

# NEWS LETTER

# THE FIRST APPLIED MATHEMATICS THEOREM



December 2000

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Mathematics & Statistics Department  
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## The Paul W. Eloie Graduate Fellowship Fund

Last summer, Howard W. and JoAnn K. Eloie, formerly of Rolla, established an endowed graduate fellowship fund for the Mathematics and Statistics Department with a gift of stocks. Howard Eloie was Director of Development at UMR from 1973 - 1990. The fund is named for their son Paul (Ph.D. '80), who is currently chair of the Mathematics Department at the University of Dayton. The Eloies have asked that income from the endowment be used to provide an annual summer research stipend for a graduate student in the department, and this will be done. The department's Graduate Policy Committee will choose the recipient each year. Both the name and desired use of the fellowship are quite appropriate. Dr. Paul Eloie is a fine example for our doctoral students to look up to as they prepare for careers as mathematicians. We extend many thanks to Mr. and Mrs. Eloie for their generosity

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*Reminder*  
*Phonathon will be held*  
*February 21-22 and 25-26, 2001.*



## The Excellence in M a t h e m a t i c s Awards

Beginning this year, our department is recognizing Missouri high schools whose students do well in mathematics at UMR with the Excellence in Mathematics Award. We asked the Registrar's Office to sort student performance of fall semester freshmen in their first UMR mathematics courses by high school for the last five years (1995-1999). This five year window will move each year, so that the awards in the future will be based on the last five fall semesters. The first mathematics course a freshman takes in the fall is the one most strongly influenced by their high school background, so we looked only at these courses. Sorting by high school allowed us to calculate a mathematics GPA for each high school. In order to recognize not only good performance, but also good performance by more students, we classified the high schools as Large (20 or more), Medium

(10-19), or Small (5-9) depending on how many students the schools sent to UMR during the five year period. Schools that sent less than 5 students were not eligible. The top schools in each group were then chosen.

The awardees this year are, in alphabetical order:

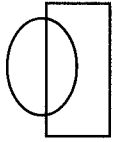
**Large:** Francis Howell H.S. (St. Charles), Francis Howell North H.S. (St. Charles), Helias H.S. (Jefferson City), Jackson H.S. (Jackson), Lafayette H.S. (Ballwin),

**Medium:** Carthage H.S. (Carthage), Duschene H.S. (St. Charles), Mehlville H.S. (St. Louis),

**Small:** Neosho H.S. (Neosho), Potosi H.S. (Potosi), Raytown H.S. (Raytown), Raytown South H.S. (Raytown), Springfield Catholic H.S. (Springfield).

The actual award consists of three parts. First is a framed certificate which can be hung in the school. Second is an HP 49G graphing calculator, the one we use in mathematics courses at UMR, and third is an overhead projector panel so the calculator can be used in the classroom.

In our department we see many students who received good, strong mathematics backgrounds at their high schools and who do well in their college mathematics courses. When teachers and schools do a good job, they ought to be rewarded and appreciated for this, but, unfortunately, such reward and appreciation is relatively uncommon. For this reason, the department decided to do something to thank some of the high schools in Missouri that have sent us well-prepared students. Awardees cannot repeat for three years, so we hope to be able to recognize many other deserving high schools in the future.



## Comments

*from the Chair*

In October I attended a leadership seminar for UM system department chairs. In addition to the leadership part, it was a good opportunity to get to know people from the other three campuses, and also to increase the visibility of UMR and our department throughout the system. I learned some things about my own leadership style, and, for example, am now more aware of when to go with my instincts and when to stop and consider whether the situation calls for a conscious override of my inclination. Anyway, what I'm leading up to is, this year I want to talk about leadership, but not mine - that's a little too close to home, and I probably said too much already. The leadership I want to bring to your attention is that achieved by you, our alumni.

Two things mentioned elsewhere in this newsletter provide examples of the leadership roles some of you fill. One is the Excellence in Mathematics Awards we gave to selected high schools this fall. Visiting the schools to present the awards has been a very pleasant experience, and at two of the schools, I had the additional pleasure of learning that the head of the mathematics department is one of our own graduates. Both Cheryl (Henson) Maddox ('96) at Potosi and Steve Haupt ('78) at Neosho are filling leadership roles at their school. The people who complete the teacher certification program in our department are alumni of whom I am particularly proud. Mathematics teachers in grades K-12 are a vitally important part of the American education system, and are in a position to significantly influence the lives of their students. This, too, is leadership. I believe that those teachers with degrees from UMR, such as Cheryl and Steve, are as well prepared mathematically as anyone and are better prepared than most. Teacher certification in mathematics has been possible at UMR since the sixties. Dr. Charles Johnson was the father of the program, and I was the first graduate in 1969. Back then, and until recently, the program was a cooperative one with another UM campus, but now everything is available at UMR. This possible career option for UMR students is not as well-known as it should be, and you can help us a lot by spreading the word to young people you know who are interested in teaching mathematics.

The other article indicating leadership of our graduates is the one about the endowed graduate fellowship fund established by Howard and JoAnn Eloe, and named for their son, Paul Eloe. Paul, as mentioned in that article, is currently chair of the Mathematics Department at the University of Dayton. Department chair, or even dean, is not an unusual position for someone with a doctorate in mathematics from UMR to occupy. According to the information I have, at least fifteen of our graduates either are now, or have been, department chair, director, dean, or vice president at colleges and universities in nine states. The next Ph.D. granted by our department will be number sixty, so a full quarter of our graduates have gone on to hold leadership positions in their institutions. In academia, where a person got their degree is nearly always associated with that person, and administrative positions are, for the most part, more visible than regular faculty positions. This means that a little of the recognition and visibility associated with your academic leadership gets reflected back to UMR.

***"According to the information that I have, at least fifteen of our graduates either are now, or have been, department chair, director, dean, or vice president at colleges and universities in nine states"***

Here are the names of the people I know of in academic leadership positions. If I have overlooked anybody, please let the department know. John Carlson ('70), dean, University of South Dakota; Harold Hager ('70), former chair, Southeast Missouri State; Jim Jamison ('70), chair, University of Memphis; Darrell Thoman ('70), chair, William Jewell College; Paul Harms ('71), former chair, Taylor University; Jack Hamm, ('73), dean, Arkansas Tech; myself ('74); John Kubicek ('75), assistant head, Southwest Missouri State; J C Hankins ('76), director of actuarial science, Middle Tennessee State; Jim Richards ('76), chair, Bemidji State; Dan St. Clair ('76), chair of computer science, UMR; Deloris Tichenor ('76), vice president, Tri-State University; Paul Eloe ('80), chair, University of Dayton; William Bray ('81), former chair, University of Maine; Rhonda Magel ('82), chair of statistics, North Dakota State. Congratulations and thanks to you all.

Leadership can be shown in many ways, and people I have mentioned happen to be in a high school or college setting. I have not forgotten that several of our graduates are in positions of leadership in business and industry, too. And leadership can be exercised by anyone, regardless of their official title. I hope all of our graduates are proud of being UMR mathematics and statistics alumni, and that people you meet soon know about your alma mater. We are proud of you, and want to know what you are doing, so if you have not touched base with the department for a few years, drop us a note.

*Leon M. Hall*

## Professor Garver Reminisces

Greetings from an old timer. I really look forward to each newsletter. We enjoy reading your notes to us so Dr. Haddock thought you might enjoy knowing about us so he asked me to write a few lines and I fully agree with him.

I came to MSM-UMR in 1959 as an instructor and graduate student. I feel truly blessed that I had the opportunity to be a part of this institution. I officially retired in 1992 but continued part time for three years and summer special programs until 1999.

I have a valuable treasure of memories of the students I have had in classes, the students I advised and all of the graduate assistants I was privileged to work with. You were all great in maintaining standards and cooperating with the staff. I would treasure a note from each of you to let me know what you are doing and about your families. Send it to the Math Department, as I check my mail occasionally.

Since retirement, Norma and I have traveled to Europe in 1998 for a nine nation tour. In July, 1999 our son and I went on a fishing trip in Soldotha, Alaska. He caught a 53 lb. king salmon and I caught a 37 lb. and a 25 lb. salmon. What a thrill. Other than fishing I carve fish and birds and do all other kinds of woodworking. I have a considerable pile of saw dust and wood chips but it is a very pleasant and satisfying hobby.

Best wishes wherever you are,

*August Garver*

*Students, Faculty, Staff****Special  
Recognition***

The William Lowell Putnam Mathematical Competition is the premier collegiate mathematics competition. The 61st competition was held on December 2 of this year. Results from this competition will not be available until late spring. For the 60th competition held December 4, 1999, fifteen (15) UMR undergraduates participated. All competed as individuals. A three person team was identified prior to the competition to compete as a team for UMR. That team, consisting of James Atkinson, Sandor Swartz, and Steven Alferink, ranked 121st out of the teams representing 431 schools. In individual competition, James Atkinson, Sandor Swartz, and Ryan Rule tied for top individual score among the UMR contestants; their rank was 729th out of 2,900 contestants. While we didn't get the gold, the performances mentioned above certainly brings deserved recognition to the campus and to the individuals. Over the years the top five performers, each year, have been identified as Putnam Fellows. It was noted in the October issue of the American Mathematical Monthly that only three of the Putnam Fellows of the 1990's were from an American state university. One of these three was Xi (Shaw) Chen from UMR in 1991.

Missouri has developed its own intercollegiate mathematics contest. This contest is based on collaborative solutions (three or fewer students from an institution constitute a team). The fifth Missouri MAA competition was held on the CMSU campus in Warrensburg on April 13-14, 2000. UMR's team of Steven Alferink, James Atkinson, and Sandor Swartz finished 3rd out of 25 teams from Missouri. This team was bested only by the best from the University of Missouri-Columbia and Washington University.

Congratulations to Chad White, a junior in Mathematics at UMR, who was selected by two institutions for a National Science Foundation Summer Opportunities for Undergraduate Research Experience. The institutions were New York State University at Postdam, and Rose-Hulman Institute of Technology in Terre Haute. Chad chose the Rose-Hulman opportunity, and, with support from the department's development fund, will present some of his results at the annual mathematics meetings this January.

A comparison of student satisfaction with the quality of learning among seven College of Arts and Sciences departments brought campus recognition to the Mathematics and Statistics Department. The study extended over a six semester time period (WS97-FS99) and focused on student perception. "WS97-FS99 students perceive differences in the quality of learning between departments within each semester and the differences, with small variation, are consistent for departments across the six semesters, except for mathematics, which moved to the highest rank..." Congratulations to all those who teach, and teach with recognizable interest/concern for their students.

Two department faculty received Outstanding Teaching Awards on December 5, 2000. Col. Tom Akers (recently retired from the Air Force and service as an Astronaut) returning to teaching in the department after nearly 1/4 century, still has what it takes, receiving one of the 22 awards given this year. Dr. Vy Le, a recent addition to the faculty, is also to be congratulated for receiving this same Outstanding Teaching Award recognition. I am not sure of the numbers today, but historically recipients of these awards would be those faculty placing in the top 5% of UMR faculty as judged by their students from the previous year.

Wlodek Charatonik continues as a visiting professor at UMR; presently he is on leave from the National University of Mexico, Mexico City.

Tom Ingram spent some time on the speaking circuit during the past year. He gave invited addresses at the annual Spring Topology and Dynamical Systems Conference (San Antonio, March 2000), the First International Conference on Continuum Theory (Puebla, Mexico, June 2000), and at the special session on continuum theory and dynamics at the meeting of the American Mathematical Society (Birmingham, November 2000).

Ilene Morgan received tenure and a promotion to Associate Professor. In addition Ilene is serving as Chair of the Missouri Section to the Mathematical Association of America this year. The Missouri Section will be meeting at UMR this spring.

Kevin Pilgrim gave three lectures at the Complex Dynamics workshop held in September 1999 at Zhejiang University, Hung Zhou, China. This past summer Kevin attended international meetings and gave lectures in Spain, and Denmark. This past semester he gave Colloquium lectures at Brigham Young University and University of Tennessee.

Tim Randolph co-authoring with S. Clark (also at UMR), Y. Latushkin, S. Montgomery-Smith published the article "Stability radius and internal versus external stability in Banach spaces: an evolution semigroup approach". This paper appears in the SIAM Journal of Control and Optimization (vol. 38, no. 6 (2000), 1753-1793). Also their article "Adaptive-critic based optimal neuro control synthesis for distributed parameter systems" with R. Padhi, and S. N. Balakrishnan has been accepted and will appear in Automatica, journal of the International Federation on Automatic Control.

***New Faculty & Staff***

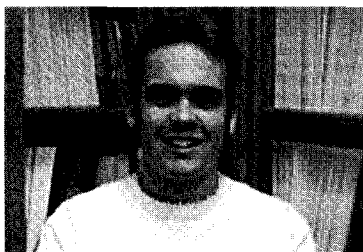
Gary L. Gadbury, a 1983 B.S. in EE from SIU (Carbondale, Ill), 1994 M.S. in Applied Mathematics from the University of Colorado (Denver), and Ph.D. in Statistics from Colorado State University (Fort Collins) joined the faculty this fall. Gary comes with teaching experience in Colorado (UC-Denver, and CSU), and two years of experience as an Assistant Professor at the University of North Carolina-Greensboro. He has industrial experience both with Sparton Manufacturing Co. and the IBM Corporation. Recently he has conducted research into modeling forest growth for the USDA Forest Service. We welcome Dr. Gadbury to UMR.

Sharon L. Matson joins the department as a secretary, and of course Newsletter producer. The later portion of her title will no doubt lead into a career option in publications. Actually Sharon joins us from a position in the Phelps County Prosecuting Attorney's Office, where she served from 1996. Prior to that she served (for eight years) as Secretary/Bookkeeper for Donald Maggi, Inc. of Rolla. We welcome Sharon to the department.

***Leaving a Legacy  
Through Your Will***

A planned gift makes a perpetual statement about your dedication to MSM-UMR. While many may not be able to establish an endowment today, they find that they are able to leave a significant legacy to the university through a planned gift, such as a bequest, life income gift or life insurance. By making a planned gift, you show your loyalty to an institution that has played a significant role in shaping your future. For more information about giving a planned gift, call Anne Weller at 573-341-6090 or e-mail her at aaweller@umr.edu.

# Scholarship Recipients



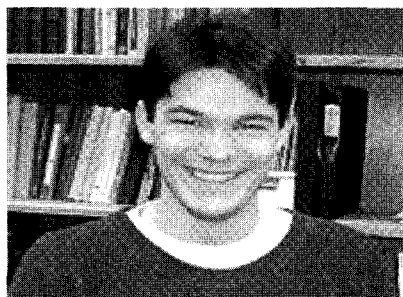
Math/Stat Faculty Scholar--Chad White, San Antonio Texas



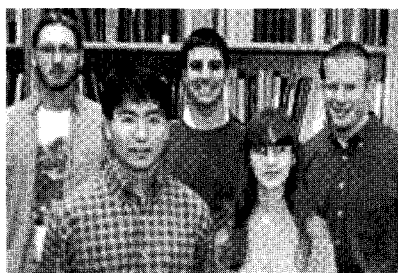
Alumni Scholars--Sandor Swarz, Springfield, Ill., Daniel Treat, Arnold, Mo.



Havener Scholar--Michael Pleimann, Arnold, Mo.



Havener Scholar--Dominic Biava, Springfield, Mo.



Havener Scholars--Matthew Battles, Spokane, Mo., David Lee, Richland, Mo., Matthew Thacker, Swansea, Ill., Jennifer Seher, Plano, Tx., Daniel Billingsley, Foristell, Mo.

Eck Scholars--Nicholas Barnhart, Sikeston, Mo., Benjamin Suderman, Tulsa, Ok. Photo was not available for the Eck Scholarship.

## In Memory of...

Min Ming Tang, a member of the UMR Mathematics and Statistics faculty from 1970 through retirement in 1990, died of heart failure July 3, 2000. Min Ming, an expert in partial differential equations and related applications, received a B.S. in mathematics from the University of Chicago in 1965. He contributed greatly to the department as a teacher, researcher and served on a multitude of Ph.D. committees from across the campus. Min Ming was burdened with health problems during his last years on campus, but he continued with a positive and constructive outlook. He was born August 24, 1944.



## OH CALCULUS, OH CALCULUS!

(To: "Oh, Christmas Tree")

[Editors' note: I have been assured that neither Ilene nor Leon will be using this publication as a first step in a career change.]

Oh Calculus, Oh Calculus,  
How different seem thy branches.  
Oh Calculus, Oh Calculus,  
How different seem thy branches.  
Derivatives tell us the rate,  
For areas we integrate.  
Oh Calculus, Oh Calculus,  
How different seem thy branches.

Derivative, Derivative,  
The limit your foundation.  
Derivative, Derivative,  
The limit your foundation.  
A quotient, both parts growing nil,  
Behold you reach a value still.  
Derivative, Derivative,  
The limit your foundation.

Oh Integral, Oh Integral,  
Partitions getting finer.  
Oh Integral, Oh Integral,  
Partitions getting finer.  
Add more and more of less and less,  
The errors disappear, we guess.  
Oh Integral, Oh Integral,  
Partitions getting finer.

Oh Calculus, Oh Calculus,  
United are thy branches.  
Oh Calculus, Oh Calculus,  
United are thy branches,  
Because of that eternal gem,  
The Fundamental Theorem.  
Oh Calculus, Oh Calculus,  
United are thy branches.



*Leon Hall and Ilene Morgan,  
December, 2000.*

## Alumni News

Pat Duvall ('62) reports that a second career (last year retiring from Boeing, taking a position as Director of Certifications with Flight Structures, Inc.) can be enjoyable, as can grandparenting.

David Cook ('67) tells us he retired from Hallmark Cards (12-31-98 after 30 years of service). Now I am wondering about the continuing influence of UMR at Hallmark. We haven't heard from Jim McHugh ('64) or Bob Sherick ('66), (others?).

Keith Rice ('69) with Unigraphics Solutions, Inc., reports that Unigraphics Solutions has been certified worldwide, the first for a CAD/CAM/CAE/PDM company.

Alan Hillebrandt ('72) is a Principal Consultant for Price Waterhouse Coopers in Los Angeles. Pamela, his wife of 33 years, is an area Resume Writer. Two children and one or more grandchildren.

Marcel Maupin ('78) an Associate Professor with Oklahoma State University in Oklahoma City, just completed a Test Bank for "Elementary Statistics" - a brief version by Allen G. Bluman.

Paul Eloe ('80) Professor of Mathematics at the University of Dayton, continues in that role but is now in his first year as Chair of the Department.

Mike Huff ('82) after 15 years with Conoco has moved to Informix Software in Lenexa, Kansas. Mike serves as their IS Desktop Services Manager. Informix Software has about 5000 employees. This past year Mike passed certification tests to receive the ISEB/EXIN Management Certificate in IT Service Management. On the home front, 12 years of marriage, four children (ages 3, 5, 8, 10), and entering the era of coaching youth sports, and participating in a multitude of activities with the kids.

Linda Penas ('85) full-time teaching at University of California Riverside, part-time teaching at Riverside Community College, involved in the design and building a new multi-media computer facility, and serving as a Vice President of the Southern California Chapter of the American Statistics Association. As "luck would have it" Linda found a big white abandoned and starving dog at her parking lot. After feeding him for several months he adopted her. Now he has a home, a 'sibling' (the now 4 year old famous, Dusty Dog), and a name, Shadow. On the question of luck, who had it, Linda, Shadow, or both.

Her new century resolution--"spend less time working and more time with family and friends!" This year's Christmas Card should carry the status of the resolution.

Kim Tracy ('85) responded to the '99 Newsletter with the information that he is writing his textbook using Java and will probably call it "Object-Oriented Artificial Intelligence--Using Java." Kim also sent an attachment, a fine looking young fellow (Michael Patrick Tracy), the Tracy's second child, born 3/14/99.

Mike Hilgers ('87) moved from the Mathematics and Statistics Department to the Computer Science Department at UMR last year. Mike has always been a multiple threat, earning a BS in Computer Science, MS in Applied Mathematics, and an MS in Engineering Mechanics while a student at UMR. Honda has now funded him to develop models of "fun factors" in motorcycle riding (really Mike, are you up to this?). On a more important note, he and Lois are the proud parents of Abigail Irene-Marie Hilgers, now about 10 months old.

Devon Christensen ('92) reports continuing work with Rose International and at the same time of the note was being contracted out to the Missouri National Guard to build interactive web pages. Cameron Grant Christensen joined the family on April 22, 2000, weighing in at 6 lbs, 14 oz. and was 19 1/4 inches tall. (Actually the announcement said 19 1/4 inches long, but by now long may be replaced by tall.)

David Taylor ('93) reported that he had found the hot/humid summers of Texas a bit too much and fled to be a Software Engineer with Motorola in Chicago. Anticipating marriage at age 70, but is a home owner in Algonquin, Illinois. Ladies, maybe he is just offering a challenge!

Doug Haas ('94) has moved to BEA Systems. He and Melissa have two children, Ryan (10) and Lucas (4).

Mark Allen ('96) is employed by Hewlett Packard in Texas.

David Ryden ('98) has taken a two year post doctoral appointment at Tulane University.

Eric Yount ('98) is continuing his studies in Ph.D. program (Statistical Genetics) at North Carolina State University.

Karen Bliss ('98) has earned an MS in Applied Math at North Carolina University. After completing Officer Candidate School, she expects to continue on to the Nuclear Power School. Her

expected assignments with the U.S. Navy will be the care and control of a nuclear reactor on an aircraft carrier.

Ananda Jayawardhana ('98) and his wife sent Christmas greetings from Pittsburgh, Kansas.

Johathan Hatch ('00) has accepted a tenure track position at Southeastern Louisiana.

Brian Raines ('00) is continuing his studies at Oxford University in England.

Ben Marlin ('00) together with Steph and Curt, sent a Christmas note from Oklahoma City.

Serguei Potchernikov celebrating a son Anthony Arthur with a poem. Congratulations!

## This Year's Retirees

Louis Grimm: After earning his Ph.D. at the University of Minnesota, and spending some time at the University of Utah, Lou joined the department in 1969 to provide leadership in the areas of ordinary and functional differential equations. He was and is a campus resource in these areas as well as in the area of translating mathematics (especially, Russian materials). Lou was active in the leadership of the department, serving as Chair from 1981 to 1987. His service on administrative committees spanned the campus and the University System. Many students from across the campus at UMR witness that his service on their advisory committee contributed to their success. He was a professor that encouraged students, and this was especially evident in his work with the students who pursued the Ph.D. under his guidance. For over 30 years Louis Grimm brought recognition to UMR through his research in differential equations, and the research of his students. While technically retired, he will still be involved, at least for some time, in the teaching/research program of the department.

Elizabeth Farrell (Secretary in the department from September, 1999 to August, 2000): Liz elected to participate in the early retirement program offered this past year. In some sense Liz left in a blaze of glory; she entered and won FIRST PLACE IN THE POETRY DIVISION in the Rolla Writing Contest. The contest attracted approximately 170 writers ages 17 to 82. Categories of writing were Poetry, Fiction, and Nonfiction. Congratulations to Liz and best wishes in 'retirement' (the opportunity to choose, and the time to pursue).

## Alumni Set Phonathon Record in 2000

Mathematics and Statistics graduates set a new record for pledges and gifts during the 1999-2000 fiscal year. More than 125 alumni pledged \$8,145 to the department and sent in \$9,645 in actual gifts. This surpasses the previous record of \$7,815 in actual gifts, established in 1995-96. Thank you for your generosity!

The average gift of \$76 for the 1999-2000 fiscal year was also the highest ever in the Mathematics & Statistics phonathon history. The previous record average gift was \$67, set in 1998-99.

Your increased support provides funds for scholarships, support of student activities including the Missouri Mathematics Competition, and international travel for faculty.

"Your support has made a significant difference in our department," says Dr. Leon Hall, chair of Mathematics and Statistics. "Scholarships are extremely important, and so are the student activities that your gifts help us underwrite. In January, for example, Chad White will be able to present the results of his summer research at the Joint Mathematics Meetings, thanks to your support."

This year, we will begin calling our alumni starting February 21. When the phone rings, please take a moment to share some of your Rolla experiences with a current student, and say, "Yes," when asked for a pledge. Taxpayer support accounts for only 40 percent of the university's revenue, making your contribution a vital ingredient in the revenue pie. Private funding also helps distinguish UMR from other universities, increasing the value of your education. Any amount you give will be appreciated, and most importantly, your participation will help make UMR a leader in alumni giving among public universities.

## Contributions Matching gift companies

AlliedSignal Foundation Inc.  
Hewlett-Packard Company  
Lockheed Martin Corporation  
NCR Foundation  
SBC Fopundation  
Texaco  
USAA (United Services Auto Assoc.)

## Gifts

Ackerson, Deborah J. '79  
Akers, Thomas D. '73  
Allen, Mark Andrew '96

Anderson, David Earl '90  
Anderson, Dennis R. '74  
Andrzejewski, Jennifer Ann '88  
Babson, Gail Anne '84  
Baird, Thomas B. '63  
Berendzen, Thomas A. '68  
Bliss, Karen Marie '98  
Boberschmidt, Lawrence A. '65  
Box, Richard A. '75  
Breig, William F. '62  
Brock, Van W. '63  
Brown, Harmon C. '72  
Bruening, James T. '71  
Buhrmester, Earl K. '72  
Callahan, Susan L. '78  
Carlson, John W. '70  
Carter, Karen S. '73  
Caton, Kurt D. '72  
Christensen, Devon Lee '92  
Christensen, Grant Allen '92  
Coates, Willard D. '74  
Cook, David L. '67  
Crawford, Joseph Shawn '96  
Cross, Gavin Morrison '90  
Davis, Kevin Thomas '86  
Deligeorges, Dorian Socrates '97  
Dik, Mehmet '97  
Dorrell, Edward W. '68  
Dugger, Alva G. '68  
Duvall, Henry Pat '62  
Edmonde, Nancy L. '77  
Edson, Barbara '64  
Edwards, Shawn David '92  
Eloe, Paul W. '77  
Estes, Larry E. '69  
Fitzgerald, Colleen A. '74  
Fletcher, Glenn Russell '95  
Galli, Donald H. '74  
Gerlt, Lori J. '89  
Graham, Bonnie A. '76  
Grice, John V. '78  
Guffey, James Michael '85  
Haas, Douglas James '94  
Haas, Gerald N. '62  
Haddock, A. Glen  
Hager, Harold W. '70  
Haile, Brian Douglas '91  
Hall, Leon M. '69  
Hamilton, James R. '73  
Hamm, Jack R. '68  
Hand, Linda Marie '82  
Haney, Larry G. '68  
Hankins, J C '76  
Hartman, Heather Jo '98  
Havener, Gary W. '62  
Hawkins, Larry O. '73  
Hegemann, Victor J. '74  
Heim, Patricia T. '80  
Helm, James C. '64  
Hillebrandt, William A. '72  
Ibarra, Cheryl A. '71  
Jamison, James E. '65  
Johnson, Kenneth G. '69  
Jones, Rana Elaine '87  
Keeton, Robert T. '74  
Kieffer, John C. '67  
King, Sherry Lee '95  
Kingston, Joseph V. '67  
Kirgan, Mary Ellen '93  
Kubicek, John D. '75  
Lacey, Robert J. '86  
Lane, William L. '73  
Lee, Chin-Ming '70  
Lindesmith, Stanley Benson '90  
Maupin, Marcel A. '78  
Mausshardt, Denise Ann '83  
McKee, Rhonda Louise '84  
Moppins, Brandi Michelle '97  
Neill, James W. '73  
Oakes, Janet R. '75  
Oberbeck, Keith M. '74  
Obermann, David F. '78  
Oster, Teri Lynn '84  
Palaski, Robert J. '65  
Parsons, Kenneth C. '74  
Polly, Kimberly Ann '95  
Porter, David Bryan '88  
Reed, John K. '80  
Reiman, Paul Whitney '83  
Reiter, Nancy Lillian '82  
Rice, Donald Keith '69  
Richards, James L. '72  
Riggs, Donna B. '94  
Riggs, John R. '67  
Roe, Robert P.  
Rooks, Joseph L. '73  
Saliga, Linda Marie '89  
Schirer, Ivan J. '70  
Searcy, Elizabeth Ann  
Sherrick, Sherman W. '68  
Sicking, Paul O. '76  
St. Clair, Daniel C. '75  
Stahl, Joseph W. '69  
Stair, George W. '62  
Stokes, Brenda Kay '87  
Swint, Martin O. '65  
Tanzey, William H. '74  
Tarr, Harold W. '70  
Trnka, Mary L. '75  
Van Alstine, William L. '66  
Wagener, Marian R. '71  
Wagner, James Carl '94  
Wagner, Michael D. '67  
Walker, Lois J. '76  
Warfield, Melissa Susan '88  
Wells, Curtis L. '70  
White, Terri J. '78  
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# “First Applied Mathematics Theorem”

(no doubt used without proof for may thousands of years)

*If set A consists of n objects and set B consists of m objects and no objects are in both A and B then the join of A and B ( $A \cup B$ ) is a set consisting of  $n + m$  objects.*

The theorem provides a way to determine the number of objects in a combining of two sets without counting the objects in this new set. It strikes me as a very useful tool. Addition provides an efficient way of finding the answer to real world questions!

Interestingly, it is the converse of this theorem which comes to mind as one of the early experiences in mathematics. Perhaps there is a subtle message lessening the usefulness of addition.

*If n and m are counting numbers and A is a set with n objects, B is a set with m objects and there are no common objects, then the sum  $n + m$  can be found by counting the objects in the set  $A \cup B$ .*

The converse provides a way to find  $n + m$  by constructing a set with n objects, and a set with m objects, then counting the objects in the combines set. The question which comes to mind is, why I should want to compute  $n + m$ ?

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