MATH@ANDREWS

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Blackburn Rules MathFest

Wins top IIME award for research talk in Albuquerue

This summer, senior mathematics major Chantel Blackburn had the opportunity to participate in the Research Experience for Undergraduates (REU) at Grand Valley State University in Allendale, MI. Along with eight other outstanding students from universities across the United States, Chantel researched a mathematical problem for eight weeks while also sharpening her skills at communicating mathematical ideas through writing and speaking.

Chantel studied the Hausdorff Metric Geometry under the supervision of Stephen Schlicker, Chair of the Grand Valley Department of Mathematics, along with Alex Zupan, a Junior from Gustavus Adolphus College in Minnesota. Together they explored some ideas in topology, and studied the strange and mysterious properties of the Hausdorff Metric, a metric that measures the distance between non-empty compact subsets of *n*-dimensional Euclidean space.

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2005 Graduates Fledge and Disperse

Seven mathematics majors graduate on May 1, 2005

The 2005 mathematics class was one of the largest and most distinguished we've graduated. Of seven graduated, one is in medical school, four are doing graduate work (two of them in mathematics), and two are planning to enter law school. Here they are, in alphabetical order:

Jonathan Kaleimomi Chong received his degree in December 2004 but we count him in with this class. Jonathan's first major was Physics and he received a Mathematical Studies second major. He's presently enrolled as a medical student at Loma Linda University.

Jeffrey Powell Hafner was a Biophysics major with a Mathematical Studies second major. He is now enrolled in the Interdisciplinary Mathematics and Science Masters program here at Andrews.

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Alex Zupan and Chantel Blackburn at MathFest 2005

Blackburn Rules MathFest, continued from page 1

DEPARTMENT OF MATHEMATICS

DONALD H. RHOADS Chair FACULTY Shandelle M. Henson Ronald D. Johnson Joon Hyuk Kang Lynelle M. Weldon LECTURERS Keith G. Calkins Shirleen Luttrell EMERITI Kenneth Franz Theodore Hatcher Edward J. Specht Kenneth Thomas **IIME** (MICHIGAN GAMMA CHAPTER) Chantel Blackburn, President Laura Mack, Vice President Eric Brown, Secretary **EIGEN (MATHEMATICS AND PHYSICS CLUB)** Chantel Blackburn, co-President Laura Mack, co-President

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The department of Mathematics at Andrews University is primarily an undergraduate department, offering the degrees of Bachelor of Science in Mathematics and Bachelor of Science in Mathematics Education, as well as a Mathematical Studies Major, Mathematics Minor, and Mathematics Education Minor. An interdisciplinary Masters in Mathematics and Science is administered jointly by the Departments of Physics, Mathematics, Chemistry, and Biology. The REU program concluded with the option to present the summer's research results at MathFest, an annual mathematics meeting sponsored by the MAA, in Albuquerque, New Mexico. Chantel presented her team's results in the Pi Mu Epsilon Student Sessions, and Alex presented in the MAA Student Sessions. The student talks were judged and the exceptional presentations were awarded cash prizes. Chantel and Alex swept the top awards at the event, receiving the Council on Undergraduate Research Best Student Research Talk for Pi Mu Epsilon and MAA respectively.

Chantel is in the Honors program at Andrews and will graduate in May 2006 with a BS in Mathematics and minors in Religion and Physics. She plans to pursue a PhD in Mathematics. \Box

Kang Promoted

Joon Kang appointed Associate Professor of Mathematics

Joon Hyuk Kang, who joined our faculty in 2000, was promoted this year to Associate Professor. At Andrews, as at most respectable universities and colleges, promotion is a non-trivial accomplishment and is based on achievements in teaching, scholarship, and service. The Rank and Continuous Appointment Committee was especially impressed with Kang's fine research record. He has published, to date, a total of nine papers in peer-reviewed journals, most of them in the area of partial differential equations. One additional paper (co-authored with his student, Kami Lizarraga) has been submitted for publication. His specialty is the Lotka-Volterra competition model.

To date, Joon Kang has published nine partial differential equations papers in a variety of journals, and has submitted a tenth that was coauthored with student Kami Lizarraga

Joon received his early mathematical training in Korea, having graduated from Sung Kyun Kwan University with a BS in Mathematics. He holds Masters degrees in Mathematics and Statistics from Michigan State University and completed his doctorate in Applied Mathematics at MSU in 1998. His wife, Yun Myung Oh, also has a PhD in Mathematics from MSU and presently teaches at IU Northwest. They have a four year old daughter, Min Seo. \Box

Calkins Receives PhD at Notre Dame

Keith Calkins finds $\alpha = 137.036\ 0000(11)$

ISD mathematics teacher Keith Calkins ($Ke^{i\theta}$) first visited the AU Math department after eighth grade while it was still in the basement of Nethery Hall. Arriving in 1975 as a freshman math major, he was soon grading computer programming homework for LeRoy Botten, director of the Computing Center and instructor in the Math department. In the fall of 1978 Keith began a full-time job as a systems programmer in the Computing Center, and has worked there or in ISD Math ever since.

In 1981 Keith finished a mathematics major, and by 1982 was AU's fourth Computer Information Science MS graduate.

Keith Calkins finds cesium-133 D1 centroid frequency is 335 116 048 748.1(2.4) kHz hence $\alpha = 137.036\ 0000(11)$.

In 1991 Berrien County started a Math and Science Center for bright area public high school students. AU hosted one site, and by 1993 needed someone to teach the three math classes. By this time Keith was completing his PhD coursework in Physics at Notre Dame by day while continuing computer support at Andrews at night. Keith accepted a position to teach in the Math and Science Center, with the expectation of continuing his research. The teaching load precluded physics research, however, and Keith ended his relationship with Notre Dame in 1996 soon after his orals to receive a masters degree.

By 2002 Keith completed coursework and student teaching to obtain secondary certification. He returned to Notre Dame in the fall of 2003, where physics professor Carol Tanner had a hot project tailor-made for his situation and needed a graduate student. Over the course of the next 20 months the team designed and built a special diode laser which helped measure the Cesium D1 frequencies to a precision of 7 parts per trillion at the National Institute of Standards and Technology in Boulder, CO. These frequencies, when combined with precise measurements of the Rydberg, proton/electron mass ratio, cesium atom/proton mass ratio, and cesium recoil frequency, provided the improved measurement of α , the fine**Gilead Ariel Kutnick** graduated Summa Cum Laude (4.00 GPA) in Computer Science with a Mathematical Sudies second major. He is now enrolled as a graduate student in Computer Science at Indiana University Bloomington.

Kami Michele Lizarraga graduated Summa Cum Laude and was a J. N. Andrews Scholar. Her honors thesis was a collaboration with Joon Kang "Existence and uniqueness of the positive steady state solution for perturbations of the general competition model", and has been submitted for publication in *Dynamics of Partial Differential Equations*. In addition to her mathematics degree she nearly completed a second major in English. Kami is working this year for the Virginia Board of Bar Examiners. She got a very high score on the LSAT and is hoping to attend one of the great law schools. She'll show those barristers a thing or two.

Clara Joy Logan graduated with the unusual distinction of having coauthored three research papers as an undergraduate. "Predicting dynamics of aggregate loafing behavior in gulls at a Washington colony" (*Auk* 121:380-390), "Predicting numbers of hauled-out harbour seals: a mathematical model" (*Journal of Applied Ecology* 42:108-117), and "Habitat patch occupancy dynamics in Glaucous-winged Gulls (*Larus glaucescens*) I: A discrete-time model" (*Natural Resource Modeling* 18:441-468) were coauthored with Shandelle Henson and Jim Hayward as part of Clara's work with the Seabird Ecology Team. Clara is now enrolled in the PhD program in mathematics at the University of Tennessee, Knoxville.

Abimael Santana received a double degree, in Mathematics and in Mechatronics Engineering Technology. A long-time mainstay of the Math Tutoring Center, he's now doing graduate studies in Mathematics at Miami University, Oxford Ohio.

Amy Michelle Wright received a double degree, in Mathematics and in Business Economics. She graduated Summa Cum Laude and was a J. N. Andrews Scholar. She wrote her honors thesis on the topic "The Econometric Analysis of Andrews University 2000 Graduate Surveys". Amy will enroll in the University of Michigan School of Law next fall.

We are proud of these students, and wish them well in their continuing studies and careers. $\hfill\square$

structure constant. Publication of these results is pending in *Physics Review A* and are expected to be used in the 2006 revision of the *Recommended Values of Physical Constants*. \Box

Johnson Teams up with Econometrics Professor

Begins interdisciplinary research with David Beckworth

Ron Johnson has begun an alliance with the Department of Economics in the School of Business at Andrews University. He is currently attending an econometrics class and is collaborating with David Beckworth. Beckworth is an Andrews macro-economist who is studying how shocks tend to play out in the market. Together, they are working to solve several mathematical models that explain how these shocks persist in time.

In addition to collaborative research, Ron would like to establish a close relationship between the departments of mathematics and economics. The goal (and challenge) will be to improve the educational opportunities for students in both departments. Mathematics students would have an opportunity to see how advanced math is used in another discipline, and economics students would have a better preparation for graduate school. \Box

Developmental Program Running Smoothly

The developmental mathematics courses at Andrews consist of MATH091 and MATH092. These two courses provide a flexible arrangement for students to work under individualized instruction. All students needing review start in 091 and work on the ALEKS website for individualized assessment and review. The instructor (Lynelle Weldon or Shirleen Luttrell) and three student lab assistants are in the classroom to guide students and answer questions. Many students are able to finish the review in one semester, but 092 is available for those who need to continue on for another semester. The occasional student who needs to work for three semesters may reregister for 092 to complete the review. The lab assistants appreciate the opportunity to practice their teaching skills and many students enjoy the instant feedback and self-determination of the system. Lynelle is gathering data to analyze the success of the developmental program in the past and present and we are looking forward to seeing the results. \Box

Luttrell Replaces Show

Shirleen Luttrell picks up developmental program; Janine Show moves to Taiwan

Shirleen Luttrell has been around campus for the last seven years. She worked in the Math & Science Center teaching mathematics to Berrien and Cass County students. While it was a transition from teaching Calculus to teaching arithmetic, Shirleen enjoyed the challenge her new position offers. Her new duties include proctoring Math Placement Exams, teaching two arithmetic/algebra college courses, and assisting several high school classes.

Luckily for most people, she keeps to her posted class times and office hours. If it wasn't for that, you would have a hard time finding her. One hour she is in the Science Complex, the next she is in Smith Hall. It is a pattern that repeats itself three to four times a day for three days out of the week. You figure that out! It may sound demanding on the feet, but it is lighter in preparatory work. Shirleen feels she got the best of both worlds. \Box

Seabird Team Soars

Students coauthor four research papers in 2005

The Seabird Ecology Team is an interdisciplinary group of mathematicians and biologists, based at Andrews University and funded in part by a \$304,000 grant from the National Science Foundation. The group studies the dynamics of the distribution and behavior of marine birds and mammals. The team is vertically integrated, including faculty, graduate students, and undergraduate students from Andrews University, the University of Arizona, and Walla Walla College. The methodology utilizes mathematical models, dynamical systems theory, statistics, field observations, and experiments. Much of the summer field work is based at the Walla Walla College Marine Station at Rosario Beach. Since 2002, the team has involved 17 undergraduate students and 4 graduate students in significant research leading to publication in peer-reviewed journals.

The team is lead by Shandelle Henson (Mathematics, Andrews University), Jim Hayward (Biology, Andrews University), Joe Galusha (Biology, Walla Walla College), and

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Jim Cushing (Mathematics, University of Arizona). Current masters students include Andrea Moore from Andrews and Nick Wilson from Walla Walla. Undergraduates from Andrews University currently involved in the team include Chantel Blackburn, Christina Burden, Daniel Greene, Liza Habenicht, Sharon Hodge, Cassie Johnson, Sheena Lyn, Brianna Payne, Becca Prouty, Michael Scott, and Maureen Serem.

In 2005, three team publications coauthored by students appeared and one is in press. Please visit the team's website www.andrews.edu/~henson/seabird/seabirdhome.html. □



Seabird Ecology Team Spring 2005, L to R: Chantel Blackburn, Christina Burden, Cory Gregory, Sheena Lyn, Matt Sharrock, Andrea Moore, Linda Lange, Catherine Parris, Jim Hayward, Shandelle Henson, Clara Logan

2005 Donations

- Math & Science Center Scholarship Fund. This fund provides college tuition assistance for students who have been in the Science and Mathematics program Andrews operates for gifted students from Berrien and Cass counties. The fund has until December 2006 to reach \$15,000, and is nearly halfway there.
- Specht Geometry Project. See adjoining article.
- Mathematics Department Fund which is used to support activities such as the Pi Mu Epsilon honor society within the Department.
- An Endowed Professorship in Mathematics.

Checks should be payable to Andrews University, with the purpose of the donation on the "for" line. We have enclosed an addressed envelope for your convenience. □



Andrea Moore and Jim Hayward leave for field work



The Seabird Team meets weekly at Dr. Henson's place for an evening seminar presented by the research students. L to R: Andrea Moore, Becca Prouty, and Maureen Serem



Cassie Johnson explains her research

Specht: 90 and Still Doing Mathematics

Our department continues in the grand tradition of Ed Specht. We love to see Ed and Mary appear in our department for a visit. Ed's kind and encouraging spirit blesses and guides us in our work.

At 90 years old, Ed Specht is still doing mathematics. Keith Calkins has typeset over 400 TeX pages of Ed's geometry book from handwritten/typed documents. These pages have been hand-corrected by Ed, and are awaiting a second (or third) revision. □

Ex Cathedra

From the Chair

Since we last produced one of these Newsletters a lot has happened in the Department. More, in fact, than we can tell you about in this slim edition.



Donald Rhoads

First, I note with sadness that Joyce Jones, widow of our long-time friend and colleague Harold Jones, has gone to her rest. Joyce continued her work at the university right up until she was diagnosed with lung cancer.

Last January I had the pleasure of breakfasting with Don Albers at the meetings in Atlanta. Don, who received a Masters from our department back in the sixties, is probably the best-known of our alumni, as far as the mathematical world is concerned. He chaired the mathematics department at Menlo College in California, and is just now retiring as Director of Publications for the Mathematical Association of America, where he has a marvelous record of achievement.

On a personal note, I'm planning to retire at the end of June, and the Department is working on getting someone new as chair who will be an improvement in several respects. I must say that my "second incarnation" at Andrews has been a wonderful run for me—more than I ever could have expected, after leaving in 1972. I'm 68 now, my wife is 70, and driving each weekend from here to my home in Bloomington, IN, is getting to be a bit much.

When I came back to Andrews in 1998, I wondered what the Department would be like. When I left in 1972 it was a notably collegial place—the teachers liked each other, were very supportive of one another, and we all pulled together. What would it be like after 26 years, with a complete change of faculty, except for Ted Hatcher? I found, much to my delight, that that same spirit was still here. There IS something to traditions—the one that Ed Specht established here is alive and well.

There are many challenges ahead. Andrews is moving into a new phase of increased emphasis on scholarship and is developing many genuine excellences.

Our President is working on a bold new fund-raising campaign to increase the University's endowment from its present \$25 million to something really substantial. Our admissions standards have gone up a bit, but we are still deeply committed to helping good, solid, able students to be successful beyond all expectations. Our freshmansophomore retention rates are quite spectacular for an institution of our type—in one recent year, over 80 percent of freshmen returned the next year.

Our new Engineering program is meeting enrollment expectations and promises to bring more students to the departments of Computer Science, Mathematics, and Physics. We have seen the number of majors in the Department climb quite steeply—the number now stands at 33. It looks as if we'll have a big graduating class in May 2006, so that number may drop a bit next year, but there are several extraordinarily promising freshmen this year who have declared mathematics majors.

Andrews has turned into a place where a fine scholar can make waves. For one thing, Andrews is now a truly exciting place for students to learn mathematical modeling and mathematical biology. Shandelle Henson is, I think, a bit too modest in her piece (in this Newsletter) on the Seabird Ecology Team. She puts enormous energy into her students as she involves them, at the undergraduate level, in her research. This is excellent work, which will surely "bear much fruit".

We have just begun. In future years, you will see a proliferation of endowed professorships at Andrews, reserved for scholar/teachers of high distinction. We're now accepting contributions toward an endowed professorship in the Mathematics Department—we expect that it will take a few years to raise the \$2 million necessary, but we have to begin sometime.

Endowed chairs are the way this University is going to attain the "margin of excellence" that any distinguished institution must have. They insulate the faculty to some degree from the cyclical ups and downs of enrollment, and allow us to maintain high academic standards and provide the superior learning experiences that our best students deserve.

I very much appreciate those alumni who have given to our Department in the past few years. Your contributions have helped the Specht Geometry Project, have funded the Pi Mu Epsilon honor society's activities, and much more. On page 4 you will find a list of projects and funds that are open for donations, and I thank you in advance for your loyalty and interest.

May you all have a joyful Christmas and may God bless you richly always.

Don