

# PRIME BITS

Department of Mathematics Newsletter  
University of Colorado, Boulder, CO 80309-0395

Fall 2014

Volume 16

## CU's Math Dept. hosts lectures

The Mathematics Department hosted a variety of lectures during the University of Colorado-Boulder's Fall 2013 and Spring 2014 semesters, several of which were made possible through endowment funds established to further the department's mission. Most of the presentations, held in Math 100, the large lecture hall in the Math Building, were free and open to the public.

Professor Benedict H. Gross, the George Vasmer Leverett Professor of Mathematics at Harvard University, presented the **50th annual DeLong Lecture Series** during the week of Jan. 15, 2014. For the first lecture in the DeLong Lecture Series, Professor Gross spoke on "The Rank of Elliptic Curves." The topic of his second lecture in the series was: "The Arithmetic of Hyperelliptic Curves."



Professor Benedict H. Gross

Professor Gross is a member of the American Academy of Arts and Sciences and the National Academy of Sciences. His research interests are primarily in number theory and representation theory. He is a recipient of the Cole Prize by the American Mathematical Society.

**The William Reinhardt Memorial Lecture in the Philosophy of Mathematics** was presented by Dr. W. D. Hart on the subject "Orayen's Paradox" on Dec. 6, 2013. A central application of sets is the standard theory of truth, Tarski's. But that view of truth fits set theory itself only awkwardly; that awkwardness is Orayen's Paradox.

Dr. Hart is Professor Emeritus of Philosophy at the University of Illinois at Chicago, where he was chair of the philosophy department from 1994 until 2006.

The William Reinhardt Memorial Lecture in the Philosophy of Mathematics was founded to commemorate the life of William Reinhardt, professor of mathematics at the University of Colorado from 1967 until his death in 1998.

**The Fifth Annual Fall Convocation Lecture** was presented by Dr. James Grime on the subject "The Enigma Project" Dec. 10, 2014 in Math 100.

Dr. Grime is a mathematician and public speaker working for the Millennium Mathematics Project at

*Continued on p. 6*

## Math Chair's Communiqué



Professor David Grant

Dear Alumni and Friends of the Department,

This past year has been an exciting and wonderful one for the Department of Mathematics, due not only to the successes of our dedicated students and faculty, but also to the largess of our generous donors. There's much good news to report:

### **I) On the Educational Front:**

This summer we started a new undergraduate research program, where promising undergraduates get funded by the Department to work with our faculty on current research problems. This was so successful, that in the future, we are also hoping to have the funds to include first year graduate students on these projects, training our graduate students to both be researchers and mentors.

*Continued on p. 13*

## Meet Our New Faculty

### New Tenure Track Assistant Professor



**Sean O'Rourke** received his Ph.D. in Mathematics from the University of California, Davis under the direction of Professor Alexander Soshnikov. He joined the CU Boulder Mathematics Department in August 2014 after completing postdoctoral positions at Rutgers University and Yale University.

Dr. O'Rourke's research interests include Probability Theory and Mathematical Physics, especially problems related to Random Matrix Theory. In particular, he is interested in the spectrum of non-Hermitian random matrix models with dependent entries in both the asymptotic and non-asymptotic regimes. He enjoys hiking and biking, both of which are more prevalent in Boulder than in New Haven.

### Burnett Meyer Instructorships for 2014-15



**Dr. T. Alden Gassert** joined the Math Department faculty in fall 2014 as a Burnett Meyer Postdoctoral Instructor.

He submitted the following brief bio at the request of Prime Bits. "I received my PhD at the University of Massachusetts Amherst this past spring under the direction of Farshid Hajir. Prior to that I obtained my bachelor's degree at

Bowdoin College in Brunswick, Maine. My research interests are in Number Theory, and more specifically, Arithmetic Dynamics. In my thesis, I studied properties of dynamically generated number fields. I also have interests in the study of unit groups and special units of number fields. I am also a Project NExT '14-'15 Fellow. I am ecstatic to be joining the Boulder community! I look forward to working closely with the number theory group, as well as everyone else in the department, over the next few years. This will be my first experience living away from the east coast, and when I am not working, I plan to be out exploring the Rockies."

**Dr. Elizabeth Gillaspay** became a Burnett C. Meyer Instructor in fall 2014. The following bio was submitted by Dr. Gillaspay at the request of Prime Bits. "My mother tells me that she's known I would be a mathematician since I was 2; it took me another 18 years to admit that she was right.

When I enrolled in Macalester College as an undergraduate, I planned to major in political science. It didn't take long, though, before I found myself using my math homework to procrastinate writing my political science papers, sometimes until 2 AM! Eventually I saw the writing on the wall and changed my major from political science to mathematics.



"After graduating from Macalester, I enrolled in the mathematics PhD program at Dartmouth College, from which I graduated in June 2014. My thesis research focused on  $C^*$ -algebras, which were invented in the 1940s as a mathematical framework for quantum mechanics. However, it was quickly discovered that  $C^*$ -algebras are also a great way to study topological groups and related objects, and this is where my interests lie. There are many different  $C^*$ -algebras associated to any given topological group; in my research, I try to understand exactly how similar these different  $C^*$ -algebras are, and how much of the difference between the  $C^*$ -algebras can be detected at the level of the groups.

"Even after deciding to pursue a career in mathematics, though, I've always had other interests as well. I minored in music at Macalester, and spent a year between college and graduate school living in Granada, Spain, teaching English and studying math. Since then I've returned to Spain a number of times, and I'm always eager to practice my Spanish. In addition to traveling, I love dancing and spending time outdoors -- Boulder seems like a wonderful place for all of these, as well as for mathematics.

"I fell in love with mathematics in my first proof-based math course, where I saw for the first time that math could be about beauty, and precision, and certainty, rather than calculations and formulas. I am consequently very excited to be teaching Real Analysis at CU-Boulder this fall. What a great opportunity to share my love of the beauty and precision of mathematics with a new generation of students!"

## PRIME BITS

*Published by the*  
CU--Boulder Department of Mathematics

Editor: William B. Jones  
[William.Jones@colorado.edu](mailto:William.Jones@colorado.edu)

Production Editor: Kathleen H. Jones

*Continued on p. 6*

## Faculty Spotlights

**Stephen Preston** received a Simons Foundation Collaboration Grant this year. The Simons Foundation's Division for Mathematics and the Physical Sciences provides grants to mathematicians to stimulate collaboration in the field primarily through the funding of travel and related expenditures.

**Sebastian Casalaina-Martin** received a "Simons Foundation Collaboration Grant for Mathematicians" in 2014.

**Karl Gustafson** recently published six papers (some with coauthors) across several domains (Partial differential equations, Unbounded operator theory, Financial risk, Complexity, Mathematical physics, Ergodic theory). These appeared in the journals, respectively: SIAM J. Sci. Computing, 2014; Bull. des sciences mathématiques, 2014; J. Stat. Comp. and Simul., 2014; Mind and Matter, 2013; Chaos, Solitons and Fractals, 2013; Physica A, 2014. Gustafson also completed a long-overdue contribution to early Boulder climbing history: The Summit Club: Boulder's Teenage Climbers 1949-1953, published in Trail and Timberline (Fall, 2013), Colorado Mountain Club.

**Keith Kearnes** won an ASSETT award for Excellence as an Outstanding Teacher for Technology in Teaching.

**Judith Packer** and fellow members of the Diversity Committee won a 2013-2014 Diversity & Excellence Grant.

**Eric Stade's** MATH 1310: Calculus, Systems, and Modeling, is highlighted on the ASSETT website: <https://sparc.colorado.edu/eric-stade/>

**Rob Tubbs** won a Faculty Recognition Award given by the Boulder Faculty Assembly.

**Jonathan Wise** and **Sebastian Casalaina-Martin** organized the Spring 2014 Western Algebraic Geometry Symposium at the University of Colorado.

### Math education receives MTE Partnership Grant

David Webb and Kimberly Bunning in Education along with Department of Mathematics Professors Eric Stade and Rob Tubbs, have been awarded a grant through the Mathematics Teacher Education Partnership from the Helmsley Trust to work on professional development and materials related to CU's active-learning calculus courses.

---

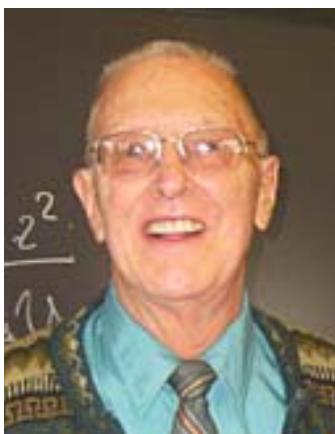
## In Memoriam

---

**John H. (Jack) Hodges**  
Sept. 30, 1928 – Sept. 2, 2014

Emeritus Professor John H. (Jack) Hodges, a member of the Mathematics Department faculty from 1960 until his retirement in 1995, died at home in Boulder, CO, on Sept. 2, 2014 of congestive heart failure. He was 85. Jack was a kind man who lived fully each day and died as he had lived, on his own terms.

Jack had a passion for teaching and learning. His success as a teacher was marked in 1968 with the student-initiated Teaching Recognition Award, and a Teaching Excellence Award from the Boulder Faculty Assembly in 1990. In 1993, he received the Burton W. Jones Distinguished Teaching Award, a regional teaching award given annually by the Rocky Mountain Section of the Mathematical Association of America. After focusing most of his career on undergraduate affairs, he decided in 2011 to establish the John H. "Jack" Hodges Scholarship for Undergraduate Mathematics, which currently



awards \$1000 annually to a deserving student. Jack loved to share his love for mathematics, and he even created a course to help people get over their fear of the subject. "The Spirit and Uses of Mathematics" particularly helps elementary school teachers appreciate the beauty and logic of math.

Jack was also interested in the math-religion-theology connection, which was reflected in his reading and discussions at the Wesley Foundation Chapel on campus and various study groups at the First United Methodist Church. He served as chair of the Wesley Board for many years, interacting with students and modeling for them the possibility of an integrated life of the mind and faith. For over 50 years he was active in his church as teacher, choir member and social justice activist. He lived a life of integrity, which meant that he gave generously of his time and resources to

*Continued on p. 7*

## Student News

### Awards, Scholarships, Honors and Competitions

#### Sergey Lozinsky: Summa cum laude in Mathematics

Faculty Advisor: Professor Richard Green  
 Thesis Title: “Properties of the G-Invariant Bilinear Form on the Spin Representations of the Simple Lie Algebras of Type  $D_n$  and  $B_n$ ”

#### William Lowell Putnam Competition

First place: Christopher Aicher  
 Second Place: Harold Hausman  
 Third place: Michael Moy

#### William E. Briggs Teaching Excellence Award 2013

Natalie Coston and Jeffrey Shriner

#### Burton W. Jones Teaching Excellence Award 2014

Scott Andrews, Clifford Bridges and Trubee Davison

#### John H. “Jack” Hodges Scholarship

Harold Hausman

#### Wolfgang J. Thron Fellowships

Krisztian Havasi  
 Erica Shannon

#### Adele V. Leonhardy Scholarships

Harold Hausman and Philippe Guegan

#### Frances C. Stribic Scholarships

Julie Linman  
 Matthew Grimes  
 Matthew Krupa  
 Clifford Blakestad

#### Sieglinde Haller Scholarships

Ryan Rosenbaum  
 Joseph Migler

#### University Summer Fellowships

Jared Nishikawa  
 Boramey Chhay  
 Pearce Washabaugh  
 Kevin Selker  
 Charles Scherer  
 Clifford Bridges  
 Alexander Nita  
 Keli Parker  
 John Willis  
 Joseph Migler

## Recruitment Weekend Spring 2014

Graduate student recruitment weekend was a big success with 15 candidates attending the Math Department’s events.



Potential graduate students experiencing the Red Rocks near Settlers Park in Boulder during the spring 2014 Recruitment Weekend.



Checking out a Boulder pub was included in the spring 2014 Recruitment Weekend for potential graduate students.

## Graduate Degrees

(These are listed by student's name, degree and faculty thesis advisor/mentor. Thesis titles are given for Ph.D. degrees.)

### December 2013

David Henry Wayne (Ph.D. Math) Markus Pflaum; The K-theory of filtered deformations of graded polynomial algebras.

Matthew G. Krupa (M.S. Math)

Benjamin Allen Purkis (Ph.D. Math), Judy Packer; Projective multiresolution analyses over irrational rotation algebras.

Dmitro Golovanich (B.A. & M.A.), David Grant

Pearce Washabaugh (M.S. Math), Stephen Preston

### May 2014

Scott Douglas Andrews (Ph.D. Math), Nathaniel Thiem; Type-free approaches to supercharacter theories of unipotent groups.

Amy Feaver (Ph.D. Math), Katherine Stange; Euclid's algorithm in multiquadratic fields.

Justin Charles Keller (Ph.D. Math), Nathaniel Thiem; Generalized supercharacter theories and Schur rings for Hopf algebras.

### August 2014

John Hower (Ph.D. Math), Markus Pflaum.; A Global Symbol for the b-Calculus on Manifolds with Boundary.

Boramey M. Chhay (M.A. Math), Stephen Preston

Elliot Kruskal (M.A. Math), Agnes Szendrei

### Correction

In the Fall 2013 issue of Prime Bits, p. 8, Tyler Janes (M.S.); Karl Gustafson. Topic: "Dark Pools" was listed incorrectly as an M.A. Math degree.



David Wayne



Scott Andrews



Amy Feaver



Justin Keller



Benjamin Purkis



John Hower

## Math Dept. promotes inclusion with diversity workshop & activities

This past academic year the Department Diversity Committee stepped up its activities. The committee, which consisted of faculty members and graduate students, held special events in both the Fall and Spring Semesters. The aim of the committee is to promote diversity in the department at all levels, in part by promoting an atmosphere of inclusion, friendliness and cooperation within the department. In October 2014, the committee hosted members of the graduate student body who wanted to take part in the University's Challenge Course, located on Baseline in Boulder near Williams Village. Led by guides, participants took part in balancing activities and rope-climbing and other such events that used teamwork skills as well as athleticism. In February 2014, the committee

organized a special "ice-skating night" for faculty and students. The Departmental Diversity Workshop, entitled "Diversifying Math: Increasing the number of successful students from traditionally underrepresented groups in CU Boulder's Mathematics Ph.D. programs" was held March 16-18, 2014, and was partially sponsored by a grant given to the Diversity Committee by the University of Colorado System Office of Academic Affairs.

This grant, together with departmental funding, helped the Diversity Committee and departmental leaders put on the workshop. The committee brought in mathematicians who have extensive experience in diversity issues, including Professor Phillip Kutzko from the University of Iowa, who

*Continued on p. 6*

### ***Diversity, (continued from p. 5)***

helped with planning the workshop structure, Professor Ruth Haas from Smith College, Professor Aloysius Helminck from North Carolina State University, and Dr. Paulette Willis from Reasoning Minds Inc in Houston, Texas. These visitors brainstormed with members of the department, both students and faculty, on ways to increase numbers in our graduate program of students from traditionally underrepresented groups, and to discuss more general strategies for making the department graduate program nurturing and supportive for all graduate students. The visiting experts met with students and faculty in small groups, at a reception and in more informal gatherings. The visitors also gave a departmental colloquium in the form of a panel discussion. In addition to the Diversity Committee's formal activities outlined above, throughout the year, graduate student members of the committee held conversations with fellow graduate students to discuss various issues of concern to all students in a supportive setting. The members of the Diversity Committee during 2013-2014 were: Judith Packer, Anca Radulescu and Robert Tubbs (faculty members) and Allison Beemer, Clifford Bridges, Natalie Coston, Jae Min Lee, Megan Ly and Keli Parker (graduate student members).

Pictured at right: students experiencing the University's Challenge Course in October 2013.



### ***Lectures, (continued from p. 1)***

Cambridge University. Dr. Grime described the history of Alan Turing and the Enigma, sharing the triumph of mathematical ingenuity.

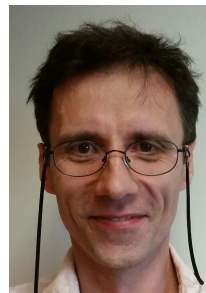
Finally, for a slice of fun, the department hosted a **Pi Day Lecture**. On this "most sacred of Math holidays," March 13, 2014, Luke Anderson presented a lecture on "The Lives of Pi" in the large lecture hall, Math 100. Over the centuries, the number has attracted the attention, not only of mathematicians, but also of politicians, physicians, theologians, and musicians, with mixed results. Of course pie was served after the lecture.

### **Actuarial science career fair held**

The Actuarial Studies and Quantitative Finance Program sponsored an open house and panel discussion on careers and internships in actuarial science on April 2, 2014 in the Burnett Meyer Lounge (Math 350). The Program is jointly sponsored by the Departments of Mathematics, Applied Mathematics, Economics, and the Leeds School of Business.

### ***New faculty, (continued from p. 2)***

#### **Ulam Chair Visiting Faculty**



**Professor Gerard Misiolek**, received a Ph.D. from the State University of New York at Stony Brook in 1992. His research interests include: Geometric Analysis, Analysis of PDE, infinite-dimensional Hamiltonian Systems, Fluids. A Polish national, Misiolek obtained his MA in Mathematics at the Warsaw University. His non-mathematical interests include soccer, classical music and blues.

**Professor Mati Rubin**, Ben Gurion University, Beer Sheva Israel.

## Math Corner: The Laws of Thought

Professor Keith Kearns describes research by J. Donald Monk, Professor of Mathematics, CU Boulder, for this issue's Math Corner:

The name of this article is taken from a famous book from 1854, by George Boole, concerning the algebraization of logic. Boole and his successors used symbols such as  $P, Q, R$  to denote propositions (declarative statements), which could be combined with  $\cdot$  (and),  $+$  (or), and  $-$  (not). If  $P$  represents “ $1+1=2$ ” and  $Q$  represents “ $0=1$ ”, then  $P \cdot (-Q)$  represents “ $(1 + 1 = 2)$  and  $(0 \text{ is not equal to } 1)$ ”. Distinct propositions like  $P \cdot (-Q)$  and  $(-Q) \cdot P$ , which have the same meaning, are treated as equal. Thus the elements of a Boolean algebra are considered to be *meanings* of propositions, and Boole's goal was to find the laws of manipulating propositions without changing their meanings. A finite list of laws explaining how  $\cdot, +$  and  $-$  interact with one another was discovered in the 19th century, and proved to be complete in the 20th century.

But Boolean algebra is inadequate to analyze statements that depend on quantification. We use  $\forall$  (for all) and  $\exists$  (there exists) to write statements like  $\forall x \exists y(x + y = 2)$  (for all  $x$  there exists  $y$  such that  $x + y = 2$ ). Boole's algebra had to be enriched to understand the effects of  $\forall$  and  $\exists$ . Alfred Tarski and his students proposed an enrichment of Boolean algebra, called *cylindric algebra*, which works. This invention prompted a research problem: Is there a finite and complete list of the ‘Laws of Thought’ that includes quantification? (This is a vague way of writing the question: Is there a finite and complete list of laws defining the class of the cylindric algebras of meanings of formulas?)

CU professor Don Monk proved that the answer is No, there is no finite list of laws defining the class of cylindric algebras of meanings of formulas. He used a surprising idea. The first version of the proof, which applied only to algebras of formulas in 3 variables, succeeds exactly because there are infinitely many positive integers  $n$  that do not arise as the order of a projective plane! (The fact that such integers exist is due to Bruck and Ryser.) Thus, astonishingly, it is possible to start with the fact that there are infinitely many positive integers that do not arise as the order of a projective plane and derive from this that there is no finite list of axiom schema capturing everything provable in 3-variable logic. A few years later Monk was able to prove the same result for logic with any number variables. This theorem altered the course of development of algebraic logic as researchers worked to improve, refine or to avoid the consequences of Monk's results.

### **Jack Hodges In Memoriam**, (continued from p. 3)

many human service agencies and political causes, locally and beyond. He walked his talk for LGBT equality by his active involvement with his wife Jean in PFLAG, a national family organization that offers support, education, and advocacy for gay, lesbian, bisexual, and transgender persons and their families. He represented First United Methodist Church on the Interfaith AIDS Coalition since its inception years ago. When they weren't involved in social activism,

Jean and he traveled extensively to see the world to experience different cultures.

Donations to honor Jack can be sent to:  
The John H. (Jack) Hodges Mathematics Scholarship,  
University of Colorado Foundation, Arts and Sciences  
Development, (Attn: Margot Neufeld), 1305 University  
Ave., Boulder, CO 80302.

## Retired Faculty News



Retired mathematics faculty and spouses gathered for the annual picnic at the home of Bill and Martha Jones on Aug. 8, 2014. Sitting: Marina (care giver for Richard Roth), Laura Fischer, Richard Roth, Martha and Bill Jones and John “Jack” Hodges. Standing: Muriel Briggs, Doris and Kent Goodrich, Ruth Rebekka Struik, Susan and Jerry Malitz, Sara and Bob MacRae, Judith Ramsay, Pat and Wolfgang Schmidt, Arlan Ramsay, Dick and Frieda Holley, Denise and John (hidden) Hodges, Albert and Virginia Lundell, Jean Hodges.



**Homer Ellis** retired from the Mathematics Department in 2014. Ellis joined the University of Colorado faculty in 1965 after previously holding assistant professor positions at the Universities of Utah and Washington. His research interests have included differential equations, differential geometry, mathematical physics, relativity and unified field theory.

**William B. (Bill) Jones** and wife Martha visited ancient Mayan ruins in Belize and Guatemala in 2013 where they sensed tension caused by the presence of drug traffic.

Later in the year they did a pilgrimage to Belgium and southern France where Bill had spent most of the first three years of his life. In July 2014 they attended a reunion of Bill’s relatives at the University of Mississippi (Ole Miss) where Bill’s maternal grandfather, Alfred Hume, had served as chancellor and professor of mathematics.

With the current issue of *Prime Bits*, Bill will have completed 25 years (mostly as a volunteer after retirement) as editor and publisher of the department newsletter.



Martha and Bill Jones

**Wolfgang Schmidt** traveled with wife Pat in late November and early December 2013 for three weeks in South India, first at the Math Research Institute in Chennai, and then a week with a friend, Schlickewei, visiting various old Hindu temples.

In June he spent three weeks in Vienna to see his sister. His daughter in law with two grandchildren joined him there during the last week, and he was their guide in his old home town.



## Alumnae/Alumni News

**Lee W. Badger** (M.A. 1970; Ph.D. 1975; Thesis advisor Jerold Malitz). Dr. Badger wrote: “With no more preparation than the undergraduate course in logic, I took the logic seminar led by Stan Ulam and Walter Taylor in fall of 1969. Three main memories: My presentation of Jerome Kiesler’s soon-to-be-published axiomatization of  $L(Q)$  was a disaster when, as a novice, I decided to have a more casual exchange with the audience by presenting the proofs from memory – and my memory froze. Then there was the time of the seminar. At the organizational meeting, person after person covered cell after cell of the weekly time slots. What remained was Friday after 4 p.m. and that’s when we met. But that extreme time was no match for Stan’s (Stanislaw Ulam) fatherly presence. He gave mathematical insights, recounted history – much of which he witnessed – and kept us all in stitches with personal anecdotes. I failed to appreciate until years later that I was in the presence of a giant of twentieth century mathematics.



“After CU my immediate post-doc was to tend a herd of 100 beef cattle for a year. Then for five years I was a bouncing adjunct – from Southern Illinois to Middlebury and then Fort Lewis. Finally I landed

at Weber State here in Utah and after 26 years took early retirement to continue home improvement with my wife, Roz, read philosophy, write, and hobby on the Missouri farm where I grew up. My love of mathematics has been rivaled by that of the out-of-doors. After a good deal of hiking and climbing in the seventies, eighties and nineties, my wife and I took up river rafting. Now our sport of choice is cycling. I’ve built new friendships over the years but none closer than those from Boulder.”

**James Marshall** (B.A. Math, 1968, MBA 1969) worked on his MBA at CU-Boulder under Dr. Claude McMillan and at his company, Marketing Systems, and also at NCAR as a computer programmer. After teaching at Oregon State University and the University of Oregon James started his own business which he recently sold after 27 years. In retirement Marshall has devoted much of his life as a volunteer working extensively with three retired Ph.D. mathematicians from the University of Oregon, including Theodore Palmer (ex dean, UO Mathematics), Charlie Right, and Paul Patterson on the Atkinson Bridge at Mt. Pisgah Arboretum, Eugene, Oregon. Mt. Pisgah is a place where they hike.

The Atkinson Bridge is an 86 foot long trestle bridge over a viewing pond. This team of four constructed the

bridge, labeled all the pieces, had it pressure treated and reassembled it as the Oregon winter was closing in. In addition to the bridge work, James repairs their tired old equipment like mowers and other equipment where his construction background makes this a way he can contribute.



Charlie Right (bearded) and James Marshall working on a bridge join out in the brush.

Marshall writes: “I still have Colorado roots. My sister and brother-in-law, both CU graduates, live in Lakewood. A year ago my wife and I purchased a condominium in Boulder where we spend a few months there a year. We like the hiking at Chautauqua and the surrounding areas and enjoying the local events. Our last trip there was just after the floods where we noticed the damage to trails throughout the area. We hiked in Rocky Mountain National Park a few days before they closed it for the year taking the long way around through Nederland. I remember reading an article years ago in a business publication talking about what good employees mathematics graduates make. I think this is an under-exploited area that could improve the attraction of young people throughout the lower grades. Just having a mathematics degree opened many doors for me.”

*Continued on p. 16*

## ***New Scholarship Endowments to benefit mathematics students***

### ***Richard Laver Graduate Fellowship***



Richard Laver

The Richard Laver Graduate Fellowship was established in 2014 in memory of the late Emeritus Professor Richard Laver by his brothers John and Michael Laver and his wife Sherrie and a family friend. Their gift of \$65,683 will provide support for PhD students in the Mathematics Department of approximately \$2,600 per year. Rich Laver joined the faculty of the CU Mathematics Department in 1974 and became Professor Emeritus in 2008. He earned his Ph.D. degree at UC Berkeley in 1969 under the direction of Ralph McKenzie, making him the academic brother of Keith Kearnes and the academic grandson of Don Monk, both of the CU Mathematics Department. Rich Laver was a celebrated set theorist, chess player and a life-long athlete, hiking and walking even until the end of his life.

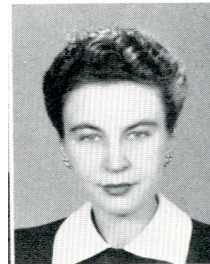
### ***Marlene Massaro Pratto and David Pratto Scholarship in Mathematics***

Marlene and David Pratto have established the Marlene Massaro Pratto and David Pratto Scholarship in Mathematics with a gift of \$50,482. The endowed fund will provide a \$2,000 scholarship each year for undergraduate mathematics students. Marlene Massaro Pratto received a B.A.

mathematics degree from CU Boulder in 1960. David Pratto is a CU Boulder Sociology alumnus.

### ***The Sieglinde Talbott Haller Mathematics Scholarship.***

Sieglinde “Linda” Talbott Haller, with a gift of \$904,000, established an endowment fund to provide scholarships for students in the Department of Mathematics at CU Boulder. The estimated annual earnings for the Haller Endowment Fund will be \$36,000.



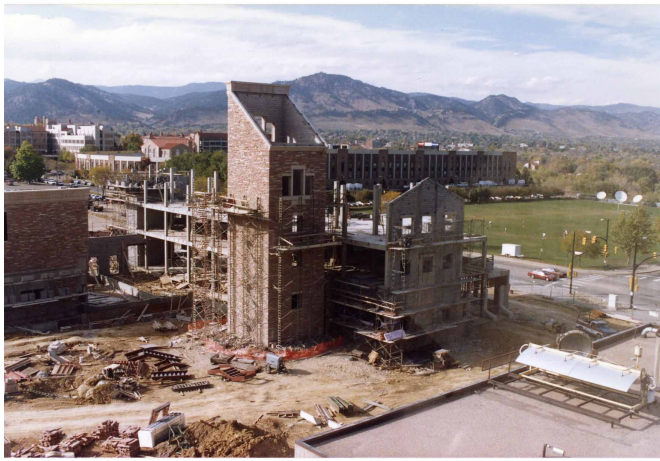
Sieglinde  
Talbott Haller

A 1941 graduate of the University of Colorado, Ms. Haller was herself a scholarship recipient. She was a competitor on the CU

Swimming and Diving Team and was also involved in yearbook publications.

After graduating from CU, she moved to Denver. In 1946, she moved to Chicago where she lived until 1972 and worked for the Chicago Tribune in their marketing department. When she retired early from the Tribune, she moved to the Canary Islands where she lived for several years. Eventually, she moved to Florida where she lived the remainder of her life.

## ***A look back***

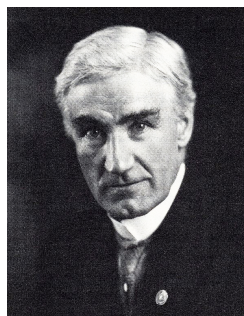


The Mathematics Department moved from Hellems and Ketchum on the old campus to the new Engineering Center in the mid-1960s in order to better serve the needs of the Engineering College, School of Business, College of Arts and Sciences, School of Education and Graduate School. By 1987 the shortage of office space in the Engineering Center had become so acute that planning was started for a new building to house the Math Department and engineering library. Dedication ceremonies for the Mathematics Building and Leonard H. Gemmill Engineering Library took place on Sept. 25, 1992. While some longtime faculty members still think of the Mathematics Building as a “new structure,” most of the 2014 entering freshmen were not born when the building was constructed.

## ***Mathematics Department Endowment Funds***

It would be difficult to overstate the benefits of Endowed Funds which provide vital support for teaching, research and scholarship. Their contributions continue in perpetuity according to the will of donors. If you are interested in creating an Endowed Fund or contributing to an existing one please contact the department chair, Professor David Grant at Department of Mathematics, University of Colorado, Boulder, CO 80309-0395, [David.Grant@Colorado.EDU](mailto:David.Grant@Colorado.EDU), or Margot Jenson Neufeld, University of Colorado Foundation, University of Colorado at Boulder, Boulder, Colorado 80302. Direct: (303) 541-1475, [margot.neufeld@Colorado.EDU](mailto:margot.neufeld@Colorado.EDU). Following is a brief description of existing Mathematics Department Endowed Funds.

### ***Ira DeLong Lectures***

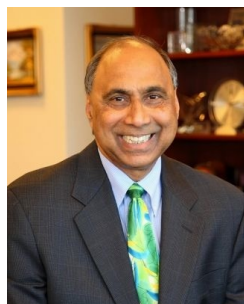


Ira M. DeLong

Professor Ira M. DeLong was essentially the Mathematics Department at CU Boulder from 1888 until his retirement in 1925. After DeLong's death in 1942 his bequest to the university of \$25,000 accumulated interest until 1963 when the faculty began using income from the endowment to fund an annual series of DeLong Lectures and undergraduate prizes for the Putnam competition. Chosen from the leading mathematicians of our

time, the lecturers typically spend a week on campus holding informal discussions with faculty and students in addition to giving three lectures open to the public.

### ***Frank F. Islam Scholarships***



Frank F. Islam

With a gift of \$52,000 to the CU Foundation, University of Colorado alumnus **Frank F. Islam** endowed two annual scholarships for CU Boulder mathematics students: The Frank F. Islam Mathematics Scholarship in Honor of **William B. Jones** (Emeritus Professor, Mathematics) and the Frank F. Islam Mathematics Scholarship in Memory of **Wolfgang J. Thron** (Emeritus Professor, Mathematics).

In making this gift Islam said:

“These two individuals were the instruments of my successful life journey and the core belief that we must continue the giving in any way we can. I hope these scholarships will allow students in the Mathematics Department to pursue their dreams, choose a career and make their marks on the world. When I give money for a scholarship program, I strongly believe I am investing in the future. I had a great experience at CU, and I hope these scholarships will help the next generations of students to have the same great experience. I want to inspire others to have passion for philanthropy.”

Born in India, Islam immigrated to the United States at 15. He earned bachelor's and master's degrees in computer science from the University of Colorado.

[www.renewingtheamericandream.net](http://www.renewingtheamericandream.net) or [www.ffislam.com](http://www.ffislam.com).

### ***Sieglinde Talbott Haller Math Scholarship***

Please see New Scholarship Endowments, p. 10.

### ***John H. “Jack” Hodges Scholarship***



John and Jean Hodges

In 2010 with a gift of \$25,000, Emeritus Professor John H. Hodges endowed a scholarship for undergraduate mathematics students, providing for an annual award of \$1000 to a CU undergraduate with financial need who is a good student. He had considered bequeathing the

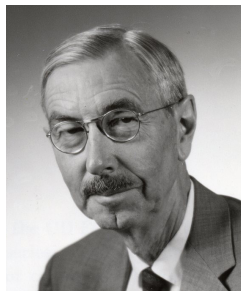
scholarship funds but decided: “Who knows how long anybody is going to last? I'd like to do it while I'm still around.”

Hodges was a member of the CU Boulder Mathematics faculty for 33 years (1960-1993) and continued teaching part-time for two more years. He served as department chair, directed dissertations for a large number of students and was the recipient of many teaching and service awards, including: The CU-student-initiated Teaching Recognition Award (1968), the Boulder Faculty Assembly Teaching Excellence Award (1990), the Outstanding Service to the University Award (1993) and the annual 1992 Burton W. Jones Teaching Excellence Award given by the Mathematical Association of America (Rocky Mountain Section). In reflection Hodges said: “I had the GI bill. It was a blessing for our whole country. The GI bill changed the character of education of the United States. I feel some desire to help carry that on for other people.”

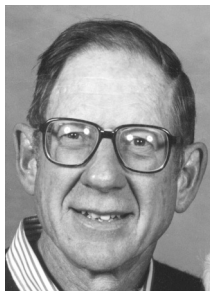
### ***B. W. Jones and W. E. Briggs Teaching Excellence Awards***

When Professor William E. Briggs retired in 1988, gifts were made by faculty of mathematics and other Arts and Sciences

*Continued on p. 12*

***Endowment Funds,*** (continued from p. 11)

Burton W. Jones



William E. Briggs

departments for a memorial in recognition of his distinguished service as a faculty member (1955-1988) and Dean of the College of Arts and Sciences (1963-1980). Since Briggs and Jones had been close friends who greatly valued good teaching, it was decided in 2007 to fund a separate William E. Briggs Teaching Excellence Award with both awards funded by a combined endowment. Each year the Burton W. Jones award is given to a veteran Math graduate student teaching assistant (TA) for outstanding teaching accomplishments. The William E. Briggs award is given each year to a first-year TA in the Mathematics Department for outstanding teaching accomplishments.



Aubrey Kempner (left) with Burton Jones at Kempner home in 1952

***Kempner Mathematics Colloquium***

The Kempner Colloquium began in 1963 in honor of Professor Aubrey J. Kempner who served as head of the Mathematics Department from 1925 until he retired in 1949. Kempner gave the inaugural lecture on Reminiscences of the University of Goettingen where he received his Ph.D. degree under Edmund Landau in 1911. Kempner continued to take an active interest in the department until his death in 1973. The Kempner Colloquium Endowment was established in 1995 by gifts from faculty (\$15,000), the College of Arts and Sciences (\$10,000) and CU Math alums, including a major gift of \$25,000 from Dr. William J. LeVeque (B.A. 1944). LeVeque wanted to perpetuate the memory of the CU professor Aubrey Kempner who had greatly influenced his life. The weekly colloquium on topics of broad mathematical

interest is essential for maintaining a vibrant learning environment.

***Richard Laver Graduate Fellowship***

Please see New Scholarship Endowments, p. 10.

***Adele Leonhardy Memorial Scholarship***

The Adele Leonhardy (B.A. 1924) Memorial Scholarship was established by a gift from her estate. Awards are made to graduate students or upper division A&S undergraduates majoring in mathematics. Recipients must demonstrate excellence in their studies and must be preparing to teach mathematics. Adele Leonhardy was born in Carbondale, Colorado and grew up in Fruita near Grand Junction. While attending the University of Colorado from 1917 to 1924 she taught elementary school in Boulder to pay for her college education. After graduate work at the Universities of Chicago and Missouri she taught mathematics at Stephens College until her retirement in 1967. Professor Leonhardy understood the difficulty of working one's way through college and she dedicated her life to teaching. Her gift to the University of Colorado will enable students from future generations to become teachers of mathematics.

***Marlene Massaro Pratto and David Pratto Scholarship in Mathematics***

Please see New Scholarship Endowments, p. 10.

***Burnett Chandler Meyer Endowment***

Burnett Meyer

The Mathematics Department has established a two-year postdoctoral position called the Burnett Meyer Instructorship, with the first appointment in August 2009. Candidates are considered who have a Ph.D. degree in any area of mathematics including mathematics education. Selection is based on strong evidence of teaching and research. The position has a teaching load of three courses per year. The Burnett Meyer Instructorship is funded by a bequest of more than \$2,000,000 from the estate of the late Professor Emeritus Burnett Chandler Meyer who was a member of the CU Boulder faculty from 1957 to 1990. The bequest is to be used for the benefit of students and faculty. A portrait and plaque in honor of Professor Meyer has been placed in the Mathematics Building.

Continued on p. 15

## Chairman's Annual Communiqué, (continued from p. 1)

As I reported last year, our colleagues Professors Eric Stade and Robert Tubbs are co-principle investigators on a grant from the Helmsley Foundation to develop educational materials based on our first-year calculus sequence that will make our calculus courses a national model.

They have been working tirelessly with our new Calculus Coordinator, Dr. Faan Tone Liu on this project, also developing service learning materials for high school teachers. This past year Liu entirely revamped our graduate teacher training program, turning our graduate students into better teachers and propelling their careers (and helping our undergraduates!)

Our Diversity Committee, headed by Professor Judith Packer, has also been working on graduate student development — hosting a three-day summit on how to attract and retain students from underrepresented groups. We have begun to implement recommendations from that summit that will benefit all our graduate students.

Finally, our colleague Professor Markus Pflaum is piloting an exciting new undergraduate course he's developing on mathematics and chemistry — explaining how topology is used in stereochemistry.

**II) From our marvelous Donors:** The family and friends of our beloved former colleague Rich Laver have endowed an annual summer graduate fellowship in his honor. Rich was a wonderful set theorist and a wonderful man, who succumbed to Parkinson's Disease in 2012, after spending his career in our Department, enriching the lives of his students and colleagues. We have raised more than 60% of the total we need for this permanent remembrance for Rich. If you would like to contribute to this living tribute, you can go online at <http://www.cufund.org/give-now/> and enter "Richard Laver Graduate Fellowship" in the FUND box.

I am also thrilled to announce that our alumna Marlene Pratto has endowed a new undergraduate scholarship, the "Marlene Massaro Pratto and David Pratto Scholarship in Mathematics". Pratto was an early pioneer in computing.

### III) Advances in Research:

This year was a strong one for Math Department researchers having their research recognized by outside funding agencies. During 2013-14, Math Department Professors Judith Packer, Stephen Preston, and Sebastian (Yano) Casalaina-Martin won Simons Foundation Collaboration Grants for Mathematicians. In addition, recent hires Professors Kate Stange and Jonathan Wise both won Grants for Research in Mathematics from the National Security Agency.

The Department hosted two major research conferences this year. In April Professors Sebastian Casalaina-Martin and Jonathan Wise co-hosted the Western Algebraic Geometry Symposium, and in May, Professors Keith Kearnes, Don Monk, and Agnes Szendrei were hosts of the 2014 North American Annual Meeting of the Association for Symbolic Logic, which included a special session on the work of our former colleague, Rich Laver. (I'm sorry to report that Don is retiring this year, after 53 years on the CU faculty, but pleased to report that this year we will be conducting a search for a new faculty member in logic and foundations.)

This year we were also thrilled to be able to hire a new faculty member, Professor Sean O'Rourke, whose expertise is in probability. O'Rourke got his PhD from UC Davis three years ago, and joins our faculty after holding postdoctoral positions at Rutgers and Yale Universities.

**IV) Giving back to our Community:** We feel an important part of our mission is to bring mathematics to the greater Colorado community. Towards that end, we have constituted an Outreach Committee, headed by Professor Eric Stade. This year the Committee has begun developing a course on mathematical origami for CU's Science Discovery program. (Their goal is to "heighten interest and increase literacy in science, technology, engineering and math by providing hands-on experiences that connect [K-12] students and teachers to current CU science." They currently serve more than 30,000 students and teachers around the state each year, see <http://sciencediscovery.colorado.edu>.)

Through the Outreach Committee, the Department this year became a proud sponsor of Colorado Math Circle, which hosts math talks and problem solving sessions for advanced high school students and advanced middle school students. (See: <http://coloradomath.org>.)

This year Professors Robert Tubbs and Carla Farsi successfully applied to make the Mathematics Department a host of a future MoSAIC (Mathematics of Science, Art, Industry, and Culture) Conference, which will bring this popular set of exhibits on Math and Art to the CU campus in Fall 2015 (<http://www.mosaicmathart.org>). Check back on our website for the exact date! ([math.colorado.edu](http://math.colorado.edu)) Farsi has previously organized a special year on Math and Art on the CU Campus, and Tubbs's book, "Mathematics in Twentieth-Century Literature and Art," was published this summer by the Johns Hopkins University Press.

So we have much to look forward to!

Sincerely,  
David Grant, Chair

## **Mathematics Department Donors 2012-2014**

The Mathematics Department is grateful for the generous contributions by donors listed below. Gifts to endowments and funds make it possible to bring colloquium speakers (DeLong, Kempner and Reinhardt) to the CU Boulder campus, to offer scholarships (Haller, Hodges, Islam, Laver, Leonhardy, Pratto, Stribic and Thron) and awards to outstanding teaching assistants (B.W. Jones & W.E. Briggs) and Putnam Contest winners. Gifts (cash or securities) can be sent by returning the enclosed form MATHEMATICS DEPARTMENT 2014 ANNUAL FUND to the CU Foundation. Contributions to the Mathematics Department through the CU Foundation are tax deductible.

Steven Curtis Aanenson  
 Beverly K. Aanenson  
 Bryan Murray Albert  
 Jean Albert  
 Charles Daniel Baca  
 Theresa A. Baca  
 Lee Wilson Badger, PhD  
 Alfred Hudson Balch, Jr.  
 Sharon S. Balch  
 Amy Christina Baldor  
 Sherry Dyce Barba  
 Janet Heine Barnett, PhD  
 George Winfield Heine, III, PhD  
 Brian D. Bartlett  
 Kenneth Alan Beegles  
 Jo Ann Beegles  
 Steven J. Benson  
 William A. Bernstein  
 Delilah Ball Blount  
 Stephen E. Bricher, PhD  
 Julie M. Bricher  
 Muriel M. Briggs  
 William L. Briggs, PhD  
 Kay M. Brown  
 Charles H. Brown  
 Fred Thomas Burton  
 Mary Jane Burton  
 William John Cable  
 Virginia Cable  
 Robert Eaton Caliga, Jr.  
 Krista A. Caliga  
 Jesse Anthony Cardenas  
 Peter Ansel Carr  
 David B. Carrington, PhD  
 Shin-Sun Chow  
 Shu In In Huang, PhD  
 Richard James Clancy  
 Frederick Joseph Clare, PhD  
 Adrian Lawrence Clark  
 James Daniel Clark  
 Carol E. Clark  
 Kevin Jay Compton  
 Judith Carlson Compton

Patricia A. Cordova  
 Mario D. Cordova  
 James A. Daily  
 Susan Jean Danz  
 Martha Fiege Diesslin  
 Craig A. Diesslin  
 Kenneth W. Dukes  
 Jeanne E. Dukes  
 Amie J. Elcan, PhD  
 Gordon Bonan  
 Klaus Emil Eldridge, PhD  
 Julia A. Eldridge  
 Gary Ray Elmquist  
 James Theodore Elshof  
 Brenda Berryman Elshof  
 Catherine Marie Ezo  
 Norman P. Farquhar  
 Colleen Cabot  
 Maureen Bell Field  
 David A. Field PhD  
 Joan M. Fiore Wills  
 Mark Fiore Wills  
 Norman Ray Franzen, PhD  
 Janet Franzen  
 William M. Frost  
 Ellen L. Frost  
 Ryan William Gardner, PhD  
 Kristine Amari  
 Robert C. Gunning  
 Wanda Holtzinger Gunning  
 Garney Hardy  
 Jack Noah Hyatt  
 Andrea Susan Hyatt  
 Steven Mark Jacobs  
 Linda Oja Jacobs  
 Matthew G. Jacobson  
 Thomas H Jefferson, Jr., PhD  
 Karen L. Jefferson  
 Judith Packer Jesudason  
 James V. Jesudason  
 Lloyd J. Johnson  
 Barbara E. Johnson  
 Kathleen Marie Johnson

Martha H. Jones  
 William Branham Jones  
 John Knox Karlof, PhD  
 Rita M. Katich  
 Joseph Michael Katich  
 Benjamin Fuller Katz-Moses  
 Joel M. Kelson  
 Claudia Kelson  
 Steven Douglas Kerr, PhD  
 Thomas H. Kerr  
 David King  
 Kim Rolf Kokkonen, PhD  
 Anita Kokkonen  
 Donald Mark Labencki  
 James Frank Lathrop, PhD  
 Carol R. Lathrop  
 John Laver  
 Michael Laver  
 Sherrie D. Laver  
 Wayne William Lucier II  
 Paul Allen Malsam  
 Donna Mae Malsam  
 Robert Eugene Mattick  
 Csilla Farkas  
 John Mark McArthur, PhD  
 Karla Jeanette Oty, PhD  
 Vivian Grace McCullough  
 Robert C. Mers, PhD  
 Joyce S. Mers  
 Jessica Blythe Milito  
 George Moreno  
 Clara Moreno  
 Thomas Marston Morse, PhD  
 William H. Myers III  
 Amy Suzanne Ockel  
 Dwayne William Ockel  
 Joseph O'Keefe  
 Stacey O'Keefe  
 Christopher Lee Oliver  
 Emily Suzanne Pavey  
 Dan Ernest Philipp

*Continued on p. 15*

**Endowment Funds,** (continued from p. 12)***William Reinhardt Memorial Lectures***

The William Reinhardt Memorial Lecture Endowment Fund was established in 2001 by family, colleagues and friends of Professor Reinhardt who was a Mathematics Department faculty member from 1967 until his untimely death on June 22, 1998 at the age of 59. Reinhardt was deeply interested in the foundations and philosophy of mathematics, occasionally teaching courses in the Department of Philosophy.

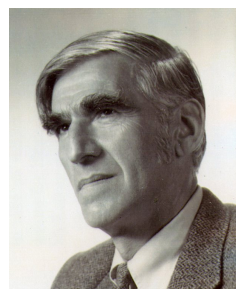
***Frances C. Stribic Scholarships***

Frances Stribic and Dorothy Martin

Frances Stribic was a member of the Mathematics faculty from 1926 until she retired in 1965. Finding a need for someone to teach statistics, she prepared herself in that subject and not only taught it for a number of years

but also did research applications jointly with psychology Professor Dorothy (Happy) Martin. Professor Stribic was an outstanding teacher, well respected by her students and colleagues. In 1990 her friend Happy Martin established the

Stribic Scholarship awarded each year to a female graduate student chosen by the faculty for excellence in mathematics scholarship.

***Wolfgang J. Thron Mathematics Fellowship***

Wolfgang Thron

In 1999 Professor Emeritus Wolfgang Joseph Thron expressed his faith in and devotion to the University of Colorado with a gift of \$216,000 to endow the W. J. THRON Mathematics Fellowship awarded each year to an outstanding graduate student in the Mathematics Department. Thron was a member of the Mathematics Department from 1954 until he retired in 1985. He served as department chair from 1972 to 1974 and he was thesis advisor for 21 Ph.D. students. In 1980 Thron was elected to the Royal Norwegian Society for Sciences and Letters (Det Kongelige Norske Videnskapers Selskap) for outstanding creative research in mathematics and for his great inspiration to others to do creative work. He was awarded the University of Colorado Medal for outstanding contributions to the university and for his distinguished career as a scholar, teacher and research mathematician.

**Mathematics Department Donors 2012-2014,** (continued from p. 14)

Jerry Lee Pitter  
 Marlene Rose Pratto  
 Terrance John Quinn II  
 Annette W. Ramaley  
 Alaina Elise Rouse  
 Paul Joseph Schachter  
 Robin Nass Schachter  
 Wolfgang Schmidt  
 Patricia Schmidt  
 Douglas Alexander Siegel  
 Constance M. Snell  
 Robert Isaac Snell, PhD  
 Amy Elizabeth Spann  
 Nancy Lynn Stainton  
 James Stainton

Collin K. Starkweather, PhD  
 Peter R. Stevenson  
 Patricia R. Stevenson  
 C. William Swartz III  
 Jean McLarty Tidball  
 Ronald Richard Tidball  
 Eric Walter Wainwright  
 Margaret Ann Wainwright  
 Karen Lea Waligorski  
 Errol Waligorski  
 Leonard Weiser  
 Sue Wilkinson  
 Judith Sharon Zinn



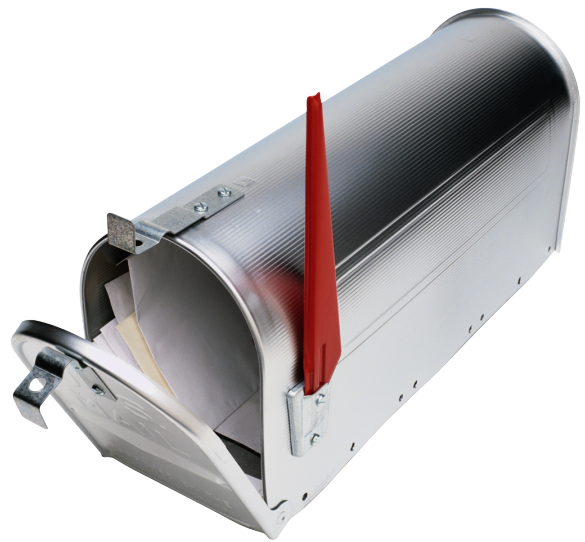
 University of Colorado **Boulder**

Department of Mathematics  
395 UCB  
Boulder, CO 80309-0395

***Alumnae/Alumni News,*** (continued from p. 9)



The Atkinson Bridge is an 86-foot long trestle bridge over a viewing pond at Mt. Pisgah Arboretum, Eugene, Ore. Photo shows the bridge under construction by a team that included alumnus, James Marshall.



**Want *Prime Bits* online?**

If you would like to receive your future editions of Prime Bits via email as a .pdf file, just send an email to: [primebitsonline@colorado.edu](mailto:primebitsonline@colorado.edu) and we'll email them to you at the account you specify (or the account you email us from).