MATH@ANDREWS

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Robert C. Moore New Chair

By Donald H. Rhoads, outgoing Chair

Last year with the impending retirement of Don Rhoads as Chair of the department the matter of succession became a big issue. Senior mathematicians with an orientation to scholarship, an excellent record of teaching, the necessary managerial skills, and the willingness to uproot and relocate are not plentiful in the Adventist system.

Our search quickly turned to Dr. Robert Moore, who taught at Southern Adventist University for 27 years and was one of Shandelle Henson's teachers. He participated in the Conference for High School Teachers that Andrews hosted in 2003 and had expressed an interest for many years in developments in remedial and general education on our campus. His research interest in how students learn to do proofs resonated with several of us, and we felt sure that he would be supportive of the scholarly work of our faculty. As Shandelle Henson put it, "Bob is a person who does

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2006 Math Graduates

Chantel Blackburn (BS Math) is in the Mathematics PhD program at the University of Arizona, taking classes to prepare for her qualifying exams. She's teaching a Trig course (true to form, the first time she has formally "taken" trig) and finding the process growing and exciting. Along with J. M. Cushing and S. M. Henson, she is submitting a research paper (based on her Honors project) to the *Journal of Biological Dynamics*.

Jeff Hafner (MS in Math and Science) is currently a physics grad student and TA at The University of Buffalo, "duking it out with this crazy Buffalo weather". So far, he says, the weather has won.

Vanessa Land (BS in Math and Spanish) is teaching Spanish at River Valley High School in Three Oaks, Michigan, and hopes to teach a math class next year. She and Goran Pujic, now in his fourth year of architecture at Andrews, are to be married in July 2007.

Laura Mack (BS in Math and Physics) is studying in the Atmospheric Science program at Colorado State University, currently taking courses in Atmospheric Dynamics, Cloud Physics, and Atmospheric Chemistry. She finds her studies incredibly interesting—and says that her math major "definitely helped me"—especially since she can tell her classmates why all their math is wrong. "Thank you Andrews math department!!"

Andrea Moore (MS in Math and Science) is working on a Master of Arts in Teaching at Andrews University, and plans to do doctoral study in Environmental Modeling in the fall of 2007. She is also doing GED tutoring at the Newplant SDA Church in Benton Harbor, MI. Along with coauthors S. P. Damania, J. L. Hayward, S. M. Henson, and S. V. Hodge, she is preparing a manuscript for submission to the research journal *Condor*.

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ANDREWS UNIVERSITY

DEPARTMENT OF MATHEMATICS

PROGRAMS

*Bachelor of Science in Mathematics

*Bachelor of Science in Mathematics Education

*Mathematical Studies Major

*Mathematics Minor

*Mathematics Education Minor

*Minor in Mathematics of Economics and Finance

*Behavioral Neuroscience mathematics track

*Master's in Mathematics and Science (interdisciplinary)

FACULTY

Shandelle M. Henson

Joon Hyuk Kang

Robert C. Moore (CHAIR)

Yun Myung Oh

Lynelle M. Weldon

EMERITI

Kenneth Franz

Theodore Hatcher

Donald H. Rhoads

Edward J. Specht

LECTURERS

Keith G. Calkins

Shirleen Luttrell

ΠΜΕ (MICHIGAN GAMMA CHAPTER)

Nicholas Valles, President

Christopher Armstrong, Vice President

Thomas Adams, Secretary

EIGEN* (MATHEMATICS AND PHYSICS CLUB)

Thomas Adams, Math President

Danielle Wuchenich, Physics President

Anneke Ingram, Secretary

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Department of Mathematics

Andrews University,

Berrien Springs, MI 49104

Graduates

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Roger Schmidt (BS in Computing, Mathematical Studies major) is working at Whirlpool Corporation, doing PC support and software development.

Rochelle White (BS in Math) is working on a master's degree in music at Andrews University. Her degree is with performance emphasis, specializing in instrumental conducting.

We are proud of these students, and wish them well in their continuing studies and careers. We also list some of our math minors who have especially close connections to our department—see article on page 4. □

Robert C. Moore New Chair

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everything with excellence."

At the Joint Meetings at Atlanta, in January of 2005, we did some preliminary exploration of the possibility of his moving to Berrien Springs--with equivocal results. The following fall he agreed to visit Andrews and that's when he became more interested in joining us.

"It was my need for a change that really brought me across," Bob says. "I was attracted by a department with so much scholarly activity and teaching competence. I was also impressed that the department was trying to address a number of the issues inherent in educating a wide spectrum of general education students while properly mentoring its majors."

The department is not only highly interdisciplinary, but its actions strongly affect other programs and departments across the campus. This makes starting in "cold" as its chair, without having taught on campus, a fairly daunting prospect. Of this, Bob says "It has been a fun challenge, and many people on this campus, especially those in departments who are close to us, have been very helpful." Those of us in a position to observe him up close can verify that Bob has taken hold of his new position with real vigor and energy.

Bob Moore received his bachelor's and master's degrees from Southern Adventist University and the University of North Carolina at Chapel Hill, respectively. His doctorate is from The University of Georgia, Athens. His research area is mathematical proofs, especially the transition mathematics majors make from computational courses, like calculus, to advanced courses that require students to read and write proofs. At the end of the day he gladly goes home to his wife Lois (who is a nurse) and his bees. We are sure he sleeps the sleep of the righteous.

Welcome to Andrews, Bob Moore! □

Don Rhoads Retires

After six years as Chair of the department, Don has retired to his home in Bloomington, Indiana. Don does not have a long academic career at Andrews (only 15 years), as academic careers go, but it goes back a long way. He started at Andrews, as an Instructor, in 1962. From 1964 to 1967 he did graduate work at the University of Michigan, receiving his PhD in 1968. He left in 1972 (as Associate Professor) to pursue a business interest in Bloomington.

Of returning to the campus in 1998, after a 26 year absence, he says "I wasn't sure I could learn to teach again, so Jean and I agreed that for the first year we would not move to Berrien Springs. She would stay at home and continue working at Indiana University, and I would come home each weekend."

That "first year" stretched to eight years and 350 or so round trips—Don junking his old car along the way and equipping himself with a VW Golf TDI. "This way, at least, I could do the whole round trip on one tank of fuel and not feel that I was totally trashing the environment."

"I've had a wonderful run here, and I'll continue to do what I can to help the Andrews department achieve stature and the whole institution to become a truly great university."

Don can be reached by e-mail at his Andrews e-mail address, or at drhoads@bluemarble.net. His address is 1000 W Williams Rd, Bloomington IN 47404 and phone number is 812-876-1042. □

Yun Myung Oh Joins Department

Dr. Yun Myung Oh has joined the Andrews University Department of Mathematics as Associate Professor. She was on our faculty part time for three years previously, and since then was Visiting Assistant Professor at Michigan State University and also taught at Indiana University Northwest.

Yun Myung took her bachelor's and master's degrees at Ewha Women's University in Korea, and her PhD from Michigan State University. Her research area is Riemannian Geometry. Since receiving her PhD, she has published nine research papers, some of which are jointly authored with her husband Joon Hyuk Kang, who is also on the mathematics faculty at Andrews. They have a daughter, Min Seo.

Dr. Oh is a warm, kind person who takes a serious interest in her students. In the classroom, she exhibits a truly formidable chalkboard technique—she writes with the most amazing clarity and speed—almost as fast as she talks. The department is delighted that she could join our faculty and we all wish her a long and illustrious career here. □

Johnson Leaves for Southern

Dr. Ronald D. Johnson, one of the most versatile mathematics teachers on our faculty, has taken a teaching position at Southern Adventist University, his *alma mater*.

Ron's bachelor's degree at Southern was in music, and he earned his PhD at the University of Texas (Arlington) while teaching at Chisolm Trail Academy in Keene.

Over the 15 years Ron was on the Andrews faculty, he became known for his helpfulness to his students and the ingenuity and cleverness with which he approached teaching. The move was partly occasioned by the desire of his wife, Dr. Frances Johnson, who taught in our Department of Nursing, to take advantage of professional opportunities as a Nurse Practitioner which exist in the Chattanooga area.

We wish Ron and Frances all the best as they pursue their careers down south! □

Henson Promoted to Professor, Wins Teaching Award

Shandelle M. Henson has been promoted to Professor. She received her undergraduate degree in mathematics from Southern Adventist University, her master's from Duke, and her PhD from the University of Tennessee (Knoxville). She postdoc-ed at the University of Arizona for two years and stayed on as a visiting assistant professor for an additional three years. Before coming to Andrews University, she spent two years at the College of William and Mary as an assistant professor of mathematics.

In Spring 2006 Shandelle received the Daniel A. Augsburger Excellence in Teaching Award.

April 21, 2006, marked a more important transition for Dr. Henson. She and Dr. James L. Hayward, Research Professor of Biology at Andrews University, were married in Corwin, Ohio by Jim's father, Elder James Hayward.

Shandelle and Jim lead the Seabird Ecology Team, an interdisciplinary group of mathematicians and ecologists that apply mathematics to ecological systems. They live in Niles, Michigan. □

Mathematics Minors Graduate, Make a Splash

Because of the interdisciplinary nature of the Department of Mathematics, we sometimes get unusually close to students who are taking a minor in the field. Often (but not always) this comes about because of the student's involvement with the Seabird Ecology research program, which involves both mathematics and biology students. Here are three who graduated with math minors in 2006:

Christina Burden (BS in Biology) is working on her master's in biology at Andrews. Her thesis will analyze the male cricket call in relation to environmental variables like temperature, time of day, and geographic distubution. She will be using the math modeling techniques she learned from Dr. Henson in an attempt to predict the cricket calling song given any combination of environmental variables.

Larissa Mann (BS in Speech-Language Pathology and Audiology) enjoys the distinction of having been accepted in all four of the graduate programs she applied to! Larissa was a mainstay of our department's corps of paper graders (readers) for her entire time at Andrews. She's now at Central Michigan University working on her doctorate in Audiology, and enjoying her studies.

Rebecca Prouty (BA in Spanish) was a member of the Seabird Ecology Team. She is currently working at AU as the administrative assistant to Ron Whitehead and office manager of the Center for Youth Evangelism. □

Calkins Researches in Rochester

Dr. Keith Calkins, of the Andrews University Math and Science Center (our high school program for gifted students) took the opportunity during the summer of 2006 to do research at the University of Rochester (NY) in the Department of Chemistry. This research was funded by the National Science Foundation through their Research Experience for Teachers (RET) program, a smaller program than the similar REU program for undergraduate research. It specifically provides research opportunities for high school teachers.

His research involved testing and documenting a molecular dynamics program written by his advisor/mentor Harry Stern, a theoretical chemist at Rochester. This program uses the Particle-Particle Particle-Mesh Ewald Sum Method of breaking the long-range forces into a short-range component calculated via particle-particle methods and the remainder done through particle-mesh techniques.

Keith first fit power-law equations to the total RMS-error for various mesh sizes and number of coordination shells used. He then found a minimum total RMS-error which provided accurate results for such properties as the dielectric constant in 256 TIP4P water molecules. A publication is in progress.

Others in the research group were screening a molecular database for drug-like properties or modeling the folding of proteins into their tertiary structure. Keith says, in passing, that "There was time to pursue some genealogical 'dead ends' off hours." □

Bruce Lee Honored at Homecoming

During Homecoming Weekend 2006, the Physics Department celebrated Bruce Lee's 50 years at Andrews. Lee joined the faculty in 1956 and is currently Professor Emeritus of Physics and Director of Physics Enterprises. Physics students, colleagues, friends, and alumni joined forces on Friday 29 September to put on a physics demonstration "Homeshow" in the Thompson Amphitheatre, a luncheon in the Chan Shun Lobby, a ribbon-cutting and naming of the Bruce Lee Commons, a Physics Enterprises Open House, Sabbath School for Physicists at the Campus Center, and a Physics Reunion Potluck in a transformed physics classroom in Haughey Hall. At the homecoming parade, former and current students and faculty with bow ties, matching tee-shirts, and golden balloons escorted Bruce Lee on the physics float throwing gold coins to the spectators with a golden goose at his side.

Congratulations, Bruce Lee, and thanks for all you have done for our University with your creativity, foresight, generosity and commitment over 50 years. □

-Contributed by the Department of Physics

Rhoads Wins Dean's Award

Dean William Richardson awarded the 2005-2006 Dean's Award to retiring chair Don Rhoads. The award is given to one department chair that has made a significant contribution to his or her department. Richardson, who also retired in 2006, remarked that, although the criteria were subjective, Don's award was highly defensible.

See the Chair's column on the last page of this newsletter for a brief survey of the manifold ways in which Don has contributed to the department. □

Seabird Team Receives Big NSF Grant

The National Science Foundation (NSF) recently renewed funding for the Seabird Ecology Team. The NSF Division of Mathematical Sciences awarded the new grant of $300,000 to Andrews University and Walla Walla College, in collaboration with the University of Arizona. The three-year grant funds the Team's ongoing research in the mathematical basis of animal behavior. Much of the work is done with Glaucous-winged Gulls on Protection Island National Wildlife Refuge in Washington State.

The four Co-PI's on the project are Shandelle Henson, Professor of Mathematics at Andrews University, Jim Hayward, Research Professor of Biology at Andrews University, Joe Galusha, Professor of Biology and Dean of Graduate Studies at Walla Walla College (Andrews MA '72), and Jim Cushing , Professor of Mathematics at the University of Arizona.

The Team currently includes 12-15 undergraduates and three master's students. Three post-graduate students are finishing up papers for submission to peer-reviewed journals. Participating undergraduates receive the prestigious Research Experience for Undergraduates (REU) fellowship from NSF.

While at the island, which measures only about a mile and a half long by a half mile wide, the research team stays in a cabin, seven miles by boat from the closest town. Working sixteen-hour days beginning at 5:30 am, the researchers spend their time in blinds observing the gull colony. At the top of each hour, they record the number of gulls and the behavior of each bird. Back at Andrews University and Walla Walla College, the researchers analyze the data using time series methods with differential equation models.

An understanding of the dynamics of animal behavior can help prevent some of the conflicts that arise between animals and humans. "In terms of the science itself, we're forging a new field - the mathematical theory of animal behavior," Henson states. "We're breaking new ground, and we're proud of that."

The Team's new website, designed by member Tom Adams, is at `http://www.andrews.edu/~henson/seabird/`. □

-Adapted from Andrews University press release

Seabird Ecology Team April 2006

Elvis is Alive and Visits Andrews!

Dr. Elvis Pennings, doggy colleague of Dr. Tim Pennings, Professor of Mathematics at Hope College, visited Andrews University with Tim on September 15 to give the EigenTalk. Elvis, who holds an honorary degree from Hope College, knows calculus and bifurcations, and has collaborated with Tim on research for several years.

Tim relaxes with Elvis (back right) and friends.

At the EigenTalk, Tim presented an optimization problem in which Elvis must compute how far to run on land and how far to swim in Lake Michigan in order to fetch a ball as fast as possible. Elvis quite consistently chooses the optimal solution.

To learn more about the famous dog Elvis and his human colleague, google "Elvis calculus"! □

ΠME News

Fourteen new members were inducted into the Michigan Gamma Chapter of Pi Mu Epsilon on April 4, 2006 in a ceremony held at the Mack residence. Graduating master's student Jeff Hafner gave the lecture, entitled "A brief introduction to graph theory."

The new members are Tom Adams, David Beckworth, Christina Burden, Aurora Burdick, Joelle Chase, Brendan Cross, Jeff Hafner, Rebecca Prouty, Steve Thorman, Nick Valles, Roy Villafane, Jerry Weldon, Bill Wolfer, and Danielle Wuchenich.

The newly elected officers for 2006-2007 are Nick Valles, President; Chris Armstrong, Vice President; and Tom Adams, Secretary-treasurer. The outgoing officers were Chantel Blackburn, President; Laurie Mack, Vice President; and Erik Brown, Secretary-treasurer.

Pi Mu Epsilon, Inc. is the honorary national mathematics society. According to the official society website, it was founded in 1914 at Syracuse University and has more than 300 chapters at colleges and universities throughout the country. The purpose of the society is the promotion of scholarly activity in mathematics among the students in academic

institutions. The Michigan Gamma Chapter of Pi Mu Epsilon was chartered at Andrews University in 1970. □

New Departmental Website

Before leaving for Southern Adventist University, Ron Johnson transferred the department's website to the university template. Visit our new site at `http://www.math.andrews.edu/.`

2006 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.
- Specht Geometry Project.
- Mathematics Department Fund. Used to support activities such as the Pi Mu Epsilon honor society within the department.
- Endowed Professorship in Mathematics.
- Computer lab in HYH 112.

Checks should be payable to Andrews University, with the purpose of the donation on the "for" line. Please send to Bob Moore, Chair, Department of Mathematics, Andrews University, Berrien Springs, MI 49104. Thank you for your generosity and support!

Research Updates

Breaking News

- A paper by former student *Kami M. Lizarraga* (BS 2005), together with *J. H. Kang* and J. H. Lee, "Perturbation of a nonlinear elliptic biological interacting model", has been accepted by the journal *Dynamics of Partial Differential Equations.*
- The paper "Steady state coexistence solutions of reaction-diffusion competition models", by *J. H. Kang* and J.H. Lee has been accepted by *Czechoslovak Mathematical Journal.*
- The paper "Modeling territory attendance and preening behavior in a seabird colony as functions of environmental conditions", by *S. M. Henson*, J. G. Galusha, *J. L. Hayward*, and J. M. Cushing, has been accepted by *Journal of Biological Dynamics.*
- Twelve research papers by department members are currently in submission or preparation. Four of these twelve have student coauthors. For details, see the departmental website.
- *S. M. Henson* has been appointed a senior editor of *Journal of Biological Dynamics*. She also serves as a senior editor of *Natural Resource Modeling.*

Publications Appearing in 2006

- The paper "Optical frequency measurements of $6s\ ^2S_{1/2}$–$6p\ ^2P_{1/2}$ (D1) transitions in ^{133}Cs and their impact on the fine-structure constant", by V. Gerginov, *K. Calkins*, C. E. Tanner, J. J. McFerran, S. Diddams, A. Bartels, and L. Hollberg, appeared in *Physical Review A*, 73, 032504, (2006).
- The paper "Experimental support of the scaling rule for demographic stochasticity", by R. A. Desharnais, R. F. Costantino, J. M. Cushing, *S. M. Henson*, B. Dennis, and A. A. King, appeared in *Ecology Letters,* 9, 537-547 (2006).
- The paper "Identifying environmental determinants of diurnal distribution in marine birds and mammals", by *S. M. Henson*, *J. L. Hayward*, and *S. P. Damania* appeared in *Bulletin of Mathematical Biology,* 68, 467-482 (2006). Damania (MS Biology, 2004) was a graduate student of Henson and Hayward, and a member of the Seabird Ecology Team.

Presentations 2006

- *K. G. Calkins* gave invited colloquia at Andrews University in 2006 in the Departments of Chemistry, Physics, and Mathematics.
- *S. M. Henson* has given invited talks in 2006 at the Ecological Society of America Annual Meeting in Memphis and the Joint Mathematics Meetings in San Antonio, as well as colloquia at Calvin College, the University of Chicago, and Georgia Tech.

Alumni/Emeriti Notes

Kami Lizarraga (BS 2005) is enrolled at Columbia University Law School.

Dr. Ed Specht and his wife Mary have moved from South Bend to Bloomington, where Mary is in a nursing home. Ed is living with their son, Fred. Both Ed and Mary are 91.

Dr. Ken Thomas, former Chair, passed away on November 12. (See article on page 7.) Please keep Shirley and family in your prayers.

Send Us Your News!

The next newsletter will feature alums and friends of the department. Please send your news and a photo to henson@andrews.edu.

Former Chair Passes Away

We are sad to report that our former department chair, Kenneth E. Thomas, passed away on November 12, 2006 at his home in Scotland. Ken joined the Mathematics Department in 1985 and became chair in 1990, a position he held until 1998. His wife, Shirley, worked as a secretary in the Seminary. Ken grew up in South Africa and spent much of his life working on that continent, serving as president of the Zambian Union from 1980-85.

Ken earned his master's degree at Andrews and his doctorate at the University of Nebraska. As department chair, he was humble, hard working, and very well organized, a trait that carried over into his classroom and lectures. "Ken was very interested in his students," said Ken Franz, a colleague of Thomas for a number of years. "He spent lots of one-on-one time with them, whether his own students or not, and he was well liked by them."

"Ken was a respected leader on campus. As department chair, he was able to unify the general education math requirements" reported Ted Hatcher, retired mathematics professor and department chair. This was a significant contribution to the university that is still very much evident.

As a person, Ken was a dedicated Seventh-day Adventist who lived his Christian beliefs. He was always ready to lend a helping hand wherever it was needed. "When I arrived on campus, Ken loaned me his van!" said Lynelle Weldon. "He was very supportive of his faculty."

We bid farewell to a beloved teacher and respected scholar, an inspiring leader and Christian gentleman. □

Math & Science Center Students Score Well on MMPC

The 50th Michigan Mathematics Prize Competition (MMPC) was held in October. Twelve Berrien County Math and Science Center students placed within the top 1,000 statewide and are invited to take part II of the exam in December. Robert Nash of Niles, a junior taking BC Calculus in the program, answered 27 of the 40 multiple-choice questions correctly placing 36th statewide. This year the cutoff for the top 10% was 16. □

Ex Cathedra

From the Chair

As I begin my work as chair, I want to give tribute to my predecessor, Don Rhoads. During the past six years the number of mathematics majors has increased dramatically to over 30. I attribute much of that growth to Don's efforts in creating a vibrant department through faculty recruitment, curriculum development, and the establishment of high but reasonable academic standards.

The strength of a department resides with its faculty, and as chair Don was instrumental in hiring most of us. He was particularly creative in finding a way to entice Shandelle Henson to join the department. Her research program has been very successful, not only in terms of productivity but also in providing research experiences for students. With Joon Hyuk Kang and Yun Myung Oh also conducting active research programs, the department has the research strength a university ought to have.

The creation of the Mathematical Studies major, which students take as a second major, is one way in which Don has served both students and other departments. He also worked with the Engineering and Computer Science Department to secure funds for the computer lab in that department, which we use for our developmental courses.

Keith Calkins points out that Don did an admirable job with the transition of the Math and Science Center. He was chair during the last year of growth (2000-01) to 50 students per grade level, and he oversaw the difficult staff reductions (2001-04) that took the program back to 30 students per grade level.

Don had a major impact on the university as a whole through the general education program. To support reasonable academic standards, he established and smoothed procedures for dealing with prerequisite enforcement, transfer credit, and developmental courses. Along with Lynelle Weldon, he created the Reasoning with Functions course and wrote a textbook for it.

We were very pleased last spring when Dean Bill Richardson honored Don with the Dean's Award in recognition of his achievements as a department chair. Don's vision and intense dedication have indeed had a major impact in helping "the department achieve stature and the whole institution to become a truly great university." From all of us, thank you, Don!

Bob Moore