

COUNTABLE BITS

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Student Awards

Each year the department gives the **Florian Cajori Award** in Mathematics and Computer Science, honoring a student who has demonstrated unusual talent and achievement and also demonstrated a breadth and depth of interest in math or computer science. This year's honoree is **Denali Molitor**, who graduated with distinction in mathematics. We are pleased to have Denali stay on with us next year as a Paraprofessional. She plans to go to graduate school to study applied mathematics.

In addition, the department honors a graduating student with the **Sophie Germain Award**, which recognizes unusual dedication and passion for mathematics or computer science. This year's award goes to two mathematics majors, Ravi Donepudi and Hanson Smith. Ravi and Hanson both have plans for graduate school. Ravi is headed to the University of Illinois in Champaign-Urbana and Hanson the University of Colorado in Boulder.

Computer Science Tenure Track Hire

We are excited to announce that after a national search, Benjamin Ylvisaker will join us in Fall 2014 as our new tenure track computer scientist. Our computer science program has continued to grow (wait lists in CS 1 and 2 already for 2014-15) combined with the retirement of Steven Janke lead us to pursue having a second computer scientist in the department and we are glad Ben agreed to join us. Ben's career includes a Ph.D. from the University of Washington, several stints at (doomed) technology startups, and teaching engagements of various flavors at Swarthmore College, Cornell University and the Technical University of DaNang. Ben's technical interests include software engineering, programming languages, computer security, and high-performance parallel computing. Without having done any actual research into the matter, he believes himself to be in an extremely small minority of people who have been both the principal investigator on a DARPA contract and arrested on a military base. Ben maintains a flock of two dogs and a cat (and the occasional small critter) with his partner Jocelyn (CC graduate, Anthropology, '02). Welcome Ben!



TENURE FOR STEFAN ERICKSON



Stefan was awarded tenure and promotion to Associate Professor by the college this year. Stefan is an algebraic and computational number theorist. His research interests range from the Stark conjectures, to elliptic and hyperelliptic curve cryptography, and include Apollonian circle packings. His most recent paper, "Projective Formulas for Real Hyperelliptic Curves of Genus 2" was co-authored with two former CC undergraduates Tra Ho and Samuel Zemedkun. This paper was recently accepted for publication in the journal *Advances of Mathematics of Communication*. He is currently working on paper on enumerating cubic function fields with Colin Weir at Simon Fraser University and graduating CC senior Ravi Donepudi. In his nine years at CC, Stefan has taught a wide range of courses including Algebraic Number Theory, The World of Numbers, Mathematics of Cryptography, and Mathematics of Poker. He also organizes the Putnam team and sponsors blockly poker nights. In his spare time, Stefan enjoys gardening, traveling, Zen meditation, and yoga.

Andrea Bruder's Sabbatical

Andrea spent the fall semester of 2013 on pre-tenure sabbatical. She received a Dean's Benezet Grant to visit Arizona State University for one month to start working on a new project in mathematical biology with her collaborator Yun Kang. Inspired by a field system from a previous project, a system of ladybugs, aphids, and ants, Andrea and Yun are studying a three-species model that includes predator-prey, competitive, and mutualistic interactions between the three species. As always, answering one question leads to three new ones, and she brought home good problems for her research students to work on over the summer.



Mike Siddoway in the Dean's Office

Mike has been in the Dean's Office since July 1st 2013 as Associate Dean of the Faculty. Mike states, "I knew this new position would take me far away from the classroom and mathematics, but had no idea how distant my office in Armstrong would really be from the vibrant CC mathematics and computer science community always abuzz with activity in Tutt Science Center. So, I feel like I'm writing these brief words from the moon. I've got two papers that are working their way through various editors' offices and am organizing a Fall 2014 conference in New Orleans in honor of Laszlo Fuchs (my thesis advisor), so am keeping minimally mathematically active. It has been great this past year to serve our special school in a new capacity in the later years of my CC career, but my heart will always be with CC Math/CS, and I am happy to know I'll (really!) be back in the department someday."

*Math and Computer Science
Faculty (2013-2014)*

Marlow Anderson
David Brown
Andrea Bruder
Stefan Erickson
Rodney James
Steven Janke
Beth Malmskog
Jane McDougall
Michael Penn
Mike Siddoway
Amelia Taylor
Fred Tinsley
Matthew Whitehead

Departmental Staff

Marita Beckert (Staff Asst.)
Cory Scott (Paraprof.)
Amy Pacheco (Tech. Dir.)



Cory Scott

Rawles Exam

The annual Rawles exam went off smoothly in Block 6, with six problems of varying difficulty. Our *upper division winner* was **Ravi Donepudi**, and our *lower division winner* was **Ganesh Karapakula**.

Goldwater Scholarship

The Goldwater Scholarship is very competitive and is considered by many to be the top scholarship for students pursuing a career in research science. **Jessica Badgeley**, math minor, was named a Goldwater Scholar and **Gautam Webb**, math major, earned an Honorable Mention by the Barry Goldwater Scholarship and Excellence in Education Program.

MODELING CONTEST WINNERS

This year, three CC teams participated in the annual *Mathematical Contest in Modeling* in February. Out of 6755 submitted solution papers, the team of **Emma Krakoff** '16, biochemistry major, **Melissa Jav** '16, mathematics major and Euclid Scholarship recipient

received the Finalist Winner ranking (top 1%). Pictured, from right to left are Ganesh, advisor Amelia Taylor, Melissa and Emma. The team of **Eleanore Campbell** '16, mathematical economics major, **Jun Guo** '15, physics major, and **Beini Yu** '16, mathematics major, and the team of **Trevor Barron** '14, computer science major, **Ravi Donepudi** '14, mathematics major, and **Aradhya Sood** '14, mathematics and economics major, both received a Meritorious Winner ranking (top 11%). During the contest, each team chooses one of two open-ended modeling problems. Only non-human resources are allowed, and all of the modeling as well as the writing must be completed in 4 days. All of the CC teams this year chose Problem "B" to work on, asking them to "build a mathematical model to choose the best college coach or coaches (past or present) from among male or female coaches in such sports as college hockey or field hockey, football, baseball, softball, basketball, or soccer." They were required to take into account whether coaching in 1913 differs from coaching in 2013, and to present their metrics for assessment, along with their top 5-10 coaches in each of the sports. Congratulations to our winning teams!



OUR PARAPROFESSIONAL, CORYSCOTT

As my year teaching at CC comes to a close, I'm very happy to have had the chance to be paraprofessional for the Mathematics and Computer Science department. I gained a lot of teaching experience, and was able to pick the collective brain of the faculty whenever I had some mathematical (or programming) problem that was vexing me. I'm glad to have had a chance to work closely with the department (and Marita!) this year. Colorado College is really a special institution, and although mathematics on the block plan can get a little crazy sometimes, I feel very lucky to have been able to lend my skills to help teach mathematics and computer science (read: Calc I and Introduction to Java). Outside the department I read and cooked a lot, worked on some interesting woodwork, did a tremendous amount of dog training, and published my first mathematical paper! In the fall I will start a two-year Master's degree program in the Great White North (i.e. Calgary, Alberta, Canada). After that, I hope to move on to a Ph.D. program somewhere sunnier and, eventually, teach at the college level. Next year the dept. has the good fortune to have another exemplary math major, Denali Molitor '14 as our paraprofessional. I wish her the best and am confident that she will find this job every bit as fulfilling as I did. Again, thanks to the faculty and staff of the department for helping me learn the ropes, and for helping me grow as a mathematician, programmer, teacher, and person.

Putnam

The 74th Annual William Lowell Putnam Mathematical Competition took place on December 7, 2013. This nationwide problem-solving contest is a devilishly difficult six-hour exam with over 4000 undergraduate contestants from the United States and Canada. Colorado College had seven participants this year. Two of our students, senior **Denali Molitor** and junior **Gautam Webb** placed in the top 15% of all contestants. Other participants who scored well were senior **Ravi Donepudi** and sophomore **Ganesh Karapakula**. Congratulations to all our students who braved taking this exam!

Sishar Bhattarai — In Memoriam

We sadly communicate the news that alumni Sishir Bhattarai passed away on March, 28, 2013 in Kathmandu, Nepal. Sishir obtained his bachelor's degree with distinction in mathematical economics in 2001, and is remembered as a fine student from his classes with various CC faculty (Fred, Jane, Mike). He earned a masters degree from the University of Chicago and passed away while working as a Senior Consultant, serving as a governance and public policy expert, in the office of the Asian Development Bank (ADB) in Kathmandu, Nepal. He is survived by his wife, Liza Sigdel Bhattarai and their preschool aged son, Shriyans Bhattari.



EUCLID SCHOLARS!

The Euclid tradition continues. Euclid Scholarships are awarded annually to freshman and sophomores showing outstanding promise in mathematics and computer science. This year's winners are:

Melissa Jay is a sophomore. Melissa states, "My first statistics class not only influenced my decision to become a math major, it also opened my eyes to the hidden trends in data and the infinite number of problems that can be solved by methods of quantification. Numbers have a unique power, that when analyzed can exceed qualitative methods. I am excited to continue studying the inherent beauty of numbers found in data and in the natural world." Melissa is an avid rock climber and hiker who works at the climbing gym on campus, and tries to get outside as much as possible. She is also an active member of the CC SIAM chapter and the CC Outdoor Recreation Committee.

Soeren Walls is a first year student who has been coding for six years. Soeren states, "Right now I'm almost finished programming my first Android app for the Google Play Store, a puzzle platformer videogame about defying gravity called Gravl, which I've designed using Photoshop and programmed in Java over the past six months. I'm hoping to major in Computer Science & Theatre and maybe figure out how to combine the two disciplines."



Nate Mankovich is a first year student who was drawn to problem solving at an early age. He enjoyed calculus courses this year and is excited about venturing into higher level mathematics courses next year. Nate works in the GIS computer lab and plays on Wasabi, the CC ultimate Frisbee team. He also enjoys trail running, backpacking, skiing and rock climbing.

Nicolas Kramer is a sophomore who stated that he, "likes logic algebras, geometry, set theory, boxing, off shore sailing, walking in the woods, a good pair of work boots, and old trucks. He hopes he will like universal algebra, category theory, topology, grad school, being a teacher and growing old."



The *Euclid Scholarships* are made possible by donations from generous alumni. If you'd like to help, you may send a check (made payable to "Colorado College" and with "Euclid Scholarship Fund" on the memo line) to: Development Office, The Colorado College, PO Box 1117, Colorado Springs, CO 80901-9897

Graduating Majors, 2014:

Mathematics:

Max Ciaglo
Rosie Curts
Ravi Donepudi
Irene Draper
Willa Hopkins
Denali Molitor
Sam Seiniger
Hanson Smith
Aradhya Sood
Zach Steedman
Nicole Williams
Erin Wolpert
Carson Wray

Computer Science:

Patricia Andrews
Trevor Barron
Evan Cole
Coulter Fatt
Julian Katz
Azeem Sola

Mathematical Economics:

Michael Bennett
Conor Crowley
John Goldberg-Richmeier
Eli Greenspan
Kenneth Marsh
Chinmay Mungi
Gavin Nachbar
Jayson Post
Jaclyn Rosenquist
Henry Sachman
Sylvie Scowcroft
Kai Thompson
Thamanna Vasan
Lachlan Watkins

LAS Major:
Colin Ronald

CURRENT STUDENTS GOING PLACES

Over the summer, **Katy Martinez** and **Minqui Liu** will do research projects with Andrea Bruder as part of a Faculty-Student Collaborative Research Grant. **Melissa Jay** is headed off to participate in the Iowa Summer Institute in Biostatistics and **Gautam Webb** (San Diego State), **Emma Holmes** (Brown University), and **Eleanore Campbell** (University of Northern Iowa) have all been accepted into *Research Experience for Undergraduates* programs. These are all prestigious awards; awardees will have their travel and living expenses covered and receive a stipend to engage in research with a small group of competitively selected students. The *Budapest Semester in Mathematics* is our study abroad program of choice for math majors where students can study a range of rigorous upper division mathematics in Europe. This year **Nicole Pey**, **Julia Napolitano** and **Irene Draper** all spent their fall in Hungary as part of this program. Many of our students have exciting internships and jobs for the summer, including Jason **Mushinski** who is doing software engineering with CA Technologies, **Julia Napolitano** will be working at Spencer Stuart, a leading executive search consulting firm in Washington DC, and **Nicole Pey** is working for UBS Wealth Management in New York City. Finally, **Joseph Howard** is teaching middle school as part of the "Breakthrough Collaborative."

NEWS FROM ALUMNI AND SENIORS

Azeem's Big Idea Award: This year CC held its second campus-wide entrepreneurial competition called *The Big Idea* where teams of students develop entrepreneurial ideas and pitch them to a panel of judges. Our own **Azeem Sola**, a senior computer science major, was on the second place team that won \$15,000. **Senior Plans:** **Hannah Kim** is headed off to complete a masters in engineering at Columbia University this fall. **Denali Molitor** is participating in a summer research program in applied mathematics at UCLA and will be our new paraprofessional for 2014-15. Zach Steadman has a teaching position in Denver. **Trevor Barron** will be working for Lockheed Martin. **Graduate School Bound:** **Ravi Donepudi** is headed to the University of Illinois, Urbana-Champaign, and **Hanson Smith** the University of Colorado at Boulder.

Alumni News: **Victoria Curnette** is completing her second year teaching in Korea and **Demetria Humphries** just completed a year as the paraprofessional for CC's Film and New Media Studies. **Amy Hepner** is in the graduate statistics program at Ohio State University. **Dani Richardson** owns the local company Baby Cotton Bottoms. **Elise Hellwig** published her first paper in the *International Journal of Difference Equations*.

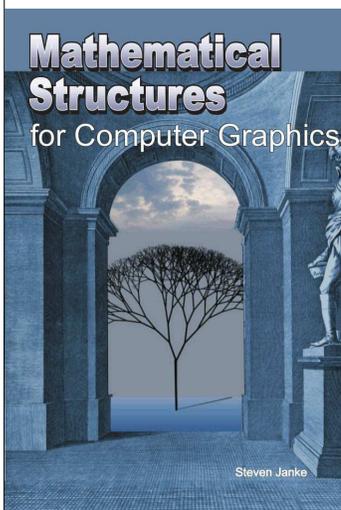
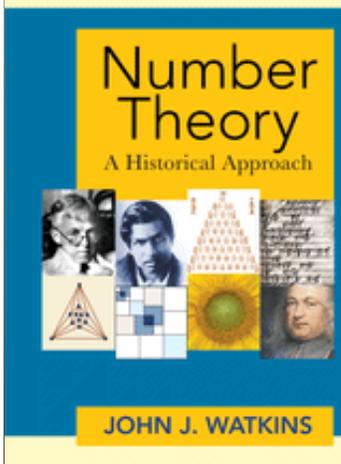
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Other Snippets of Departmental News: We are hosting the MAA Rocky Mountain Section Meeting in April 2015 to celebrate the 100th Anniversary of the section. We will also conduct an external review of the department in 2015.



YEAR-LONG VISITORS



Michael Penn (left) and **Rodney James** (right) will join us for another year. Michael has been helping out with the problem solving activities in the department as well as running a set theory seminar. Rodney, will be teaching FYE with Amelia Taylor in the fall and both have been wonderful active members of the department.



Beth Malmskog, who has been with us the last two years, is heading off to a tenure-track position at Villanova University in Philadelphia. We will miss Beth and wish her good travels and lots of luck in her new position.

BLOCK VISITORS, THIS YEAR AND NEXT

The department experienced heavy enrollments this year and is facing extreme enrollments for next year as well! (21 in Analysis I, 25 in Algebra I and 25 in both PDE's and Probability!). This year's high enrollments required a late-in-the-game addition of several extra courses to meet the demand. We were very fortunate for the additional help from block visitors **Gonzalo Aranda Pino**, University of Malaga, **Gene Abrams**, UCCS, and **Jim Powell**, Utah State University. Gonzalo and Gene both taught full calculus courses and Jim Powell taught 25 in Numerical Analysis, freeing up Andrea to cover yet another full calculus class. All three visitors also gave excellent Fearless Friday talks for us this year. They have done a fantastic job of teaching for us and we are thankful they could help out. It looks like Gonzalo and Gene will join us again next year along with Emeritus faculty member **Kathy Merrill**, whom we are very excited to have join us. As our enrollments continue to grow without bound, we expect to have a few more block visitors next year as well.

FACULTY JOURNAL PUBLICATIONS

Amelia Taylor's paper, co-authored with Elizabeth Allman and John Rhodes, "A semialgebraic description of the General Markov model on Phylogenetic Trees" will appear soon in the SIAM Journal on Discrete Mathematics. **Rodney James's** paper, co-authored with Rick Miranda, "A Riemann-Roch Theorem for Edge-Weighted Graphs" appeared in the Proceedings of the American Mathematical Society, Volume 141, no. 11, Nov. 2013, Page 3793-3802. **David Brown's** paper "Linking molecular and population processes in mathematical models of quorum sensing" appeared in the *Bulletin of Mathematical Biology*, 75:1813-1839 this year. **Andrea Bruder and David Brown** co-authored a paper with Miro Kummel from Environmental Science, "How the aphids got their spots: predation drives self-organization of aphid colonies in a patchy habitat" which appeared in *Oikos* 122:896-906. In the March, 2014 edition of *The American Mathematics Monthly*, Marc Chamberland and Doron Zilberger published an article titled "A Short Proof of McDougall's Circle Theorem" effectively naming a theorem after our own **Jane McDougall**. Jane originally proved this generalization of Ptolemy's theorem which is a very nice geometry theorem from antiquity. While Jane's longer proof is more general than what appears in the monthly, Chamberland and Zeilberger, in Jane's words, "Came up with a short proof that uses Lagrange interpolation - it is awesome and elementary."

BOOK PUBLICATIONS

John Watkins, although retired in 2010, continues to be productive. This year his book, *Number Theory: A historical Approach*, appeared in print. He would especially like to thank the many students who endured earlier drafts of this book in their number theory course at CC; their many comments and suggestions improved this book immeasurably, and he is deeply grateful. John also published a book last year, *Combinatorics: Ancient and Modern* (co-written with Robyn Wilson), as reported in the 2013 newsletter and recently had a chapter, "Krull Dimension of Polynomial Rings and power Series Rings" appear in the book *Progress in Commutative Algebra*. In addition, he continues to write book reviews regularly for the *Mathematical Intelligencer*.

Steven Janke's book, *Mathematical Structures for Computer Graphics*, grew out of notes for a graphics course taught at the college over the past twenty years. It focuses on the mathematical ideas useful in graphics like vector geometry, transformations, triangles, polyhedra, and the algebra of pixels. Along the way some of the physics of light is developed to understand how to shade objects. The publisher (Wiley) plans to have the book available in the fall of 2014.

The third edition of **Marlow Anderson's** *A First Course in Abstract Algebra* is expected in Fall 2014.