



**Teaching:**

- 2007 Spr. **Instructor, Math 422 University of Montana:** Abstract Algebra  
**Instructor, Math 107 University of Montana:** Contemporary Mathematics
- 2006 Aut. **Instructor, Math 221 University of Montana:** Linear Algebra  
**Instructor, Math 151 University of Montana:** Calculus
- 2006 Spr. **Instructor, Math 221 University of Montana:** Linear Algebra  
**Instructor, Math 121 University of Montana:** Precalculus
- 2005 Aut. **Instructor, Math 221 University of Montana:** Linear Algebra  
**Instructor, Math 121 University of Montana:** Precalculus
- 2002 Aut. **Instructor, Math 170 UC, Berkeley:** Linear Optimization
- 2001 Sum. **Instructor, Math 444/5, University of Washington** "Geometry for Teachers"
- 1999 – 2000 **Lead Teaching Assistant, University of Washington** This involved working with a faculty member to develop and run a week-long training session for incoming graduate students and acting as a TA Mentor for ten new graduate students.
- 2000 Sum. **Co-Instructor, Math 444/5, University of Washington** In this instance the course responsibilities were split between two instructors.
- 1998 Aut. **Teaching Assistant Mentor, University of Washington**
- 1997 – 1998 **Grader: Math 524/5/6, University of Washington** the Real Analysis sequence for first year graduate students
- 1995 – 1997 **Teaching Assistant: Math 120, 124, 444/5, University of Washington** Pre-Calculus, First Quarter Calculus and "Geometry for High School Teachers"
- 1991 – 1992 **Teaching Assistant in Physics, Cornell University** This included a "Physics for Poets" course, acting as instructor for a Special Relativity mini-course and two semesters of Physics labs.
- 1988 – 1989 **Head Teaching Assistant, Physics, Stanford University** Each of the large physics courses at Stanford has a "Head TA" to work with the professor creating tests and homework assignments and to handle the organizational needs. I was Head TA for Physics 55, "Light and Heat" in Fall 1988 and for Physics 25, "Modern Physics" in Fall 1989. It was rare for undergraduate to act as TAs at Stanford and I know of no other undergraduate Head TAs.
- 1987 – 1989 **Teaching Assistant, Physics, Stanford University** two quarters as a TA in the Freshman Physics sequence and two quarters as a teaching assistant/group leader in a special undergraduate Low Temperature Physics lab
- 1985 – 1987 **Group and Individual Tutor in Physics, Stanford University** trained by the Center for Teaching and Learning at Stanford University.
- 1982 – 1998 **Private Tutoring in Mathematics** hundreds of hours tutoring mathematics: Fourth Grade through Eleventh Grade Level as well as SAT Prep.

**Talks and Conferences:**

- 2007 Apr. **Graduate-Faculty Conference, University of Montana**  
“Visualizing Multivariate Data”
- 2006 Nov. **Matroids in Montana Conference, University of Montana**  
“Affine Gale Diagrams, Radon Partitions and Diameters of Polytopes”
- 2006 Apr. **Graduate-Faculty Conference, University of Montana**  
“Polytopes: Windows into Higher Dimensions”
- 2004 Nov. **Colloquium, University of Regina** “Polytopal Graphs and Digraphs”
- 2004 Sept. **Colloquium, University of Montana** “Polytopal Graphs and Digraphs”
- 2004 Sept. **Big Sky Conference, University of Montana** “Polytopal Digraphs”
- 2002 Mar. **4th Bay Area Discrete Mathematics Day, Stanford University**  
“Linearly Induced Orientations on Combinatorial 4-Cubes”
- 2001 Oct. **Combinatorics Seminar, University of California, Davis**  
“Polytopal Graphs and Digraphs”
- 2000 Aug. **VK75: A Celebration of the 75th Birthday of Victor Klee (Co-Organizer):**  
a three day international conference with over fifty participants, organized with fellow student Shawn Cokus
- 2000 July **MSRI Workshop on Combinatorial Game Theory (Participant):** a two week course organized by E. Berlekamp and D. Wolfe
- 2000 Apr. **the Klee-Grünbaum Festival of Geometry (Participant):** A week long conference in honor of Victor Klee and Branko Grünbaum, held in Israel.
- 1998 July **Fifth Czech-Slovak Symposium on Combinatorics, Graph Theory, Algorithms and Applications (Participant)**

**Local Seminars:**

- 2007 Fall **Department of Mathematical Sciences, University of Montana**  
Geometry Seminar: four talks, Combinatorics Seminar: one talk
- 2006-7 **Department of Mathematical Sciences, University of Montana**  
Geometry Seminar: six talks, Combinatorics Seminar: two talks
- 2005-6 **Department of Mathematical Sciences, University of Montana**  
Algebra Seminar: two talks, Combinatorics: two talks, Geometry: two talks
- 2004-5 **Department of Mathematical Sciences, University of Montana**  
Algebra Seminar: two talks, Combinatorics: two talks, Geometry: one talk
- 2001 Sep. **Combinatorics Seminar, University of California, Berkeley**  
“Polytopal Graphs and Digraphs”
- 1998-2001 **Combinatorics Seminar, University of Washington**  
four talks on polytopal graphs and polytopal digraphs

**Math Clubs:**

- 2007 Nov. **Math Club, University of Montana** "Gambling Day" Volunteer
- 2006 Nov. **Math Club, University of Montana** "Gambling Day" Organizer
- 2004 Nov. **Math Club, University of Montana** "Gambling Day" Lecturer
- 2000 Mar. **Math Club, Seattle University**, lecture "Introduction to Polytopes"
- 1997 – 1998 **Wedgwood Elementary School Math Club (Organizer)**  
weekly, hour long meetings to explore the excitement of mathematics
- 1996 – 1997 **Wedgwood Elementary School Math Club (Co-Organizer)**
- 1996 Spr. **Wedgwood Elementary School Math Club (Volunteer)**

**Academic Service:**

- 1999 – 2001 **Preparing Future Faculty Committee Member** one of two student members
- 1999 – 2000 **Calculus Committee Member** I was the student representative and an active member of a committee to reform our department's introductory calculus sequence. Our proposal was implemented in the Fall of 2001.
- 1999 Sept. **Co-Author, The Teaching Assistant Training Manual** Professor Judith Arms and I compiled an eighty-five page text to supplement the week-long training given to incoming graduate students. Roughly half the material was edited from other sources, the other half was written by the two authors.

**Non-Academic Employment:**

- 2003 – 2004 **Poker Player** For nearly two years, I made my living as a poker player. This included playing in the main event of the World Series of Poker and in a tournament on the World Poker Tour.
- 1993 – 1995 **Mihalisin Associates, Inc.** Position – Commissioned Software Sales.

**Other Skills:**1. **2-Dan Go Player, Master Tantrix player**

Go is an ancient strategy game most popular in Japan, Korea and China, with a strong following in Europe and the U.S., as well. The game has proven to be a fertile area for study via Combinatorial Game Theory. The rankings use the same system as martial arts, with 2-Dan corresponding to second degree black belt. Tantrix is a game using hexagonal dominoes where players vie to create the longest string of their color. At one point, I was ranked among the top ten players in the world.

2. **“Wilderness Reflections” Guide and Selection Committee Member**

Wilderness Reflections is a Freshman and Transfer student orientation program at Cornell University. Groups of six to ten students are taken backpacking, canoeing or rock-climbing by a pair guides. Guides must possess a variety of outdoor, emergency and inter-personal skills. I was a guide for four such trips and for two years I served on the committee to select guides.

**References:**

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## Abstracts/Descriptions of Papers

- 1. Magic squares and antimagic graphs** (9 pages, with P.Mark Kayll and Jennifer McNulty):

An *antimagic labeling* of a graph with  $m$  edges is a bijection  $\lambda$  from its edge set to  $\{1, 2, \dots, m\}$  such that the vertex sums are distinct, a vertex sum being the sum of the  $\lambda$ -values on its incident edges. An *antimagic* graph is one that admits such a labeling. It was conjectured in [N. Hartsfield and G. Ringel, Supermagic and antimagic graphs, *J. Recreational Math.* **21** (1989), 107–115] that every connected graph other than  $K_2$  is antimagic. We verify this conjecture constructively for a class of graphs derived from the complete graphs  $K_n = (V, E)$  using a variant of magic squares.
- 2. Vertex Magic Unions of Stars** (6 pages):

A labelling of the vertices and edges of a graph is *vertex magic* if the sum of a vertex's label plus all its incident edges has the same value for each vertex in the graph. This paper verifies that bounds found by D. Wallis in the maximal edge case for unions of stars are tight and finds bounds for other extreme cases of unions of stars.
- 3. A Nonconvex Embedding of an Exceptional Simplicial 3-Sphere With Eight Vertices** (5 pages, with Gordon Williams):

In 1967 Grünbaum and Sreedharan discovered a combinatorial simplicial 4-polytope with 8 vertices which did not admit a representation by the boundary complex of a 4-polytope. In this paper we supply a nonconvex embedding and discuss the techniques used to demonstrate the validity of the embedding.
- 4. Affine Orientations of Polytopes with Few Vertices** (13 pages):

Given a combinatorial class of  $d$ -polytopes with either  $d+2$  or  $d+3$  vertices, this paper provides a good characterization telling which sequences of vertices (as well as which directed graphs) can be induced by an affine function acting on some member of the combinatorial class.
- 5. Convex and Linear Orientations of Polytopal Graphs** (15 pages, with Victor Klee):

This paper examines directed graphs related to convex polytopes. For each fixed  $d$ -polytope and any acyclic orientation of its graph, we prove there exist both convex and concave functions that induce the given orientation. For each combinatorial class of 3-polytopes, we provide a good characterization of the orientations that are induced by an affine function acting on some member of the class.
- 6. A Robust Visual Access and Analysis System for Very Large Multivariate Databases** (5 pages, with T. Mihalisin, J. Schwegler, E. Gawlinski, J. Timlin):

Paper further explores applications of a graphical method for analyzing multi-dimensional data.
- 7. Magnon Thermal Conductivity of Solid  $^3\text{He}$  in the  $\text{U2D2}$  Antiferromagnetic Phase** (4 pages, with Y.P. Feng, P. Schiffer and D.D. Osheroff):

Experiment measures thermal conductivity of helium crystals at millikelvin temperatures. My main contributions were devising an alternative analysis method and programming to computer automate the experiment.