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Winter 2005

Simpson College Mathematics Department

Functions and Lines

Seniors Present Research Papers

Simpson College mathematics majors complete a research project before graduation. This year, half the seniors worked on their projects in the fall semester and the other half will begin in the spring.

Dr. Rick Spellerberg advised Shristi Upreti, Laura Becker and Ashley Bennett in projects in game theory. Jared Rokke, Greg Elliott and Scott Roth worked on number theory under the direction of Dr. Bill Dunning.

Jared Rokke, Greg Elliott, Shristi Upreti, Scott Roth, Ashley Bennett and Laura Becker present their Senior Seminar papers during December in the Carver Science Center.

The topics of the research were varied and included applications to economics and biology. Shristi cataloged various algorithms for the museum problem in game theory and wrote a paper that will be used by students in the future. Greg spent the semester studying the axiomatic development of the rational numbers. Ashley continued work begun by Lwando Manxodidi and Shikha Basnet last May on the marriage problem.

Laura worked through a paper on applications of game theory to the study of the evolution of parasitic bird species such as cuckoos and cowbirds. She will continue this work in the spring and expects to present at the Midwest Undergraduate Mathematics Symposium in April. Scott wrote a historical perspective of nonlinear Diophantine equations and Jared investigated primitive roots.

Drs. Spellerberg and Dunning and Dr. David Olsgaard, physics, will be supervising students in Senior Seminar this spring: Brad Allen, Taylor Rettig, Amber Woodley, Aye Win, Lwando Manxodidi and Chrissy Hendricks. They will be presenting their papers during the weeks of April 18 and 25, 2005.

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Undergraduate Research Symposium Planned

The Second Annual Midwest Undergraduate Symposium in Mathematics will be held on Saturday, 9 April, 2005.

The purpose of the symposium is to promote undergraduate research in the mathematical sciences.Any student or faculty who is involved in or wants to be involved in undergraduate mathematics research is invited to attend.Students can use the symposium as an opportunity to share and celebrate their work with others in the mathematics community.

The plenary speakers will be Deanna Haunsperger and Steven Kennedy, professors of mathematics at Carleton College. The morning plenary talk will be "Halving Your Cake." Drs. Haunsperger and Kennedy will talk about the mathematics of sharing. The usual algorithm for sharing a piece of cake between two people is "I cut, you choose." If the cake has to be shared among three or more people, what do you do? Dr. Haunsperger will give the afternoon plenary talk "Election Antics" on methods of tallying votes in elections.

The First Annual Undergraduate Mathematics Symposium held at Simpson on March 27, 2004, was a great success with 60 participants representing 8 educational institutions and a variety of other organizations. There were 9 presentations by undergraduates and 2 faculty presentations. The presentation topics included solutions to problems from the Mathematical and Interdisciplinary Contests in Mode-

First Mathematics Day Draws Crowd

The Simpson College Mathematics Department hosted the first Mathematics Day this fall. The event coincided with Homecoming and was intended to build connections between our undergraudates, mathematics alumni and high school students with an interest in mathematics.

Dr. Rick Spellerberg and Dr. Murphy Waggoner started the day off talking about problems in economics, medicine, population control and other areas that require experts in mathematics to solve. They explained that this need for analytic problem solving is what makes mathematics majors highly marketable.

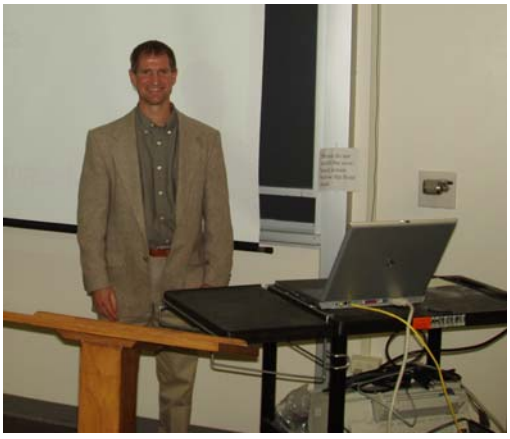
A social hour and lunch followed the talk and the faculty, students and alumni had many discussions of opportunities for mathematics majors during college and after graduation.

The department plans to have another Mathematics Day next fall.

"...this need for analytic problem solving is what makes mathematics majors highly marketable."

Kolpin Speaks on Game Theory

Dr. Van Kolpin of the University of Oregon came to the Simpson Campus on November 4 to share his expertise in game theory. As part of the Simpson Forum series, Dr. Kolpin gave a talk on game theory titled "The Evolution of Strategy: A Force for Business, Society, Science and Life".



Dr. Van Kolpin speaks on evolutionary game theory.

The students in Senior Seminar met with Dr. Kolpin to talk about graduate school opportunities. He also gave a more technical talk on evolutionary game theory to the seniors.

Dr. Kolpin received his Ph.D. in Mathematics from the University of Iowa in 1990 and is currently the chair of the Economics Department at the University of Oregon.

Dr. Dunning Retires

Dr. Bill Dunning, professor of mathematics, will be retiring after the spring 2005 semester. Dr. Dunning came to Simpson College in 1984 and was the department chair from the time he arrived until 2003.

During 20 years as department chair, he doubled the size of the department. Dr. Dunning was also instrumental in the introduction of technology into the mathematics classrooms. He was the first to use TI-85 calculators and he wrote Maple laboratory assignments for Calculus III and Differential Equations. The current mathematics competency program is also a result of Dr. Dunning's work to strengthen the mathematics curriculum.

The college has also benefited from Dr. Dunning's service. He has served on and chaired all major faculty committees sometime during his time at Simpson. He also ran the football and basketball pools.

Dr. Dunning got his B.S. in mathematics from Union College and an M.S. and Ph.D. in mathematics from Duke University. Before coming to Simpson, he taught at Belleview College near Omaha, Nebraska, and at Drake University in Des Moines.

He does not currently have big plans for his retirement, and will start out by relaxing with his wife Linda in their home in Indianola. A search is currently underway to fill his position.

"During 20 years as department chair, he doubled the size of the department."

Students Present at Joe K. Moody Science Symposium

Two senior mathematics students presented their research at the Joe K. Moody Science Symposium. The symposium is an opportunity for Simpson College students in mathematics, biology, chemistry, physics, geology and computer science to share their research with the rest of the campus community.

Ashley Bennett gave an oral presentation of her work on matching algorithms. Matching algorithms are used to match people or things in two groups either in a one-to-one or one-to-many relationship. For example, a matching algorithm might be designed to match up partners in doubles tennis or to assign students to various medical schools. Ashley's work focused on the marriage problem: how do you match *n* women with *n* men in marriage to maximize the "happiness" of the group.

Greg Elliott gave a poster presentation of his work in Senior Seminar. Greg studied the axiomatic development of the real number system and his poster focused on the rigorous development of the natural numbers, the integers and rational numbers.

Simpson Participates in Putnam Competition

Two Simpson students competed in the William Lowell Putnam Competition this past December. Shristi Upreti and Shikha Basnet participated in the six-hour competition on Saturday, December 4, 2004.

Each year the exam for the Putnam Competition consists of six questions in the three-hour morning session and six different questions in the afternoon session. The competition began in 1938 and is open to regularly enrolled undergraduates in colleges and universities in the U.S. and Canada.

Nineteen students from Simpson College have competed in the Putnam Competition since 1992. The exam is always given on the first Saturday of December and registration for the competition is in late September. Any students interested in participating in 2005 should contact Dr. Murphy Waggoner.

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The Mathematics program at Simpson College is designed to give students an opportunity to develop a mathematical foundation as a tool for understanding the world and society in which they live. The department prepares students for either graduate study, careers in secondary education, or employment in a mathematically related field.

For the things of this world cannot be made known without a knowledge of mathematics.

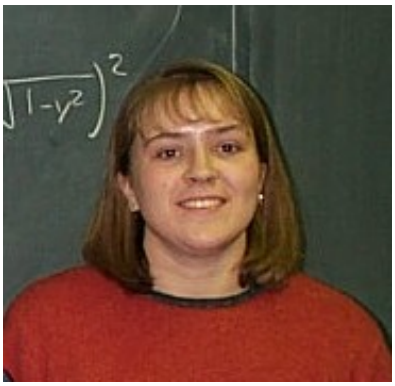
Roger Bacon

Bennett Participates in REU

Ashley Bennett participated in an Research Experience for Undergraduates with the Department of Statistics at Iowa State University during the summer of 2004.

Ashley's worked on a project to use statistical analysis to find an ordering of Plato's documents. Plato wrote seven documents in which the ordering is unknown, except that the first document was the Republic and the last was the Laws. Ashley's work built on that done by Cox and Brandwood who studied the distribution of the short and long syllables of the last five syllables in each sentence of each of the documents.

Ashley will be student teaching in the spring of 2005 and plans to attend graduate school after graduation.



Ashley Bennett completed the REU program in statistics at Iowa State.