *IMP* 4 teacher class has just completed their final *Pollster's Dilemma* training with Ned Wolff (second from left, bottom row). They are a representative group, teaching at ten different high schools located in Philadelphia, the nearby Pennsylvania suburbs, and in New Jersey.



*Pennsylvania's latest graduating class of *IMP* 4 teachers*

# Regional IMPressions

## ROCKY MOUNTAIN

One focus of our project is to keep parents and other members of the school community informed about the value of the *IMP* curriculum in preparing students to engage in real mathematics. Lew Romagnano, Professor of Mathematical Sciences, shares the following letter with parents.

*To Parents:*

*Mathematics is the search for patterns and relationships. It is the development of tools and procedures for tackling quantitative and spatial problems. It is summarizing, drawing conclusions from, and inferring from large and diverse piles of data. It is the only subject in which something can be proved to be true, as part of a system of systematically developed prior truths.*

*If this description of mathematics is surprising to you, I am not surprised. But I am saddened by the fact that your years of experience as a student in typical mathematics classes did not give you a chance to engage in this creative and dynamic discipline.*

*What the teachers at [your school] are doing by offering the Connected Mathematics Program in the middle school and the Interactive Mathematics Program at the high school is giving your children the opportunity to do real mathematics, and to do it in ways that make the most sense given what we know about how children learn.*

*I could not be more supportive of their efforts. I have had enough experience with "successful" mathematics students—students who did well enough in mathematics and liked it enough to choose to major in it in college—who have had little or no experience with the discipline I described above. I want students at my school who have the kinds of*

*experiences your children will be provided if they take CMP and IMP.*

*The teachers at [your school] need more from you parents than your acquiescence. They need your active support for their efforts. Teaching mathematics the way they propose is much more difficult than simply showing students techniques for solving certain types of problems and having the students practice them. They will be putting in many hours outside of class, collaborating with each other and with others around Colorado undertaking similar efforts, all to provide an authentic mathematics experience for your children. You need to be aware of the high level of professionalism they maintain.*

*And for students, learning why as well as how, explaining and justifying their own thinking and the thinking of others, is much more of a challenge. Your children might not like this challenge at first. They may think the rules have been changed on them. In fact, they have. However, the old rules applied to a game that no more represented real mathematics than vocabulary lists and sentence diagramming would represent true literacy. You need to support the efforts of your children, not by doing their homework for them but by encouraging their engagement in the tasks set by their teachers.*

*I am much impressed by, and grateful for, the commitment of [your school] faculty to the mathematics program they have begun to put together, and I support their work enthusiastically. Please feel free to contact me if you have any questions.*

*Lew Romagnano, Ph.D., Professor of Mathematical Sciences  
The Metropolitan State College of Denver*

## IMP Graduates in Math and Science Speak. . .

*continued from page 2*

chair about my *IMP* math background. He had not been familiar with *IMP* but was so intrigued that soon afterwards he invited a regional *IMP* director to campus to lead a workshop for students and faculty. Since then, he has worked to support local school districts implementing *IMP* and other reform math curricula."

Jennifer Visone, a former *IMP* student at Central, decided while in high school that she wanted to become an engineer. She enrolled at Drexel University and this May 2002 will complete a five-year combined bachelor and master's program in civil engineering. Throughout her studies she has maintained a 3.92 G.P.A. Like Gina, she reports that her *IMP* background has given her a definite leg-up in her studies.

She states, "*IMP* provided me with a way to create a starting point for beginning a problem and then to look at the problem in several ways. I also have definitely put to good use the experience

*IMP* gave me in working with groups. For example, Drexel freshmen engineering students are put into teams to work on a design project. My *IMP* background enabled me to guide everyone else on my team."

Kitiboon Narangajavana went from Central to Harvard University where he was an honors major in biochemistry. He found that he was aided both by specific content that the *IMP* curriculum included as well as *IMP*'s general emphasis on understanding.

"In my statistics course," he recalls, "we revisited many of the same topics I had studied in *IMP*. I felt that I understood the concepts with greater depth not only because I had seen them before, but also because *IMP* helped me learn to derive and explain concepts, understand why those concepts worked, and how to apply them to real-world situations." ■

## SUMMER 2002 INSERVICES FOR THE INTERACTIVE MATHEMATICS PROGRAM

### Key Curriculum Summer Institutes

IMP with The Geometer's Sketchpad® July 7–14,  
Mills College, Oakland  
IMP with Fathom Dynamic Statistics™ July 14–21,  
Mills College, Oakland

For information, call 800-995-MATH,  
or visit [www.keypress.com/pdc](http://www.keypress.com/pdc).

### California Regional Center

IMP 1, IMP 2 June 17–21, Berkeley  
IMP 1, IMP 2 August 12–16, Oxnard  
IMP 3, IMP 4 June 17–21, Berkeley  
Meaningful Algebra for All Students June 17–21, Berkeley  
August 12–16, Oxnard  
AP Statistics June 17–21, Berkeley  
AP Calculus August 12–16, Oxnard

### Hawaii Regional Center

IMP 1–4 June 17–21

### Illinois Regional Center

IMP 1 July 29–August 2  
IMP 2 August 5–9  
IMP 3 August 12–16  
IMP 4 August 19–23

### Midwest Regional Center

IMP 1 August 5–16  
IMP 2 August 12–16  
IMP 3, IMP 4 August 5–9  
For more details call 612-668-1950

### New England Regional Center

IMP 1, IMP 2 June 24–28, Vermont  
IMP 3, IMP 4 June 24–28, Boston  
IMP 1, IMP 2 August 12–16, Boston

### New York Regional Center

For information, contact Suzanne Libfeld 718-960-8758 or  
Arlene DeSimone 718-904-5431.

### Northwest Regional Center

IMP 2 June 24–28, Tacoma  
(Closed)  
IMP 1–4 July 29–August 2

### Pennsylvania Regional Center

For information, please see [www.gphillymath.org](http://www.gphillymath.org).

### Rocky Mountain Regional Center

IMP 1 June 17–28  
IMP 2 June 17–21  
IMP 3, IMP 4 June 24–28  
Cognitive Coaching 1 July 31–August 3  
Cognitive Coaching 2 August 5–7

[www.mathimp.org](http://www.mathimp.org)

## IMP National and Regional Centers Contact List

NATIONAL OFFICE/Sherry Fraser  
Call: (415)332-3328 Fax: (415)332-3381  
email: [imp@math.sfsu.edu](mailto:imp@math.sfsu.edu)

OUTREACH COORDINATOR/Lisa Doak  
Call toll free: (888)MATH IMP  
email: [Lisa\\_Doak@ceo.cudenver.edu](mailto:Lisa_Doak@ceo.cudenver.edu)

ARIZONA REGIONAL CENTER/Nora G. Ramirez  
Call: (480)731-8062 Fax: (480)731-8060  
email: [nora.ramirez@domail.maricopa.edu](mailto:nora.ramirez@domail.maricopa.edu)

CALIFORNIA REGIONAL CENTER/Margaret DeArmond  
Call: (661)827-4511 Fax: (661)827-4592  
email: [margaret\\_dearmond@khsd.k12.ca.us](mailto:margaret_dearmond@khsd.k12.ca.us)

HAWAII REGIONAL CENTER/Kathleen Nishimura  
Call: (808)394-1341 Fax: (808)394-1304  
email: [kathleen\\_nishimura@notes.k12.hi.us](mailto:kathleen_nishimura@notes.k12.hi.us)  
[iris\\_mizuguchi/OIS/HIDOE@notes.k12.hi.us](mailto:iris_mizuguchi/OIS/HIDOE@notes.k12.hi.us)

ILLINOIS REGIONAL CENTER/Anne Horn  
Call: (312)355-0271 Fax: (312)413-7411  
email: [annehorn@uic.edu](mailto:annehorn@uic.edu)

MIDWEST REGIONAL CENTER/Jean Stilwell  
Call: (612)668-2000 Fax: (612)668-1993  
voicemail: (612)692-0524  
email: [jstilwel@mpls.k12.mn.us](mailto:jstilwel@mpls.k12.mn.us)

MIDDLE COLLEGE HIGH SCHOOL CONSORTIUM CENTER/  
Cece Cunningham  
Call: (718)349-4017 Fax: (718)349-4003  
email: [ceccullen@aol.com](mailto:ceccullen@aol.com)

NEW ENGLAND REGIONAL CENTER/Carla Oblas  
Call: (617)373-2328 Fax: (617)373-8562  
email: [oblas@neu.edu](mailto:oblas@neu.edu)

NEW YORK REGIONAL CENTER/Suzanne Libfeld  
Call: (718)960-8758 Fax: (718)960-8054  
email: [suzli@aol.com](mailto:suzli@aol.com)

NORTHWEST REGIONAL CENTER/Brent McClain  
Call: (503)431-5545 Fax: (503)916-2725  
email: [bmcclain@ttsd.k12.or.us](mailto:bmcclain@ttsd.k12.or.us)

PENNSYLVANIA REGIONAL CENTER/Joe Merlino  
Call: (215)951-1203 Fax: (215)951-5089  
email: [merlino@lasalle.edu](mailto:merlino@lasalle.edu)

ROCKY MOUNTAIN REGIONAL CENTER/Jean Klanica  
Call: (303)756-9141 Fax: (303)756-9256  
email: [jean\\_klanica@ceo.cudenver.edu](mailto:jean_klanica@ceo.cudenver.edu)

NEW BRUNSWICK, CANADA/Marcel Lavoie  
Call: (506)453-2326 Fax: (506)453-3325  
email: [marcel.lavoie@gov.nb.ca](mailto:marcel.lavoie@gov.nb.ca)

NOVA SCOTIA, CANADA/ANTOINE JARJOURA  
CALL: (902)424-6500 FAX: (902)424-0820  
email: [jarjoua@ednet.ns.ca](mailto:jarjoua@ednet.ns.ca)

# Key Comments

## IMP and Fathom— A New Summer Institute, July 14–21

by William Finzer, Senior Scientist, KCP Technologies

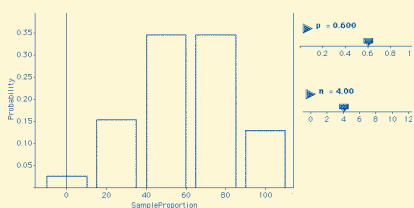
*Fathom Dynamic Statistics*<sup>™</sup> software is designed to facilitate a data-driven approach to mathematics teaching. Jim Short, Jill Binker, and I think it's a perfect match with *IMP* and are planning how to demonstrate that in a week-long national Summer Institute from July 14–21, held at Mills College in Oakland, CA and hosted by Key Curriculum Press. I left the *IMP* project in 1989 in order to return to mathematics software development; now I get to return to *IMP* with the fruits of that labor.

### Some Examples

*IMP* uses data in rich, powerful ways to provide contexts for the learning and doing of mathematics. We enjoy the process of figuring out ways *Fathom* can simplify and augment *IMP* activities. Here are a few examples of what we've come up with so far.

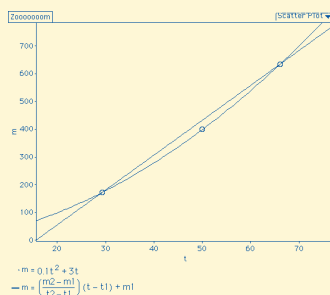
The Binomial Probability Distribution in *The Pollster's Dilemma*:

In *Fathom*, a slider is a named number whose value can be changed either by typing in a new one or by dragging. Sliders are powerful tools



for developing conceptual understanding because they allow the user to experience the ramifications of a continuous transformation. In *The Pollster's Dilemma*, students work with binomial probability distributions which are functions of both the probability of success and the number in the sample. A *Fathom* graph of this distribution (shown above) responds dynamically as the user drags either of the sliders.

Derivatives in *It's a Small World*: Remember Speedy's 400 meter race and the problem of determining her instantaneous speed; i.e., the derivative of the distance versus time function? We have found students can make a very nice graph like the one at right that allows them to adjust two points as close



*Interactive Mathematics Program* and *The Geometer's Sketchpad* are registered trademarks of Key Curriculum Press. *IMP* and *Sketchpad* are trademarks of Key Curriculum Press. *Fathom Dynamic Statistics* is a trademark of KCP Technologies, Inc. ©Key Curriculum Press, 2002.

together as they like to approximate the tangent. It turns out this would also be very easy to construct using *The Geometer's Sketchpad*<sup>®</sup>, leading us to wonder how teachers will decide between the two pieces of software in situations like this.

### The Institute:

#### Getting Started with *Fathom*

For the first two days of the *IMP* and *Fathom* Institute, we'll concentrate on bringing everyone up to speed on using *Fathom* by doing activities from various *IMP* units.

#### *Fathomizing IMP* Activities

One of the best ways to come to terms with using new software in the classroom is to develop activities for it. What better starting point could there be than the activities in *IMP*?

#### Modes of Use

We've been thinking about different ways that *Fathom* fits into teaching and learning: as a vehicle for exploration, as an electronic whiteboard for explanation and demonstration, and as a medium for working on homework and projects. In the Summer Institute, we'll both experience different ways of using the software and think about how it can impact classroom teaching and students' learning.

#### *IMP* Revisions

Soon work will begin on a major rewrite of *IMP*, and a piece of the rewrite involves developing a version of *IMP* that takes greater advantage of the capabilities of computers, especially the capabilities demonstrated in *Fathom* and *The Geometer's Sketchpad*. The *Fathom*, *IMP* Institute and a new *Sketchpad*<sup>™</sup> *IMP* Institute hosted by Key Curriculum Press will serve as an important testing ground for ideas about how to revise *IMP* in this way.

Jim, Jill, and I look forward to working with *IMP* teachers this summer. Those of you who attend will learn a great deal about teaching with computer technology and you will take many *Fathom*-based *IMP* activities back to your classrooms.

## Two New National *IMP* Summer Institutes!

*IMP* with *The Geometer's Sketchpad*

July 7–14

*IMP* with *Fathom Dynamic Statistics* Software

July 14–21

You can attend either *IMP* Institute as a stand-alone session or combine them for an extraordinary technology experience!

For information about these Institutes, on-campus housing and meal packages, or to receive a Summer Institute brochure, visit [www.keypress.com/pdc](http://www.keypress.com/pdc) or call 800-995-MATH.



1150 65th Street, Emeryville, CA 94608

#### Mail Room:

If addressee is unknown, please route to a leading *IMP* math teacher.

PRSR STD  
U.S. POSTAGE  
PAID  
PERMIT NO. 470  
SANTA ROSA, CA