

The Mackinac Gazette

Greetings from the Department Chair

Welcome to the fourth edition of the Grand Valley State University Department of Mathematics Newsletter. As has been the case for the last several years, the department has undergone many changes. We welcome four faculty to tenure track positions: Stephen Blair, Manish Chakrabarti, Shelly Smith, and Matt Wyneken. At the end of this academic year we will also have three retirements: Mary Ellen Barber, and affiliate faculty Gene Dornbush and John Kirchgessner. We wish them well.

There were some other personnel changes in the department this year. Matt Boelkins is now an Associate Professor with tenure and Karen Novotny has been promoted to the rank of Professor. This is well-deserved recognition for both. I had a relaxing and productive sabbatical in the fall, Jane Mays is on sabbatical this winter, and Matt Boelkins has a full year sabbatical.

As you will read inside, two of our faculty have recently been recognized with honors. Char Beckmann was presented with the Distinguished Contribution to a Discipline award by

GVSU and Ted Sundstrom has been named as the recipient of this year's Award for Distinguished College or University Teaching of Mathematics from the Michigan Section of the Mathematical Association of America (MAA). Congratulations to both.

Over the last three summers, the department has hosted a Research Experiences for Undergraduates (REU) program funded by the National Science Foundation. Last summer, four faculty (Ed Aboufadel, Will Dickinson, Steve Schlicker, and Jody Sorensen) worked with 8 students on research problems in wavelets, dynamical systems, spherical and hyperbolic geometry, and the Hausdorff metric geometry. The students who participated in the research were Kevin Brink (University of San Diego), Drew Colthorp (GVSU), Matt Katschke (Ohio Northern University), Kris Lund (GVSU), Amanda Morris (Haverford College), Patrick Sigmon (Wake Forest University), Jodi Simons (University of New Hampshire), and Abby VanHouten (Muhlenberg College). We had an enjoyable and productive

summer. By the end of the program, the students had produced a major research paper, and had given two major presentations. The first of the presentations took place at the Michigan REU conference at Hope College. This conference involved REU participants from programs at Grand Valley, Hope College, and Central Michigan University. At the end of the summer, the REU students gave presentations at MathFest, the annual summer national mathematics conference of the MAA, which was held in Providence, RI. Matt Katschke won a prize for his presentation at MathFest, as did Grand Valley student Nate Burch.

Our REU grant for this program ended in February, 2005. A team of 11 faculty, Matt Boelkins, Will Dickinson, Paul Fishback, Jon Hodge, Reva Kasman, Filiz Dogru, Steve Schlicker, Jody Sorensen, Akalu Tefera, Clark Wells, led by Ed Aboufadel submitted a new proposal to the NSF to continue our REU. I am pleased to report that the NSF has funded this grant and we will be hosting an REU site for the next five summers.

This newsletter marks the debut of our new editing team: Reva Kasman and David Austin. I want to thank them for the wonderful job they did in creating this newsletter. I hope you will use this newsletter to share your successes with us and let us know how you are doing. If you have the opportunity to return to campus, I encourage you to do so, to stop by and visit your old faculty friends, and to take advantage of the many opportunities that are available at Grand Valley State University.

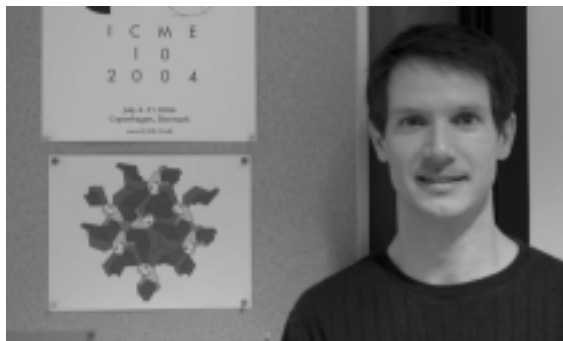


Dr. Fishback's students exact their revenge.

Steven Schlicker
Chair, Department of Mathematics

Five New Faculty Join the Department of Mathematics

The Department of Mathematics is pleased to welcome five new faculty members this year.



Steve Blair

Steve Blair has returned to Michigan to take a position as an Assistant Professor in our department. After earning a bachelor's degree from the University of Michigan at Flint and a master's from the University of Michigan in Ann Arbor, Steve taught fourth and fifth grade mathematics in Nepal for two years as a member of the Peace Corps and later taught at the College of Micronesia. These teaching experiences provided him with an appreciation of the difficulties students have in learning mathematics and developed in him a strong interest in mathematics education. To pursue these interests further, Steve returned to school to study mathematics education at Portland State University in Portland, Oregon, where he earned his doctorate last year.

Steve's professional focus is on the mathematical preparation of pre-service elementary teachers and the professional development of K-12 teachers. He is particularly interested in the teaching and learning of geometry along with broader issues of research in undergraduate mathematics education. Grand Valley appealed to Steve because of its focus on quality undergraduate instruction. He was also drawn to our department for the unique way that high-quality mathematics education faculty work within the mathematics department and the fact that mathematics education specialists and mathematicians have developed supportive and collaborative relationships. Steve says that he has received considerable help and encouragement from members of the department since his arrival and that this has helped him grow professionally in the short time that he has been here.

Manish Chakrabarti came to mathematics after earning a bachelor's degree in computer science at the Birla Institute of Technology and Science in Rajasthan, India. After a brief stay at Purdue, where he earned a master's degree in mathematics, Manish continued his graduate studies at the University of Wisconsin at Madison, where he earned a master's degree in computer science and eventually his Ph.D. in mathematics. At Madison, he particularly appreciated his thesis supervisor's encouragement to take a wide variety of courses, including computer science and mechanical engineering courses. After completing his graduate studies, instead of pursuing the traditional academic path, Manish spent the next six years working in a corporate environment as a software developer for various startups and a consultant for companies such as Siemens Research in the area of database management systems. While Manish found this to be enjoyable work, he realized that he missed working with students and having the freedom to investigate problems of his own choosing and so decided to return to school to defend his Ph.D. thesis and then join academia.



Manish Chakrabarti

Within mathematics, Manish's research interests are in Lie algebras and quantum groups. However, he is also interested in interdisciplinary work that uses mathematics in a significant way, such as database systems and data mining, bioinformatics, and image processing. Along with its focus on undergraduate teaching and research, Grand Valley's encouragement of such interdisciplinary research persuaded Manish to pursue his passion for teaching and collaborative work as an Assistant Professor in our department. Manish cites his father, who is also a mathematics professor, as an inspiration, helping him to experience the joys of mathematics, learning and teaching.



Shelly Smith

Shelly Smith earned her bachelor's degree at Portland State, which she left just before Steve Blair arrived, and her doctoral degree from Arizona State University. Shelly's mathematical interests are in a relatively new area of mathematics known as A-theory. In this subject, concepts are taken from algebraic topology, a field that uses algebra to study continuity and its properties, and applied in a discrete setting to yield insights into the properties of objects such as graphs and simplicial complexes. Shelly was led to trade sunny Arizona for an Assistant Professorship in our department and Allendale's whiter winters since she wanted to work in a department that made teaching a clear priority and that supported a diverse range of professional activities in its faculty. Shelly says that the most important thing that helped her make the transition to Grand Valley was buying a good winter coat and that she is beginning to feel at home here now that she has finally gotten the clutter in her office under control.

After earning bachelor's and master's degrees from the University of Madras, **Sailakshmi Srinivasan** taught applied math for engineering students in India for several years. When her husband's career as a software consultant brought her family to Grand Rapids after stops in Minneapolis and Philadelphia, Sai took a position as an Affiliate faculty in our department this year teaching courses such as Math 110, 122, 123 and 201. Sai enjoys teaching at Grand Valley though it has been a challenge to make the transition to teaching in a different country. For example, working with classes in which students' abilities vary widely is a new experience for her. Besides her teaching duties here, Sai enjoys coaching talented students for competitive exams such as the Continental Math League, the Michigan Math League, and the SAT. In fact, Sai's daughter, at the age of ten, recently won a first prize trophy in the Michigan Math League and scored a remarkable 610 out of 800 on the mathematics portion of the SAT.



Sailakshmi Srinivasan



Matt Wyneken

A new Associate Professor in our department, **Matt Wyneken** earned his bachelor's degree from Wabash College and his doctorate from the University of Michigan. When he then began a position at the University of Michigan at Flint, Matt says that he taught primarily as he learned: "teaching as telling." A few years later, however, when he and a few colleagues began experimenting with cooperative learning, he knew that he could never return to the traditional lecture method.

Matt experienced what he calls "a gradual, fascinating, professional and personal life-changing experience" when working on a federal grant to improve the math and science courses for elementary education students at Flint. Through this work, he developed a close working relationship with a mathematics education faculty member and moved to a much more student-centered approach to teaching. The success he found is illustrated by the fact

that students stopped asking the question, "Why do I have to know this?," in his mathematics content courses.

Through meetings, such as those sponsored by the Michigan MAA, Matt became acquainted with faculty in the mathematics department at Grand Valley and familiar with their work and values. When he learned that this department rewards its faculty for work on projects such as Enhancing the Core, Matt knew that he would like to be in our department.

Matt's current interests in the mathematical preparation of elementary teachers are taking most of his time now. He is also interested, however, in number theory, orthogonal polynomials associated with general measures, the mathematics of social choice, mathematics for business decisions, organizational learning theory, especially as it relates to education, and physics.

On making the transition to Grand Valley, Matt reports, "The support here has been tremendous. At the last department meeting, Nancy Mack said that this department has a sense of community unlike anything she has experienced at her prior institutions. It *is* special here."

Family Math Night = Learning + Fun

Imagine elementary age children and their parents together engaged in creative mathematical activities helped out by Grand Valley students and faculty in a fun atmosphere. Now you've got the idea of Family Math Night.

Grand Valley faculty members Pam Wells, Matt Wyneken and Paul Yu hoped to ease their future elementary teachers into teaching by providing a teaching experience in an environment that was realistic but low-stress. At the same time, they hoped to help local elementary students and their parents recognize that there was a playful side to mathematics that is often not appreciated through class work. Their solution was to bring these two groups together through the creation of Family Math Night.

Family Math Night events, held in local elementary schools for students in grades K-6 and their parents, provide a variety of hands-on activities that engage participants in meaningful mathematics such as geometry, probability and statistics, patterning, and measurement. For example, one activity asks students to blow bubbles that they pop on a piece of dark construction paper. The moisture from the bubble leaves a circle on the paper, the diameter and circumference of which can be measured with string. In this way, students discover that the ratio of the circumference to the diameter of the circle is π no matter how large the circle is.

Grand Valley student helpers lead the elementary students and their families through the activities in ways that are meaningful for the students no matter their age. This gives the Grand Valley students experience in writing lesson plans and modifying or extending them to make them accessible to every age range. Planning these lessons gives the student helpers valuable exposure to the standards established by the National Council of Teachers of Mathematics (NCTM).

The response to the two Family Math Nights held in the fall was overwhelmingly positive from school principals, elementary students, their parents, and Grand Valley students. Plans call for two more Family Math Nights this semester, with additional assistance from Grand Valley faculty members Steve Blair, Marge Friar and Nancy Alexander, and more events next year as well.

Faculty News and Awards

Lots of our faculty are busy working on exciting projects. We are especially proud of these recent awards and achievements.

For the first time ever, Grand Valley was able to honor employees who have given 40 years of service to the university. Our own Don VanderJagt was one of three recipients of this award, having been at GVSU since 1964. In addition to teaching, Don keeps up with his research in graph theory, and serves as our institutional faculty athletic representative to the NCAA.

Char Beckmann will be honored with GVSU's Distinguished Contribution in a Discipline Award. Char's professional goals involve bridging the gap between theoretical research in mathematics education and the practice of mathematics teaching. She was recently the president of the Michigan Council of Teachers of Mathematics, and last year she initiated a new conference *Conversations Among Colleagues*, which brings together mathematicians, mathematics educators, and partners in K-12 schools.

Ted Sundstrom will be recognized this year by the Michigan Section of the Mathematical Association of America Award for Distinguished College or University Teaching. Ted has always been focused on engaging students, helping them to share in the excitement that he finds in the wonders of mathematics. Over the years Ted has been involved in the writing of several textbooks, most recently the student-friendly "Mathematical Reasoning, Writing and Proof," which we use in our Communicating in Mathematics course.

And speaking of textbook authors, Jon Hodge has co-written "The Mathematics of Voting and Elections: A Hands-On Approach" with Richard Klima of Appalachian State University. The book, which is being published by the American Mathematical Association, is Jon's text for the new course he designed on voting theory. The course is an option for students taking the Democracy theme at Grand Valley, and has attracted students majoring in philosophy, political science and history, as well as mathematics. Jon uses discovery-based techniques in his teaching, and his book models this approach by consisting almost entirely of questions and investigations. One of Jon's goals for the course is to give non-math students a chance to have a non-traditional experience with mathematics. Voting and elections provide an interesting and engaging context for this, and many of the students are already changing their perceptions of what mathematics is all about. Students consider the ideal properties of a voting system, such as the requirement that if everyone in a population prefers Candidate A to Candidate B, then Candidate B shouldn't be able to get elected! Then they explore different models to see how well they satisfy all the desired conditions. Jon says that it has been a challenge teaching a brand new course, but that he is enjoying the experience and already has many ideas for making the class even better next time.

Kristina Lund wins Outstanding Graduate Award

Kris Lund has certainly made the most of her experience in the mathematics department. In fact, it is hard now to believe that the 2005 recipient of the Outstanding Graduate Award wasn't always a math major. When Kris first came to GVSU, she was in the engineering program, but during a semester of calculus, Professor Sundstrom convinced her to switch to mathematics, and Kris never looked back.

Kris has taken nearly all the courses offered in our department, and has trouble picking a favorite, though she particularly enjoyed the Modern Algebra sequence, as well as Numerical Analysis. She found that her math courses were always the most demanding and challenging of any on her schedule, but truly appreciated the feeling of accomplishment when she completed each one. Kris does warn other math majors to think twice before taking four math courses in a

semester, though – something she managed to survive twice!

Kris has already begun to experience life as a mathematician outside the classroom. During the summer after her sophomore year, she worked with Professor Dickinson researching spherical geometry. The following summer, she participated in the GVSU REU program and worked on the geometry of the Hausdorff metric under the supervision of Professor Schlicker. Kris has presented her work from both projects nationwide, and won an award for her talk at MathFest in Boulder, CO. Kris admits that research is hard, but found both experiences really rewarding.

Kris has contributed her own time and energy to enhancing our department for other students. She is currently the president of the Math and Stats Club, and she spearheaded the effort to have a conference room converted into a student lounge. Kris



also works in our Math Lab, and as a Structured Learning Assistance tutor for Math 110.

While Kris will miss GVSU next year, she's thrilled to be starting a Ph.D. program in mathematics on a fellowship at the University of Nebraska at Lincoln. She sees herself eventually teaching at a school focused on undergraduate education. We wish Kris continued success and look forward to hearing from Kris about her experiences.

Student Awards 2005

On Friday, April 1, the department welcomes its most impressive students and their families to the annual awards banquet at the Alumni House. We are lucky to have so many outstanding students, and it is always difficult to select just a few to honor. Here is the list of the recipients for this year.

Thanks to generous contributions to the Mathematics Endowment Fund, we will be awarding *Department Scholarships* to the following students. The selection criteria included a personal essay, grade point average, letters of recommendation, and extra-curricular mathematical endeavors.

Nathanial Burch	Lindsey Hohs
Nathan Johnson	Samuel Otten
Christopher Smith	Matthew Stamps
Aarika Woodard	

Matthew Stamps is the recipient of the *Outstanding Sophomore Award*, which recognizes his achievements early in his academic career, and encourages continued success in mathematics. Matthew will be participating in the REU program at Valparaiso this summer.

The following students are being honored as recipients of *Department Senior Awards* for their excellent work in the mathematics major, and their overall contributions to the department:

Richard Bolhuis
Thomas Kennedy
Ross Lambitz
Kristina Lund
Tarah McCarthy
Jessica Roy
Lisa Toth
Ben Vugteveen
Danielle Weist

We are excited that the Michigan Council of Teachers of Mathematics has chosen once again to honor a Grand Valley student with the *Miriam Schaefer Scholarship*. Tarah McCarthy, a mathematics major concentrating on elementary education, is one of five statewide recipients this year.

The Mathematics Department is pleased to be inducting 14 students into the GVSU chapter of *Pi Mu Epsilon*, the national mathematics honor society.

Faculty in Focus



Esther Billings

Esther Billings joined the Grand Valley faculty in 1998 after completing her bachelor's degree at Wheaton College and her Ph.D. at Northern Illinois University. Esther's teaching and research is focused on elementary education, and one of the things that she loves about teaching at GVSU is being able to interact with so many hard-working students who are passionate about becoming teachers. She also appreciates her colleagues in the department, whom she says are always available to bounce ideas off of and eager to find projects on which to collaborate.

Esther's favorite course to teach is Math 321, in which students focus on the teaching and learning of algebra at the elementary school level. She appreciates that the students in that course strongly believe that mathematics is a valuable subject, and so they are eager to concentrate on explorations of teaching for understanding. One of the main themes in Math 321 is the creation and evaluation of good math problems, and Esther has designed a particularly innovative project in which students must prepare problems for publication in a journal, and submit them to the NCTM magazine "Mathematics Teaching in

the Middle School." She is especially proud that many of her students have had their submissions published in the journal's "Menu of Problems."

Esther's own scholarly work is concentrated on different aspects of algebraic thinking. Some of her most recent projects focus on children's understanding of pictorial growth patterns and functions. She is currently supervising three Grand Valley mathematics majors as they work on their senior thesis projects, each of which involves pictorial representations of linear and exponential growth patterns. Her students have already given conference presentations on their work. In fact, several of Esther's students in past courses have had their projects lead to publications and presentations outside of Grand Valley.

Esther will be taking a sabbatical next year, during which she will be spending much of her time doing professional development with practicing teachers in local schools. Undoubtedly she will also have a bit more time for her other interests, which include quilting, reading, biking and cross-country skiing. We know that Esther will return to Grand Valley with many new ideas and experiences to share and incorporate into her work.

Gene Dornbush, an Affiliate faculty member, is retiring this year after teaching in the mathematics department at Grand Valley for the past seventeen years. Gene says that he has always loved mathematics and wanted to teach since he was in the sixth grade. Although he still feels that same passion for teaching—"I can't wait for Monday morning," he says—he wants to leave while he is still in love with his job.

Beginning his teaching career in 1955, Gene taught junior high school at Zeeland Christian for twelve years and high school at Unity Christian for fourteen. Over the next fourteen years, he worked in the test lab at Herman Miller where his job was to try to *break* chairs as part of the company's efforts to test the durability of their products.



Gene Dornbush

In 1988, Gene began teaching mathematics at Grand Valley as an adjunct faculty member and, over the years, has taught courses such as Math 096, 097, 110 and 122. He particularly enjoyed teaching Math 096 (when it was offered) as it was a challenging course to teach, given the students' mathematical backgrounds, and he felt valued by his students, many of whom were older students who appreciated Gene's understanding of the difficulties in balancing student life with family life. Currently, he loves teaching Math 110 and feels that he gets along very well with his students. To emphasize his focus on them, Gene says he feels he is not teaching mathematics so much as he is teaching students.

Although Gene is retiring from the mathematics department, don't look for him to slow down too much. He will be preparing others' income tax returns in the spring and plans to continue the house painting he has done since he was in college. In addition, Gene is an active volunteer with Meals on Wheels, Habitat for Humanity, and Ditto, a second-hand store in Holland, as well as a tutor for middle school students at the Bridge Ministries in Zeeland.

Gene also plans to spend lots of time with his family of five children, one of whom is Linda Disselkoe, an adjunct faculty member in the mathematics department, and seventeen grandchildren. With more freedom to pursue their love of travel, Gene and his wife will visit relatives throughout western Canada, ride the Rocky Mountaineer train through the Canadian Rockies, and cruise the Inside Passage to Alaska.

We would like to acknowledge Gene for his many years of dedicated service and wish him well as he begins his retirement.

Alumna in Focus

Wendy Hahn, Class of 2000



Wendy Hahn

Wendy Kooiman Hahn graduated from GVSU in 2000 with a major in mathematics and a minor in engineering. As Wendy describes it, this combination “has given me a great foundation in problem solving with a foundational knowledge in engineering techniques.” After completing her undergraduate degree, she went on to Rensselaer Polytechnic Institute, where she completed her M.S. in Operations Research and Statistics with concentrations in Systems Engineering and Simulation. Currently she works as an Applications Systems Engineer for Smiths Aerospace Company in Grand Rapids. Her work at Smiths focuses on Flight Management Systems control display pages, test procedures, and navigation.

Reflecting upon her coursework at GVSU, Wendy indicates that the advanced calculus sequence challenged her a great deal but also taught her so much. In terms of mathematics she uses on a daily basis in her job, she indicates the mathematics of logic and proof is of vital importance and that, on occasion, she has used topics from wavelets and calculus.

As for advice she gives current GVSU students, Wendy urges students to take advantage of internship opportunities during their college years. For Wendy herself, she obtained such internships at the Holland Group, Inc. and at Herman Miller. In addition, she encourages students who are contemplating graduate school to participate in undergraduate research programs like the REU program she participated in at Worcester Polytechnic Institute in Massachusetts.

Like many students who have majored in mathematics and pursued nonacademic careers, Wendy has discovered the marketability and versatility of her skills. As Wendy states, “There is not necessarily a direct correlation between a mathematics major and a career, unlike an accounting major and a career in accounting. That is what is so fun about a mathematics major. It is so flexible. Most large technological companies find mathematicians assets because they have the problem solving skills and creativity.”

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Grand Valley State University
Department of Mathematics
2307 Mackinac Hall
1 Campus Drive
Allendale MI 49401

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