Andrews University
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S. M. Henson, D. H. Rhoads, Editors

MATH@ANDREWS

Department of Mathematics, Andrews University, Berrien Springs, MI 49104-0350 USA

Inside:

Alejandra Alvarado '09

Emmanuel Scott '09
(*see p. 2*)

Number of math majors reaches 40

Mathematics is flourishing at Andrews University. This growth reflects the strengths of the Department as well as the strengths of the sciences and engineering. Our accomplishments are worth highlighting, because they are bucking national trends.

In fact, mathematics departments in American universities are losing ground on a number of fronts. Although the total undergraduate enrollment in U.S. four-year colleges and universities rose by 13% from 2000 to 2005, the enrollment in their mathematics and statistics courses was essentially flat (it grew by only 0.43%). During the same time period, the number of bachelors degrees awarded by their mathematics and statistics departments dropped by 2.4%, and the number of degrees awarded by those departments to women dropped by 9.1%. Women earned 43% of the mathematics and statistics bachelors degrees awarded by those institutions in 2005, down from 47% in 2000 (D. J. Lutzer et al. 2005, Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States, American Mathematical Society, http://www.ams.org/cbms/cbms2005.html).

In contrast, the Department of Mathematics at Andrews University is growing. While the total undergraduate enrollment at Andrews rose by 11.6% between 2003-2004 and 2008-2009 (as measured in the Fall semesters), the enrollment in mathematics and statistics courses grew by 15.7% during the same time period. From 2000-2001 to 2001-2002 the number of math majors grew from 9 to 20, and in 2009-2010 the number of majors reached 40—a dramatic increase of over 444% in nine years. Of the seven majors who graduated in 2009, 57% were women, 43% were black (two females and one male), and 29% were Hispanic (one female and one male). Of the current 40 majors, 35% are women, 25% are black, 15% are Hispanic, and 5% are Asian. This reflects well the diverse demography of the Andrews University undergraduate student body (54.7% women; 29% black; 13.5% Hispanic; 13% Asian).

Women continue to be underrepresented in mathematics faculties, both in America and worldwide. In 2005, only 18% of tenured faculty at U.S. four-year colleges and universities were women, and only 29% of tenure-eligible faculty were women (Lutzer et al. 2005).

In contrast, three of the five tenured and tenure-eligible mathematics faculty (60%) at Andrews University are women.

In terms of research, the Department faculty are among the most productive at the University (see p. 4).

In order to continue our growth, we will need access to more resources. On p. 6 you can read about some of the generous support we have received, as well as some of the challenges we face.

We appreciate your continued interest in our department, and hope you will enjoy catching up with old friends as you browse this newsletter.

-Shandelle Henson, Editor

Ben Chase

Sharon Hodge

Brian Ibanez

Sereres Johnston

Sheena Lyn

2009 Graduates

Alejandra Alvarado (Mathematics Education with Secondary Certification, Spanish Studies) currently teaches mathematics and French at Thunderbird Adventist Academy in Scottsdale, Arizona. She teaches everything from Algebra I to Precalculus. She says, "I'm enjoying it very much …I plan to teach at this level for a few years and then pursue a masters degree."

Benjamin Chase (Mathematics, Physics, Pi Mu Epsilon) graduated summa cum laude as a J. N. Andrews Scholar. His research advisor was Dr. Joon Kang, and the title of his thesis was "Existence and non-existence of positive steady-state solution to an elliptic cooperation model". The resulting publication will appear in the *Global Journal of Pure and Applied Mathematics.*

Sharon Hodge (Mathematics)

Brian Ibanez (Economics, Mathematical Studies, Pi Mu Epsilon) graduated summa cum laude as a J. N. Andrews Scholar. His honors research was completed at San Diego State University; the title of his thesis was "The geometry and motion of nematode sperm cells". His work resulted in a publication of the same name in the journal *Cell Motility and the Cytoskeleton* (66:317-327, 2009). Brian decided to go to Georgetown University to do a PhD in Economics. He says, "We are currently delving deep into the theory. It is very math intensive and I use the mathematics I learned at Andrews every day. My only regret was not starting my math degree earlier and taking advantage of more classes." This summer Brian went to an economics conference at UC Berkeley for a week. The conference was entitled Poverty and Prosperity. His plan for the future is to be a research economist at an institution such as the World Bank or the IMF. He plans to "work in the field of Development Economics to further prosperity in the developing world, and work towards the eradication of poverty through sound economic policy."

Sereres Johnston (Mathematics, Physics, Pi Mu Epsilon) graduated summa cum laude as a J. N. Andrews Scholar. Her honors research was completed at Argonne National Laboratory; the title of her thesis was "Preparation for an experimental measurement of charge symmetry violation". She is currently a physics graduate student at the University of Massachusetts. She says, "I'm really enjoying it here, I love the area—such beautiful fall colors! My work hours are split between grading and research. My research involves modeling some crazy large magnets—2 meters and 7 meters long. They will be placed in between the target and detector in a future experiment at Jefferson Lab."

Sheena Lyn (Mathematics) plans to go to dental school. While at Andrews, she coauthored a research paper with three Andrews faculty in the *Journal of Morphology* (270:70-82, 2009).

Emmanuel Scott (Biophysics, Mathematical Studies, Pi Mu Epsilon) plans to begin an MD/PhD program. □

René Friend joins department

In August 2009, René Friend joined the Department as part-time administrative assistant.

René graduated from the University of California at Davis in the summer of 2008 with a BS in Aeronautical and Mechanical Engineering. She and her husband Ryan moved to Michigan soon afterward so that he could attend the Seventh-day Adventist Seminary at Andrews University. Their son Reuben was born in February.

It is great to have René in the Department! □

Pi Mu Epsilon

On April 5, 2009, thirteen members were inducted into the Michigan Gamma Chapter of Pi Mu Epsilon (chartered 1970) in a departmental ceremony. President **Eric Shull** presided over the meeting. He was assisted by **Daniel Moskala**, Vice President, and **Kiana Binford**, Secretary-Treasurer.

The new student members are Craig Bradfield, Theron Calkins, Garret Catron, Jonathan Ford, David Greene, Andrew Hoff, Kendall Hopkins, Philippe LaGuerre, Erin McLean, Sangmi Mun, Jonathan Van Ornam, Sandra Prieto, and Amanda Umlauf.

The newly elected officers for 2009-2010 are **Daniel Moskala**, President, and **Erin McLean**, Vice President. **Andrew Hoff** has been appointed Secretary-Treasurer and **Dr. Joon Hyuk Kang** is the faculty advisor.

Two PME members presented their research during the induction ceremony. **Eric Shull** discussed tipping points of an opinion network model. **Brian Ibanez** proved that the elliptical biological predator-prey competition model has only one non-negative solution: extinction. □

PME Inductees 2009

University President **Niels-Erik Andreasen** attended the event.

Eric Shull was awarded a $1,500 DeHaan Work Excellence Scholarship.

The Department awarded the Edward J. Specht Endowed Scholarship to **Daniel Moskala**, and the Harold T. Jones Endowed Scholarship to **Theron Calkins** and **Kiana Binford**. The Louis Ulloth Scholarship was awarded to **Erin McLean**.

President Niels-Erik Andreasen and Provost Heather Knight presented the John Nevins Andrews Medallion to Professor of Mathematics **Shandelle M. Henson** at the May 2009 graduation ceremony. This is the highest honor the University bestows upon its faculty. Henson says, “I was extremely surprised and humbled.” □

Scholarships and awards

Mathematics major **Andrew Hoff** was awarded a 2009 Owen Locke Scholarship from the Owen Locke Memorial Foundation. The $10,000 scholarship, granted only to high school graduates of California, funds tuition, school fees, and books for attendance at any accredited college or university. Locke Scholars may apply for additional years of support. (http://owenlocke.org/application.html).

Mathematics minor and biology major **Libby Megna** was awarded a 2009 Barry M. Goldwater Scholarship, the most prestigious award for undergraduate science majors in the U.S. (http://www.act.org/goldwater/). The Goldwater Faculty Representative at Andrews University is physics professor Tiffany Summerscales, who is a former Goldwater Scholar herself. Libby is a native of Michigan, and is attending Andrews University on a 100% Andrews Partnership Scholarship because she is a National Merit Scholar Finalist. (http://www.nationalmerit.org/)

On 24 April 2009 the Department granted 28 awards for excellence to 24 students at a ceremony in the Mathematics Commons Room. Math major awardees were **Theron Calkins** (Calculus III and Discrete Mathematics), **Amy Hahn** (Calculus I), **Daniel Moskala** (Applied Mathematics and Complex Analysis), and **Jonathan Williams** (Calculus III; Geometry; Probability Theory and Statistical Applications). Graduate student awardees were **Peter Hutauruk** (Applied Mathematics), and **Amanda Umlauf** (Differential Equations).

Andrew Hoff,
Locke Scholar

Libby Megna,
Goldwater Scholar

J. N. Andrews Medallion

Research and professional activities

Publications

Hayward, J. L., **Henson, S. M.**, Tkachuck, R., Tkachuck, C., **Payne, B. G.**, and **Boothby, C. K.** 2009. Predicting gull/human conflicts with mathematical models: a tool for management. *Natural Resource Modeling* 22:544-563.

Hayward, J. L., **Henson, S. M.**, Banks, J. C., and **Lyn, S. L.** 2009. Mathematical modeling of appendicular bone growth in glaucous-winged gulls. *Journal of Morphology* 270:70-82.

Ibanez, B., Kang, J. H., and Lee, J.H. 2009. Non-negative steady state solutions to an elliptic biological model. *International Journal of Pure and Applied Mathematics* Vol.53, No.3, pp. 385-394.

Kang, J. H., and Jungho Lee 2009. A predator-prey biological model with combined reproduction, self-limitation terms and general competition rates. *Journal of Advanced Research in Differential Equations* Vol.1, No. 1, pp.1-10.

Kang, J. H. 2008. Steady state problem of a cooperation model with combined reproduction and self-limitation rates. *International Journal of Pure and Applied Mathematics*, 48, No.3, pp. 373-384.

Oh, Y. M. 2009. A construction of Lagrangian submanifolds of complex Euclidean spaces using Legendre curves. *Kodai Math Journal* 32:521-529.

Weldon, L. M. wrote Instructor's Guide for the textbook "College Algebra Concepts and Contexts" by Stewart, Redlin, and Watson, published by Brooks/Cole.

*Four undergraduates coauthored research papers with math department faculty: **Brianna Payne, Cassie Boothby, Sheena Lyn,** and **Brian Ibanez**.*

Presentations

J. H. Kang, MathFest, Mathematical Association of America, "Positive Steady State Solutions to Population Models", Portland, OR, August 8, 2009.

Y. M. Oh, MathFest, Mathematical Association of America, “Lagrangian submanifolds in n-dimensional Euclidean spaces", Portland, OR, August 7, 2009.

S. M. Henson, The Second International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Alabama, Huntsville, AL, October 9, 2009.

S. M. Henson, Colloquim, Department of Mathematics, "Bifurcations and chaos in laboratory populations of insects", Colorado College, Colorado Springs, CO, September 18, 2009.

S. M. Henson, Colloquim, Department of Biology, "Socially-induced ovulation synchrony in a seabird colony", Colorado College, Colorado Springs, CO, September 17, 2009.

S. M. Henson, Plenary speaker, 2009 Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, Ohio State University, Columbus, OH, August 26, 2009.

S. M. Henson, Colloquium, Department of Mathematics, Georgia Institute of Technology, Atlanta, GA, April 8, 2009.

S. M. Henson, American Association for the Advancement of Science, 175th Annual Meeting, Special Session on "Mathematical Biology, the New Frontier: Educating the Next Generation", Chicago, IL, February 13, 2009.

S. M. Henson, Joint Mathematics Meetings, SIAM Minisymposium on "Mathematical Modeling of Natural Resources", Washington DC, January 5, 2009.

L. M. Weldon and **L. C. Megna**, Joint Mathematics Meetings, AMS Session on Biology, Washington DC, January 5, 2009.

Gina Creek, Keynote Address, multiple workshops based on her book “Crafting a Culture: a Guide to Successful Campus Ministries”, Youth Workers Leadership Conference, Washington Conference, Seattle, WA, November 6-8, 2009.

*Undergraduate **Libby Megna** presented a joint research talk with faculty member **Lynelle Weldon** at the 2009 Joint Meetings in Washington D. C.*

Internships

Eric Shull and **Daniel Moskala**, undergraduate mathematics majors, completed internships at Auto-Owners Insurance Company in Lansing, MI this past summer. Both received full-time job offers; Eric Shull accepted.

Alumni and friends

Adan Alcala (MA 1975) is Chair of the math department at Forest Lake Academy. He recently brought 23 students to Andrews for a preview visit.

Chantel Blackburn (BS 2006) completed her MS in mathematics at the University of Arizona. She worked with Klaus Lux. The title of her thesis is "An Application of the Computer Algebra System GAP: The Construction of the Simple Modules of a Finite Group". Chantel is now on a GK12 NSF Fellowship and hopes to join the mathematics education PhD program. In June Chantel bought a home in Tucson.

Christina Burden (Minor 2006) successfully defended her MS thesis in Biology in July 2009 at Andrews University. Her defense took place at the Walla Walla University Marine Station, near Anacortes, WA. Her thesis involved mathematical models of cricket calls; Shandelle Henson was on her committee. Christina is a PhD student at Arizona State University.

Garnett Brendan Cross (Math Studies 2007) recently completed an MS in Engineering at the University of Notre Dame.

John Gimbel (BS 1977) is professor of mathematics at the University of Alaska. His research areas are graph theory and combinatorics. At Andrews, he was a student of Harold Jones, whom he calls "a shining example of what a good scholar as citizen should be." As a student, John spent many hours visiting in the Jones home. "It was a place where both people and ideas were appreciated. You could bring up any topic you liked and a good conversation would break out. And you didn't have to worry about offending anybody. Contrary points of view were always welcome—nobody took differences of opinion personally…what warm generous people they all were."

Douglas Hart (Minor 1980) earned a PhD in mathematics from the Colorado School of Mines in 1992. He lives in Golden, CO, and is associate professor at Regis University in the School of Computer & Information Sciences.

Kami Lizarraga (BS 2005) graduated from Columbia Law School in May with honors and passed the New York bar exam at the end of July. She received an offer of employment from the New York City law firm Weil Gotshal & Manges LLP and will begin next year. In the interim she is working for a federal judge at the United States District Court for the Southern District of New York.

Laurie Mack (BS 2006) successfully defended her MS thesis last Fall at Colorado State University in the department of Atmospheric Sciences. She worked with Sonia Kreidenweis. The title of her thesis is "The retrieval of aerosol optical properties from biomass burning during FLAME2"; you can read it at http://chem.atmos.colostate.edu/Thesis2.htm.

Laura Nelsen (BS Math Ed 2008) is an After School Director for an Elementary School in Port Chester NY. She makes the schedule, watches over the teachers, greets the parents at dismissal, and make sure everything runs smoothly. She also does a lot of paper work. She says, "It is a lot of fun."

Diethard Pallaschke, Professor Emeritus of Mathematics at the University of Karlsruhe, Germany, recently gave a generous and valuable gift to the Department: his large library of mathematics books. Herr Dr. Professor Pallaschke spent 27 years at the University of Karlsruhe, where he was Professor of Operations Research and Mathematical Economics and Director the of the Institute of Operations Research. Please see the story on p. 6.

Ed Specht (Professor Emeritus and former Chair) now resides in the home of Jimmy and Lucia Tiffany, 8588 Dell Rd, Kingsley, MI 49649. His phone number is 231-263-3974. □

"[The Jones home] was a place where both people and ideas were appreciated. You could bring up any topic you liked and a good conversation would break out… Contrary points of view were always welcome—nobody took differences of opinion personally…what warm generous people they all were." –John Gimbel

Prof. Diethard Pallaschke
(Also see story on p. 6)

Alumni and Friends! We really want to hear from you. Please send your news to Prof. Shandelle Henson, henson@andrews.edu.

Andrews University
Department of Mathematics

Programs

*BS in Mathematics
*BS in Mathematics Education
*Mathematical Studies Major
*Mathematics Minor
*Mathematics Education Minor
*Minor in Mathematics of Economics and Finance
*Behavioral Neuroscience Mathematics Track
*Masters in Mathematics and Science (Interdisciplinary)

PME Michigan Gamma Chapter

*Daniel Moskala, President
*Erin McLean, Vice President
*Andrew Hoff, Sec-Treas
*Dr. Joon Hyuk Kang, Advisor

Eigen* Math and Physics Club

*Eric Scott, Math President
*Andrew Hoff, Physics President
*Mateja Plantak, Secretary

Mission Statement

Through teaching, research, and service, the Department of Mathematics seeks to provide leadership in the mathematical sciences by:
*Preparing students with the mathematical understanding, problem-solving skills, and dispositions that enable them to excel in their chosen careers;
*Increasing mathematical and scientific knowledge through publication and presentation;
*Supporting the broader mathematics education community and mentoring others for generous service through a committed Christian life.

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Don Rhoads: The $333 challenge

Last year we started raising money for an Endowed Chair. When fully funded with $1.5 million, this endowment will support an outstanding research mathematician/teacher on the Andrews faculty and ensure a vital margin of excellence for the Mathematics program. Yes, it's a stretch to raise that much, since all we have now is a little over $3000.00.

University fundraisers have assured me that they would be happy to send some major contributions our way—and we'll need them to achieve our goal. But the case for large donations becomes much more compelling if the 300+ alumni of the Department step up and contribute substantially. We, after all, are the ones who have benefited directly from this department's tradition of excellence, and we are the ones who understand the importance of mathematics in the curriculum.

So I'm issuing a challenge: that over the next two years, our departmental alumni contribute a total of $100,000 toward an Endowed Chair—an average of $333.00 each. Of course, not everyone will contribute $333—but many of us can give more. I'm personally pledging $1,000 this year and next year, for a total of $2,000. Some of you can do better than that. Please join in and make it happen!

-Don Rhoads, Former Chair

A generous gift from Germany

On July 8, 2008 I received an email from Diethard Pallaschke, Professor of Mathematics at the University of Karlsruhe:

During my activity as a mathematician I generated a comprehensive private collection of mathematical books. Almost all of the books are in English, some few are in German, French, Russian and Polish. The complete list of books is attached.

Starting with October 01, 2008 I will be retired and will have the status of Professor Emeritus at my university. Unfortunately …I will not have enough space to store my private book collection, either at home or at my university. Therefore I have decided to offer this collection of books as a present to your university.

When I opened the attachment, I found a well organized list of books, book series, handbooks series, conference proceedings, and other items, including the Encyclopedia of Mathematics, which is an updated and annotated translation of the Soviet Mathematical Encyclopedia. The list was 80 pages long! Prof. Pallaschke also graciously paid the shipping charges from Germany to our doorstep.

I asked what motivated him to offer such a generous and valuable gift to Andrews University. He said:

… I owe my school education to the SDA church. My mother, my brother and I arrived after the Second World War as refugees in the western part of Germany. My father was already (deceased) and my mother was seriously ill. We were very much supported by the SDA church all the time. I finished my secondary school at the SDA Seminar Marienhöhe in Darmstadt. There I passed my secondary school exit examination, which is the obligatory qualification for University admission.

Professor Pallaschke earned his doctoral degree in mathematics at the University of Bonn. His distinguished career includes stints at the University of Darmstadt, the University of Münster, the University of Bonn, and 27 years at the University of Karlsruhe, where he was Director of the Institute of Operations Research.

Professor Pallaschke, we extend to you our heartfelt thanks for such a marvelous gift and for your commitment to strengthen the Department of Mathematics at Andrews University, which in turn strengthens the worldwide Seventh-day Adventist educational system. May the Lord grant you health and richly bless you and your family.

-Bob Moore, Chair