

PRIME BITS

Department of Mathematics Newsletter
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Frank F. Islam endows two mathematic scholarship funds



Frank F. Islam, a man now living the American dream, is striving to help others follow suit. University of Colorado alumnus Frank F. Islam has endowed two scholarships for CU mathematics students

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. After working extensively in the federal government, he founded QSS group, an information-technology company, one of his many successful ventures.

"I am proud to be an alumnus of this university," Islam told an audience during the Spring 2011 Conference on World

Affairs at CU-Boulder. "This university is a true treasure. I admire the splendid beauty of this university. I care deeply and love this institution. My days at the University of Colorado were the best part of my life. This university gave me strength and courage and has taught me the dignity of hard work."

Though he has lived the American dream, Islam believes that dream is in peril. He and co-authors George Munoz and Ed Crego make that case—and offer suggestions on how to reverse the trend—in a recently published book called "Renewing the American Dream." Islam now serves as CEO of FI Investment Group LLC, which focuses on providing growth capital to emerging companies and manages specialized and branded funds. Islam and his co-authors define the American dream as the opportunity of citizens to realize their potential and to succeed, which includes "getting educated and working hard in order to have a good job that pays decent wages, provides adequate benefits, puts food on the table and a roof over one's head, and allows for retirement with dignity."

Islam is supporting the critical realm of education with both words and action. With a gift of \$52,000 to the CU Foundation he has endowed two scholarships—the Frank F. Islam Mathematics Scholarship Endowment Fund in Honor of William B. Jones and the Frank F. Islam Mathematics Scholarship Fund in Memory of Wolfgang J. Thron.

Eric Stade chosen as President's Teaching Scholar

Eric Stade was informed in February by President Bruce Benson that he has been selected to be a President's Teaching Scholar, an appointment that will continue throughout his career at CU.

"Established in 1989 as a presidential initiative, PTSP endorses excellence in teaching by honoring faculty throughout the university who excel in teaching, scholarship, and research. The President's Teaching Scholars are chosen from the three CU campuses, not only for their skill in their own classrooms, but also for their potential to improve education and enlarge its possibilities across the university.

Stade, former chair of the department of mathematics, has been appointed co-director of iSTEM, a CU-Boulder program aiming to transform STEM (Science, Technology, Engineering and Mathematics) education and boost the number of STEM teachers at all levels. He has been a driving force in creating or redesigning several courses. He leads his students in undertaking outreach efforts throughout the Boulder Valley School District.

"His passion for mathematics and mathematics education is contagious,

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CU Alumnus advocate for renewing ‘the American dream’

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Jones is a professor emeritus of mathematics at CU who made a particular impression on Islam as a student. A member of the faculty from 1963 until 1997, Jones served as Mathematics Department chair from 1987 to 1990. He was awarded the U.S. Department of Commerce Gold Medal for applications of mathematics to forecast world-wide conditions of the earth’s ionosphere for long-distance radio communication. Jones lives in Boulder with his wife, Martha. He remains active in the mathematics department, writing, editing and printing its newsletter. Jones is also described as a “passionate fund-raiser” for the department.

Thron was a CU professor of mathematics who passed away in 2001. He was a member of the Religious Society of Friends and the American Mathematical Society. In 1980 Professor Thron was elected to the Royal Norwegian Society of Science and Letters and in 1985 the Board of Regents of the University of Colorado awarded Thron the University Medal.

During the Conference on World Affairs, Islam paused to recognize Thron: “I admired him and respected him. He was

kind, generous, and gracious. He helped me by providing me an opportunity to come to America. The spirit of this extraordinary man deeply touched me.

“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,” Islam said. “I know they will be very happy to see the impact these scholarships will have on the lives of students. 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.”

As Islam emphasized, “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,” he said, adding, “I want to inspire others to have passion for philanthropy.”

To learn more about “Renewing the American Dream,” see www.renewingtheamericandream.net. For more information, see www.ffislam.com.

In Memorium



Irving Weiss died in Boulder at the age of 92 on May 4, 2011. He was born in New York City on April 10, 1919 and grew up in Chatham, NJ in “the Colony”, an enclave of Eastern European Jewish immigrants. Professor Weiss was a member of the CU Boulder Mathematics Department faculty from 1962 through 1989. He

was an excellent scholar and teacher, specializing in mathematical statistics.

He attended Columbia University before transferring to the University of Michigan, where he graduated with a bachelors degree in electrical engineering. During WWII, he served as a commissioned officer radar specialist on Okinawa. After obtaining a Master’s degree in career counseling, Weiss earned a Ph.D. in applied mathematics from Stanford University.

Prior to joining the CU Boulder faculty, he worked at the Miter Corporation, the Bell Labs and Lehigh University.

During sabbaticals Professor Weiss taught at universities in England and Kenya. Weiss’ travels included tours and bike trips in Canada, New Zealand, Tahiti, Scandinavia, Italy, France and Turkey. He loved opera and ballet and was a participant in folk dancing. He was a charter member of the Boulder Road Runners and active in the Colorado Mountain Club, the Nordic Club, Boulder Aquatic Masters, and various bicycle groups. He climbed 22 of the state’s “fourteeners” and was a frequent hiker, backpacker, skier and bicyclist. He competed in the Bolder Boulder, Boulder Peak Triathlon, Nether Nederland, Peak to Peak, Governor’s Cup, Turquoise Lake 20k Road and Trail Run and many other races. Running a six-minute mile at age 63 gave him great pride. At age 88 he was still participating in the annual Courage Classic fundraiser for Children’s Hospital—a three-day, 155-mile bike ride that begins in Leadville and goes over two mountain passes. At age 91 he competed in the 2010 Bolder Boulder and planned to do so again in 2011 to become the only 92-year old to ever do so.

Professor Weiss was admired by his CU colleagues and students for his scholarship, his dedication to good teaching, his gentle friendly nature and good sense of humor. Memorial contributions may be made through the University of Colorado Foundation or the Rich Castro Track and Field Endowment Fund in memory of Irving Weiss.

Faculty Highlights

Jeanne Clelland with the help of the Undergraduate Committee nominated our math major, Molly May, for the Richard A. McCray Scholarship (\$6,000) for the AY 2011-2012 based largely on academic performance, leadership, community involvement and a desire to pursue a career in education. The scholarship endowment fund was established by the McCray family to honor Dr. Richard A. McCray who is presently the George Gamow Distinguished Professor Emeritus of Astrophysics.



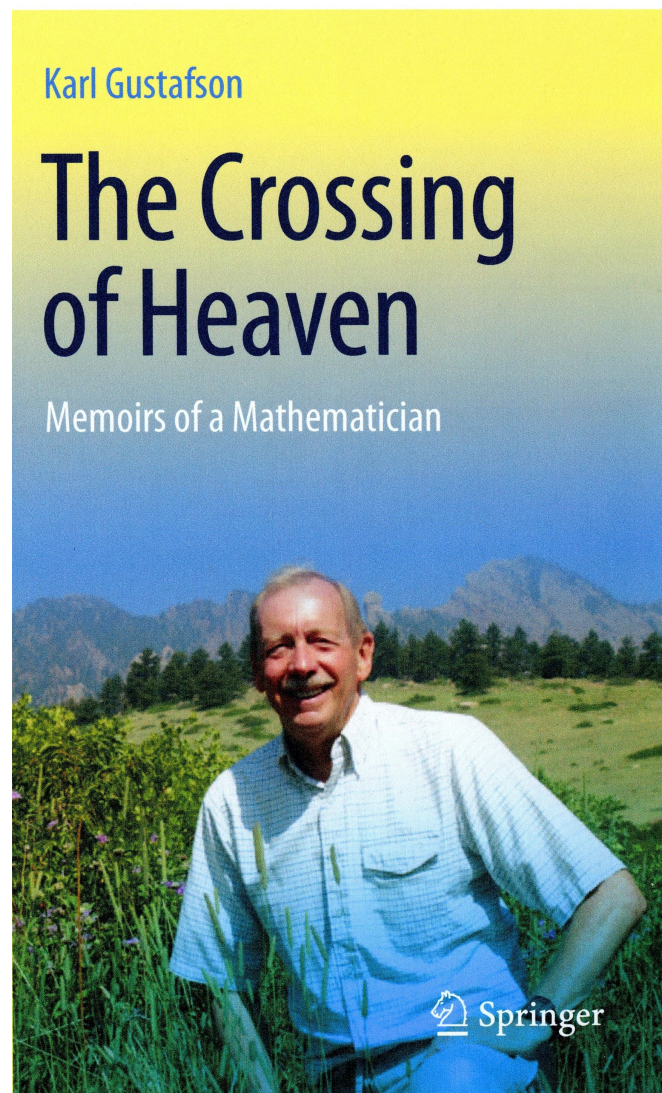
Professor Jeanne Clelland and Molly May

Richard Green is currently working on the project "Polytopal Subcomplexes and Homology Representations," funded by the Topology Section of NSF. He is also completing a monograph called "Combinatorics of Minuscule Representations".

Karl Gustafson gave a series of four lectures on Distributed Intelligent Systems: A Personal History, at the University of Thessalonika in Greece in May and in June he gave three invited lectures in Sweden, at a quantum mechanics conference in Vaxjo, and in Stockholm and Uppsala. Prof. Gustafson completed the writing of two books, both of which are expected to appear in 2011. He wrote: "These two books are capstones of my life. Writing them took virtually all spare time and weekends the last two years." The first book is his autobiography, *The Crossing of Heaven: Memoirs of a Mathematician* (Springer) by Karl Gustafson.

Following is an excerpt from the book cover. "As one of the most prolific mathematicians of our time, Karl Gustafson has been a central figure in the astonishing technological revolution of the last half-century – a revolution which has transformed human life. This, his own account of his journey

through those decades, takes the reader from his early pioneering work in computing and espionage, where his contribution was vital to the American Cold War effort, to his observations on core contemporary issues such as the stability of the world's financial system."



The second book is *Antieigenvalue Analysis* (World-Scientific), an advanced mathematical monograph. Both books should appear near this year's end.

Keith Kearnes received a Fulbright Research Fellowship for 2010-2011 which he used to spend Fall 2010 at the University of Szeged in Hungary.

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Student News

Putnam Exam Awards

1st place: Marshall Carpenter

2nd place tie: Paul Forna and Brian Kirkpatrick

2011 Burton W. Jones Teaching Award

Matthew Stackpole

2011 William E. Briggs Teaching Award

Selection to be made in November 2011

John H. Hodges Scholarship

Keegan Boyle (photo on page 7)

Richard McCray Scholarship

Molly May (photo on page 3)

Frank F. Islam Scholarships

Daniel Bragg (honoring Wolfgang J. Thron)

Ryan Rosenbaum (honoring William B. Jones)

Frances C. Stribic Scholarships

Robin Chestnut

Cui Cong

Jason Hill

John Hower

Ben Katz-Moses

Amy Keighley

David Keyes

Michael Martinez

Camilo Mesa

Andrew Moorhead

Zachary Strider McGregor-Dorsey

University Summer Fellowships

Bryce Christenson

Tyson Gern

Justin Keller

Stephen Limburgh

Benjamin Purkis

Kevin Selker

David Wayne

Wolfgang J. Thron Fellowship

William Stanton



2011 Grad Committee Special Fellowship

Nathan Wakefield



2011 Grad School Fellowship

Matthew Moore



Actuarial Science functions assist students in career planning

Panel discussions for the Actuarial Science Certificate Program were held for students in fall 2010 and spring 2011. Actuaries from firms discussed the field of actuary science and internships, providing a chance to learn about this area of study that forms the foundation of the insurance profession.

The panelists were: Andy Rellis & Doug Norri, Milliman; Daniel Heffron, CIGNA; Troy Wieck, CIGNA; Chris Mast, Mercer; Paige Beilby & Karen Farrell, Great West Life; Alex Jurhs & Nathan Baseman, QBE of the Americas; Mike Polakowski, Anthem Blue Cross and Blue Shield.

Student News, (continued from p. 4)

Graduate Degrees

Graduates are listed by name, degree, date, (faculty advisor), thesis title for Ph.D. First appointment if known.

M.A. Degrees:

Justin Keller, M.A., August 2010 (Nathaniel Thiem)
Benjamin Purkis, M.A., August 2010 (Judith Packer)
William Stanton, M.A., December 2010 (Brian Rider)
Bryan Arguello (Romero), M.A., May 2011 (Janos Englander)
Tyson Gern, M.A., May 2011 (Richard Green)
Jacob Harper, M.A., May 2011 (Richard Green)
Amy Keighley (Feaver), M.A., May 2011 (Su-Ion Ih)
Andrew Moorhead, M.A., May 2011 (Keith Kearnes)
Masaya Sato, M.A., May 2011 (Carla Farsi)
Krisztina Vanyi, M.A., May 2011 (Su-Ion Ih)
Nathan Wakefield, M.S., December 2010 (Su-Ion Ih)
Cui Cong, M.S., May 2011 (Karl Gustafson)

Topaz Dent, Ph.D., January 2011 (Agnes Szendrei). "Clones of finite idempotent algebras with strictly simple subalgebras."

Jacob Harper, Ph.D., May 2011 (Richard Green), "Homology Representations Arising from a Hypersimplex." Lecturer, University of Colorado at Boulder.

Eun Kim, Ph.D., May 2011, (Richard Holley). "Giving Spitzer's zero range process a positive range."

Michael Noyes, Ph.D., May 2011 (Brian Rider), "Spectral properties of the general Beta Hermite and Beta Laguerre ensembles in the limit beta to infinity." Postdoc, University of Waterloo.

Michael Roy, Ph.D., May 2011 (Eric Stade), "Coxeter group actions on complementary pairs of very well-poised $9F_8(1)$ hypergeometric series." Lecturer, University of Colorado at Boulder.

Matthew Stackpole, Ph.D., May 2011 (Jeanne Clelland), "Dynamic equivalence of control systems via infinite prolongations." Assistant Professor, Georgia Gwinnett College.

Joshua Wiscons, Ph.D., May 2011 (Keith Kearnes), "Moufang sets of finite Morley rank." Visiting Assistant Professor, Hamilton College.



Topaz Dent



Jacob Harper



Eun Kim



Michael Noyes



Michael Roy



Matthew Stackpole



Joshua Wiscons

Retired Faculty



Faculty, students, alums, friends and relatives gathered for a reception to honor Professor Robert Kent Goodrich on the occasion of his retirement from the CU Boulder Mathematics Department faculty.



Doris and Kent Goodrich at the spring 2011 reception honoring Professor Goodrich for his 44.5 years of service on the CU Boulder Mathematics Department faculty.

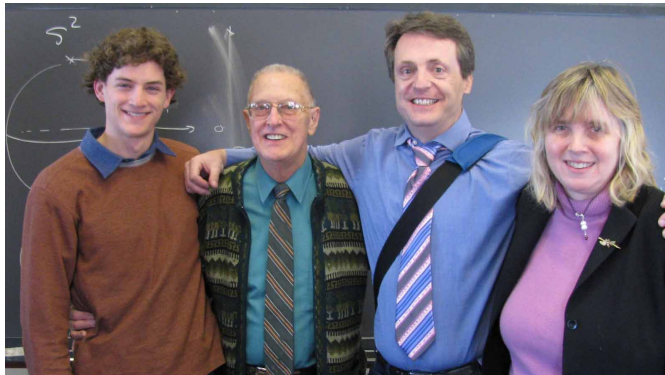
Robert Kent Goodrich retired on December 31, 2010 after 44 and one-half years of service on the faculty of the CU Boulder Mathematics Department. Many former students attended the spring 2011 reception to honor Professor Goodrich on the occasion of his retirement. He can be contacted at: rkgoodie@yahoo.com

Gordon Brown. “I want to commend you on the latest issue of Prime Bits. It was excellent, and I enjoyed reading everything in it. It is better every year.”
Gordon.Brown@Colorado.EDU

John H. Hodges. Jack and Jean Hodges will spend some time in October in Italy--Rome, Spoleto, Venice, Cinque Terra and Milan. Jack needs his trekking poles to help with balance issues, but plans to explore as much as he is able.

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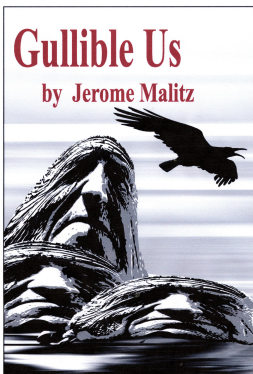
Retired Faculty, (continued from p. 6)



Keegan Boyle (John H. Hodges Scholar), Prof. Emeritus John H. Hodges, Professors Eric Stade and Judith Packer.

Henry Hermes. “Carol and I are still climbing and doing bike tours and rides. Just finished a beautiful 12 day bike tour in the Blue and Wallowa mountains of Northeast Oregon. Next (October 21-Nov 4) is a ride on the Japanese Islands of Kyushu & Yakushima. New culture, lots of fish to eat, sleep on futons, should be interesting!
hankhermes@msn.com

William B. Jones had a tough time with pneumonia in January but has now recovered enough for biking on the Boulder bicycle paths and hiking at 8500 feet elevation. I still enjoy publishing Prime Bits which is sent to 3000 CU Boulder math alums and have taken on a new volunteer job as membership secretary for the CU Retired Faculty Association. I recently began working on mathematical research with two former Ph.D. students, Cathleen Craviotto (University of Northern Colorado) and Cathy Bonan-Hamada (Colorado Mesa University) and we enjoyed visits this summer from two other former students, David Field (Ph.D. 1971) and his wife Maureen Field, and Brian Hagler (Ph.D. 1997). William.jones@colorado.edu



Jerome Malitz is the author of a recent book, *Gullible Us*, published by CreateSpace (2011), 166 pages.

Overview. “We were born gullible, raised gullible, and educated to be gullible. But today, when it comes to decision making in critical

contexts – personal, national, or global – gullibility poses a dire threat. Gullibility has had some survival value in the past, and occasionally may serve a purpose today. Often we have to take some action without having complete or perfect information – indecisiveness may not be an option. But if we are to cope as adults, gullibility has to make way for a more critical and analytical mindset. We have to be able to recognize gullibility in ourselves. We have to beware of the prime gulling venues. And we have to know how the gullers operate. Maybe then we can develop strategies to defend ourselves.” Chapter titles: 1. Introduction: Gullible from Start to Finish. 2. Science and Religion – So Close, Yet So Far. 3. Here’s to Your Health and Good Looks. 4. It’s Only Money (Economics). 5. Math, the Gold Standard. (No other subject provides a stronger defense against gullibility.). 6. Education – Perpetuating Gullibility. 7. Building Defenses. Malitz is the author or co-author of eight other books.

David Rearick. Hank Hermes reports that he saw, and talked with, Dave about two months ago. He was riding his bike on 4th street (in Boulder) and seemed in good health.

Wolfgang Schmidt. “Good as well as bad events took place in 2010/11. The bad event took place in November, when a lady snowboarder hit me on my first day of skiing, causing ten broken ribs and a broken clavicle. The recovery took long; I now have recovered but still feel occasional after-effects.

On two trips abroad I was busy with mathematics. In September 2010, I attended a number theory conference in Luminy (near Marseille), which is a French version of Oberwolfach, with the Mediterranean instead of the Black Forest. In May I had a short visit to the University of Basel, and a one week stay at Moscow Lomonosov University. I occupied a guest room in the huge Stalin era building of the university, and experienced the advantages and disadvantages of lodging there. I enjoyed seeing famous icons and an excursion to an old monastery outside Moscow. In Vienna I saw my sister and my co-author Leo Summerer, who will visit Boulder coming September. This summer Pat and I visited grandchildren in the east (Cape Cod) and the west (Los Altos in the Silicon valley).”

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Alumnae/Alumni News

Joel James Adamson (B.A. Math and EPO Biology 2002) “Thank you very much for sending me “Prime Bits” Vol. 12 (1). I was very happy to see the feature on R. Kent Goodrich's retirement and I wish I could be there to celebrate. I was proud and impressed to hear of all the graduate students he has fostered over the years. Prof. Goodrich has shaped my own career beyond the point I thought possible: I am currently working on a Biology Ph.D. in evolutionary theory but I have come to identify myself as a mathematician thanks to what I learned in Prof. Goodrich's classes. I took three from him at CU: Intro to Abstract Math, Operations Research and Introduction to Real Analysis. My experiences with him in these classes were truly transformative. He also encouraged me to pursue a math major, which I added on to my biology BA. After many hours in his “office hours” I came to realize that mathematics was more a love than just a challenge for me, and I'm still pursuing learning the most and the best way I can according to his advice. R. Kent Goodrich is always the person I describe to my colleagues as “my math professor.” Congratulations to him, and I'm sure retirement won't slow him down!” Servedio Lab, University of North Carolina at Chapel Hill. adamsonj@email.unc.edu

Albert John (Al) Beer (M.A. 1973). “I am a proud graduate of the CU Math Program. I am embarrassed to say that I have been woefully negligent in keeping up with “Alma Mater” but I have to congratulate you in somehow tracking me down! I have just finished reading the latest “Prime Bits” and was overcome with wonderful memories of my time in Boulder.

After 35 years in the Insurance Industry, I returned to academia by accepting the Michael J. Kevaney Chair of Risk Management, Insurance and Actuarial Science at St. John's University in New York City.” Professor Beer teaches courses on both the graduate and undergraduate levels. “I became an Actuary (with the help of my fantastic Math education at CU!!!!). Having served as the President and Board Member of the Casualty Actuarial Society, I would be very happy to assist any students who might be in need of some information on potential careers. I had a great many people help me along the way and I would be excited to “give back” in any way I can, either speaking in Boulder or corresponding through e-mail.” beera@stjohns.edu

Catherine M. Bonan-Hamada (Ph.D. Math 1994) and Edward Bonan-Hamada (Ph.D. Math 1996) are both members of the mathematics faculty at Colorado Mesa University (formerly Mesa State College) in Grand Junction, CO since 1996. They visited Boulder this summer to visit friends and for Cathy to continue collaborative research with Emeritus Professor William B. Jones. cbonan@mesastate.edu



Cathy and Ed Bonan-Hamada and son Connor Kapono

Robert Lewis Brueck (B.S. Appl. Math 1959, M.S. Appl. Math 1962) writes that his favorite faculty members at CU were Professor Jack Britain and Asst. Professor Paul Hulquist. Mr. Brueck can be reached at P.O. Box 623, Cascade, ID 83611. rlb@brueck.name

David A. Field (Ph.D. Math 1971), a specialist in computer aided design, recently retired from General Motors Research Laboratories after 30 years of service. David continues to be active as a lecturer and visiting professor at the University of Science and Technology in Hefei, China and at the University of Chile at Santiago as a Fulbright Scholar. David and his wife Maureen Field enjoyed a brief visit with friends in Boulder last summer.



Bill and Martha Jones with Maureen and David Field

Alumnae/Alumni, (continued from p. 8)

James Wildon Fickett (Ph.D. Math 1979) “I read your article on Dave Rearick in Prime Bits last fall, and it brought back many memories. Although I’ve always loved mathematics, what stands out in my memory at this distance is the humanity of my professors. I greatly enjoyed my bicycle rides in the foothills with Dave Rearick (trying to keep up a difficult pace while pretending I wasn’t working too hard!), talking about what really matters in life and career with Jan Mycielski, listening to Wolfgang Schmidt reminisce about Austrian pastries (oh yes, and the zeta function), and being totally blown away by Larry Baggett’s feats of memory. Of course there were good times with fellow students as well. David Young and I used to ride our bicycles to a trailhead, then backpack for a week or so, and then ride our bikes back home. One time we came back to the bicycles and found that some animal had eaten the leather saddle on my bike. I had to ride the 40 miles or so back to Boulder standing up! My thesis was in measure theory but, once out of school, I discovered that I was really interested in more applied topics. However the mathematical (and mathematical logic) training did have a very important long-term benefit, in that it honed my talent to find the flaws in arguments, and to hear what the data in various disciplines were really able to say. After spending most of my career in bioinformatics and pharmaceutical research data management, I am now engaged in an experiment (ClearOnMoney.com) to see if an insistence on solid evidence and careful reasoning can lead to better investing. We shall see, but there is no doubt that evidence and logic are sadly lacking in most of the financial press. The years I spent at CU were good ones, and the benefits have been lifelong.” nmskydown@gmail.com

Brian Hagler (B.S. Appl. Math 1992 and Ph.D. Math 1997) has been a member of the mathematics faculty at the University of Texas at Odessa since 1997. In spite of a heavy teaching load Brian remains active in research. His latest publication is “Optimizing Gaussian Quadrature for Positive Definite Strong Moment Functionals,” SIAM J. Numer. Anal. 49, pp. 1111-1126, to appear. During the summer Brian came through Boulder and joined the CU retired mathematics faculty for the annual picnic. (Photo on page 16). hagler_b@utpb.edu

Anne Campbell (Jones) Holmes (B.A. Math 1991 and M.S. CSCI 1995) is currently employed at the National Center for Atmospheric Research in Boulder. She has received a Scientific and Technical Advancement Award in 2010 jointly with other members of the Research Applications Laboratory for developing and supporting Model Evaluation Tools (MET), a highly configurable, state-of-the-art suite of verification tools used in 92 countries by



more than 1000 registered users. While MET was developed using output from the Weather Research and Forecasting model, the tools are useful in evaluating forecasts from other modeling systems as well. MET facilitates efforts of researchers, operational meteorologists and students to evaluate model forecasts, and it also encourages them on an

ongoing basis. aholmes@ucar.edu

Jerry Dale Hopponen (Ph.D. Math 1979) “I enjoyed reading the Prime Bits article about Jack Hodges, my dissertation advisor from many years ago, and would like to send him an email of appreciation.” Lincoln, CA. jerry.hopponen@gmail.com

Jack Lionel Hursch (Ph.D. Math 1964) The following information about Jack Hursch was sent to Prime Bits by Jack’s son, Michael Charles (Chuck) Hursch (CU Boulder B.A. CSAP 1988). “I received the Fall 2010 issue of Prime Bits rather unexpectedly. Don’t know how I got on the mailing list but perhaps it is because my father obtained his Ph.D. from CU. I remember hearing from him names such as Laver, Malitz and Mycielski, and was in awe of the story about Rearick’s climb of the Diamond on Longs Peak. I had a chance to meet some of the people - I’m pretty sure Malitz and Mycielski, back in the 1970s and 80s. I see that the Malitzes are pictured prominently in the photo of the First Annual Retired Faculty Picnic on p. 7. And Rearick is on that page also. Maybe some of the people I mentioned above would be interested in knowing what became of their former colleague. Jack was born Sept. 8, 1930 in Denver, CO. At the University of Denver he received a B.A. in 1951 and an M.A. in 1953. Jack was the Colorado chess champion in 1953 (Colorado Open). He received graduate education in mathematics at University of California Berkeley before coming to CU Boulder for his Ph.D. Dr. Hursch held assistant professorships during the mid-to-late 1960s at the University of Vermont @ Burlington and the University of Florida @ Gainesville. Jack’s research work in topology with Johannes de Groot (Holland) led to an invitation from Queen Julianna for one-year research associate-ship with de Groot in Amsterdam, 1969-1970.”

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

Chuck Hursch recounts an interesting event when his father solved a real-world mathematics application to allow ships to travel more efficient routes across the Atlantic Ocean. “That work was actually done on the freighter we took across the Atlantic in 1969 from Jacksonville, FL to Moorhead, NC, and thence to Antwerp, Belgium. The ship's crew was looking for a more efficient route (Great Circle?) across the ocean, and discussed the problem with my father, who worked out a mathematical solution while onboard the ship over a period of days. He was always proud of that work. He had me involved in some of the computer programming for his work on the Four Color Problem, which was an intense interest of his for many years. My father



Jack L. Hursch

moved from Boulder to Tallahassee, FL in the 1991-2 timeframe. He died in Tallahassee Aug. 11, 2008. I scattered his ashes west of Boulder up near the Continental Divide west of Diamond Lake above the Fourth of July trailhead. He had said he always wanted to return to Colorado for a last hike in the Rockies, and that ended up being the hike.”

Robert (Bob) T. Johnk (CU Boulder Ph.D. Elec. Engr. 1989) The following memories of CU by Bob Johnk were sent to the Prime Bits editor (William B. Jones). “I was just thinking about you last night while I was reminiscing on my graduate school days at CU back in the 80’s, and I still have fond memories of your applied complex variable class and you serving on my Ph.D. thesis committee. I realized that my thesis defense took place just over 21 years ago (1989) –oh my, how time flies! I have spent 21 years at the Commerce Department labs doing research at NIST (National Institute for Science and Technology) for the first 17 years. Four years ago, I came over to ITS (Institute for Telecommunication Science) to work in wireless radio propagation and am having a ball. I’m steeped in math, measurements, and statistics...it doesn’t get much better than this! The wireless revolution has really taxed my ability to keep up. I find myself in an almost continuous learning mode and frequently attending training courses. I do enjoy it. It has really been amazing to watch the advances in computing power and software tools. The computing power of desktop

and laptop machines far exceeds anything that was available 20 years ago. I imagine that mathematical research has been revolutionized by this as well. I would very much like to receive your newsletter. bjohnk@its.bldrdoc.gov

Samuel P. Kelly (M.A. Math 2007) is a member of the Mathematics Department faculty of York County Community College, Wells, Maine. He was recently married to Annah Moynihan whom he met while in Boulder. His memories of Boulder are that “It was fun.” Their home is at 47 Cataract Ave., Dover, NH 03820. Samarama@hotmail.com

John McArthur (M.A. Math 1993, Ph.D. Math 1994) is currently Vice President for Academic Affairs at Cameron University and has held this position since 2006.

Sandra K. McKenzie (B.A. Math 1974) “I enjoyed reading Prime Bits that highlighted Jack Hodges and David Rearick: two of my favorite professors when I was at CU. There was also a nice story that let me get to know you! I would like to get in touch with Jack Hodges and wondered if you can either send me his e-mail address or forward this to him.” smckenzstat@yahoo.com

Karla Oty (Ph.D. Math 1993) is currently Director of Institutional Research, Assessment and Accountability at Cameron University, a position she has held since 2010. Karla Oty and John McArthur reside at 14 NW Stonebrook Dr., Lawton, OK 73501-9599. kjojmm@sbcglobal.net

Paul Noble Swarztrauber (M.S. Appl. Math 1966, Ph.D. Math 1970) of Boulder, Colorado died on August 8, 2011. Born on November 2, 1936, he grew up in Zion, IL near the border of Wisconsin and Lake Michigan. He received an Engineering Physics degree from the University of Illinois and gained experience on the ILLIAC computer which defined his career. In 1963 he became a scientific programmer at NCAR (National Center for Atmospheric Research) in Boulder and concurrently completed his graduate education at CU. Dr. Swarztrauber was the first director of the Computational Mathematics Program at the National Science Foundation, an Adjunct Professor of Computer Science at the University of Colorado and an editor of several SIAM journals. He retired from NCAR in 2004 with the position of Senior Scientist Emeritus. Paul Swarztrauber died on August 8, 2011.

Gerard (Jerry) A. Unrein III (B.A. Math 1971) passed away October 4, 2010.

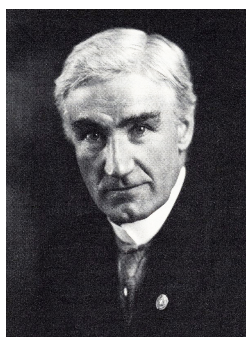
Mathematics Department Endowment Funds

Endowed funds for the Mathematics Department provide vital support for teaching, research and scholarship. It would be difficult to overstate the great benefit of these endowments for higher education. Their contributions continue in perpetuity in accordance with the will of each donor.

If you are interested in contributing to an endowment (new or existing), please contact the department chair, Professor Judith Packer, Department of Mathematics, University of Colorado, Boulder, CO 80309-0395, Judith.Jesudason@Colorado.EDU or Margot Jenson Neufeld, University of Colorado Foundation, Senior Director of Development, University of Colorado at Boulder, Boulder, Colorado 80309. Direct: (303) 492-2990 or margot.neufeld@cufund.org.

Following is a brief description of existing Mathematics Department endowments.

Ira DeLong Lectures



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. DeLong lecturers are chosen from the leading mathematicians of our time, to deliver three lectures during several days and to talk with our faculty, students and visitors.

Kempner Mathematics Colloquium



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

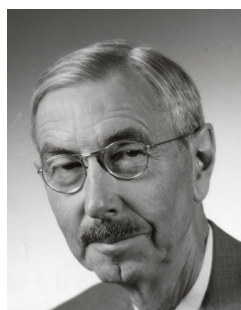
The Kempner Colloquium began in 1963 in honor of Professor Aubrey J. Kempner who served as head of the Mathematics Department from 1925 until he retired in 1949. Kempner gave the inaugural lecture on *Reminiscences of the University of Goettingen* where he received his Ph.D. degree under Edmund Landau 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 and distinguished career in mathematics. The weekly colloquium on topics of broad mathematical interest is essential for maintaining a vibrant learning environment.

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.

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



Burton W. Jones



William E. Briggs

The Burton W. Jones Teaching Excellence Award was created in 1984 by gifts from the Mathematics Department faculty to honor their colleague for his long and distinguished service as a member of the faculty from 1949 to 1971 and department chair from 1949 to 1963. When Professor William E. Briggs retired in 1988, gifts were made by faculty of mathematics and other Arts and Sciences departments for a

Continued on page 12

Mathematics Endowments, (continued from p. 11)

memorial in recognition of his distinguished service as a faculty member (1955-1988) and as 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 graduate student teaching assistant (TA) in the Mathematics Department 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.

John H. “Jack” Hodges Scholarship



Jean and John 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 he notes: “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 Department faculty for 33 years (1960-1993) and continued teaching part-time for two more years. He served as department chair for three years, directed dissertations for a large number of doctoral and master’s degree students and was the recipient of many teaching and service awards. These include: 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 had this to say about his motivation to create a scholarship. “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.”

Frank F. Islam Scholarship Endowment Fund

In 2011 with a gift of \$52,000 Mr. Frank F. Islam, a University of Colorado alumnus, established an endowment that will provide scholarships each year for two CU Boulder students. Please see article on page 1.

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.

Burnett Chandler Meyer Endowment



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 page 13

Endowments, (continued from p. 12)

Frances C. Stribic Scholarships



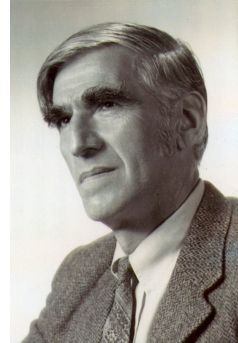
Frances Stribic and Happy Martin

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.

W. J. Thron Mathematics Fellowship

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.

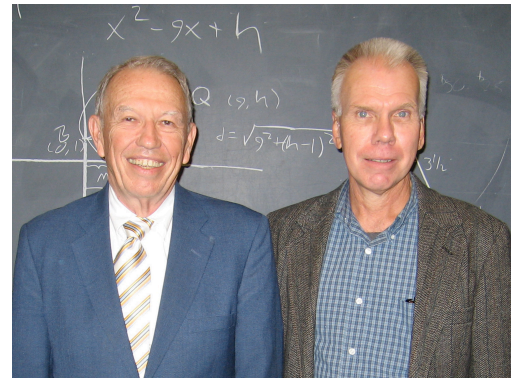


Faculty Highlights, (continued from p. 3)

Judith Packer, the Department Chair, participated in the presentation of the Annual William Lowell Putnam Exam awards. She is shown below with one of our undergraduate mathematics majors, Brian Kirkpatrick. See Putnam Awards under Student News.



Robert Tubbs, on Sept. 8, introduced Professor George Andrews of Penn State University who delivered the Math Department's Third Fall Convocation Lecture. Professor Andrews, a highly regarded mathematician known for his accessible and engaging lectures, spoke to a full audience faculty and students on the topic: "Ramanujan, the Lost Notebook, and Related Incidents."



Following are the introductory words of Professor Andrews: In 1976 quite by accident, I stumbled across a collection of about 100 sheets of mathematics in Ramanujan's handwriting; they were stored in a box in the Trinity College Library in Cambridge. I titled this collection "Ramanujan's Lost Notebook" to distinguish it from the famous notebooks that he had prepared earlier in his life. On and off for the past 35 years, I have studied these wild and confusing pages. Some of the weirder results have yielded entirely new lines of research. I will try to provide a gentle account of where these efforts have led.

The Math Corner

The “Math Corner” for Prime Bits is a creation by Professor Keith Kearnes, highlighting in simple language some significant original research by a CU Boulder mathematics professor. This year Kearnes describes work by Professor Sergei Kuznetsov..

Math Corner: Predicting the future state of an evolving system

How does one predict the future state of a system whose state at time t is measured by a column vector X_t consisting of real numbers? For example, to study human or animal migration the different entries of X_t might represent the size of different populations at different locations. To study the state of a manufacturing process over time the entries of X_t might represent the amount of different resources used and products produced during manufacturing.

The systems discussed in this note are assumed to obey a linear equation $X_{t+1} = TX_t$ where T is a constant transition matrix. The problem discussed is: given a few measured values for T , how can one give an unbiased prediction of the state of the system at a far-off future time if the system starts with a given vector X_0 ? To be specific, suppose that X_0, X_1 , and X_2 are records of the U.S. census data from 1990, 2000 and 2010. Suppose that \hat{T}_1 and \hat{T}_2 are estimates for the transition matrix T derived from the census data. How should one estimate the population distribution for years 2020, 2050, or 2100?

Each of the measured values \hat{T}_1 and \hat{T}_2 can be used with X_t to produce estimates $X_{t+1} = \hat{T}_1 X_t$ or $\hat{T}_2 X_t$, but use of the same measured value multiple times may introduce bias. This means that $\hat{T}_1^2 X_t$ and $\hat{T}_2^2 X_t$ are likely to be biased estimates for X_{t+2} . If \hat{T}_1 and \hat{T}_2 are independent, then the products $\hat{T}_1 \hat{T}_2$ and $\hat{T}_2 \hat{T}_1$ will be unbiased estimates for T^2 , but any triple product $\hat{T}_1^3, \hat{T}_1^2 \hat{T}_2, \hat{T}_1 \hat{T}_2 \hat{T}_1$, etc., is likely to be a biased estimate for T^3 .

CU faculty member Sergei Kuznetsov, together with sociologist Vladimir Orlov, discovered a formula for an unbiased estimator for T^n that depends symmetrically upon the measured values \hat{T}_1 and \hat{T}_2 ; it is the real part of the complex matrix

$$\left(\frac{\hat{T}_1 + \hat{T}_2}{2} + i \frac{\hat{T}_1 - \hat{T}_2}{2} \right)^n.$$

Here $i = \sqrt{-1}$ is the imaginary unit of the complex numbers.

The Kuznetsov-Orlov formula is valid for the more general system $X_{t+1} = TX_t + \varepsilon_t$, where ε_t is an “error vector”, if the expected value of the error is zero. The formula also generalizes to the situation where one has k independent measured values $\hat{T}_1, \dots, \hat{T}_k$ upon which to base predictions. In this case, the role of the complex numbers is replaced by the algebra $\mathbb{R}[x_1, \dots, x_{k-1}]/(x_1^2 + \dots + x_{k-1}^2 + 1)$. The Kuznetsov-Orlov formula produces many different unbiased estimators, and it is part of ongoing research to decide which of the estimators is most useful.

Eric Stade named President’s Teaching Scholar, (continued from p. 1)



and over the years it has infected in a good way all of his students and his colleagues in our department,” wrote Judith A. Packer, mathematics department chair.

“He is a force in the classroom, in the lecture halls at conference venues,

in meetings of the members of the iSTEM project, and even in the elementary schools of Boulder Valley School District where he performs his outreach, as he communicates both his enthusiasm and love of the subject matter to anyone who meets him.”

Mathematics Department Donors 2009-2011

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** to our students (**Hodges, Islam, Leonhardy, Stribic and Thron**) and to reward outstanding teaching assistants (**B.W. Jones & W.E. Briggs awards**) and Putnam Contest winners. They also support the publication of the newsletter, Prime Bits. Gifts (cash or securities) can be sent by returning the enclosed form MATHEMATICS DEPARTMENT 2011 ANNUAL FUND to the given address. Contributions to the Mathematics Department through the CU Foundation are **tax deductible**. Please see the description of **Charitable Gift Annuities** on the back of that sheet.

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Retired faculty annual picnic. Front row l. to r. Bill Jones, Richard Roth, Peggy Magnus, Pat Schmidt, Hank Hermes, Virginia Lundell, Jack Hodges, Jean Hodges, Carol Hermes. Back row: Susan Malitz, Al Lundell, Martha Jones, Muriel Briggs, Brian Hagler, Jerry Malitz, Wolfgang Schmidt, Chris and Walter Taylor, Bob and Sara MacRae, Arlan and Judy Ramsay, Doris and Kent Goodrich.