

Stright Lines

The official Newsletter of the IUP Mathematics Department

Fall, 2004-----Volume 7, Issue 2

Editor's Note

We have some outstanding current undergraduate students in the IUP Mathematics Department, and in this issue we will profile two of them. We have also included updates on faculty retirements and new hires, as well as several letters from alumni.

Dr. Tom Short worked with me preparing this newsletter and Tom will take over primary responsibilities for editing the next issue of *Stright Lines*. You will find an article about Dr. Short in this newsletter.

We look forward to hearing from our alumni and invite you to get in touch with us. Dr. Short's e-mail address is tshort@iup.edu. We hope you enjoy this edition of our newsletter.

Jerry Buriok

Dr. Caroline Anderson Retires

by
Dr. Gary Stoudt

Dr. Caroline Anderson's career at IUP dates to 1968 at what was then known as "The Punxsutawney Center." She worked her way from Instructor to Assistant Professor with Tenure in 1971,

to Associate Professor in 1977. Along the way she was able to complete her Doctor of Arts degree at Carnegie Mellon University in 1983. During her tenure at IUP, Dr. Anderson taught a wide variety of service courses effectively, including pre-calculus, calculus, and probability and statistics. In the last decade, Dr. Anderson has concentrated her efforts on MATH 217, Probability and Statistics.

Dr. Anderson made herself into an innovative statistics teacher. Over the years she has taken her students from Minitab on the VAX, to SPSS, to hand-held technology with the TI-83 graphing calculator. She attended numerous workshops and short courses to incorporate this technology into her courses. She also pursued other innovations in statistics teaching, namely working with real data, activity based statistics, and student-collected data. She worked with these ideas long before they became "fashionable" at IUP and in the statistics community at large.

Throughout her career Dr. Anderson has been a valued member of the Mathematics Department. At various times she has served on the Service Courses and Statistics Curriculum Committees, the Summer School

Committee, and numerous search committees. She was also often on the important Department Evaluation and Tenure and Promotion Committees, having chaired the latter on two separate occasions.

New Tenure-Track Faculty

Two new faculty members joined the Mathematics Department in the fall of 2004, and we want to welcome them aboard.

Dr. Yong Colen was born in Seoul, Korea and came to America when he was twelve years old. He holds a B.S. degree from Ball State University, an M.A. from Yonsei University in Korea, and a Ed.D. from Columbia University. The following is the information Dr. Colen provided about himself:

“I decided to pursue a study of mathematics for two reasons: (1) I was very fortunate to have one outstanding mathematics teacher for all four years in high school. Ms. Guillard inspired me to view mathematics as a creative process. (2) Secondly, after studying architecture for a year, I switched my major to mathematics education. I literally wanted to think outside the cubical.

I have taught students from elementary to university levels. My primary interest lies in finding and conveying ways to improve how our students learn mathematics. Specifically, I would like to use technology to improve teaching and learning, investigate comparative/international mathematics education, design challenging curricula for all students and improve prospective teachers’ mathematics knowledge and pedagogy.

I have three children: Hannah Emily of New York, Philip Andrew of New Jersey, and Alyssa Lydia of Ohio. Each time we move to a different state, God has provided a wonderful wonder. Due to the strong correlation between moves and having children, my wife, Jung, is very uneasy about the move to Pennsylvania. Otherwise, we are VERY excited about a new chapter in our lives.”

Dr. Brian Sharp’s specialty is also mathematics education. He provided the following statement about himself:

“I was born in Elkins, West Virginia and grew up playing baseball and fishing. After high school, I attended West Virginia University where I received a B.A. and M.S. in mathematics. As part of my Masters’ program, I taught sections of algebra and calculus. I loved teaching mathematics, so I obtained my teaching certificate and taught for eight years at the middle school and high school levels. After my eighth year of teaching, I decided to pursue my doctorate at the University of Virginia. While at UVA, I became interested in how students learn rational number concepts and how technology can be used to improve the teaching and learning of mathematics.

I have a wife, Denesa, and three active boys – Garrett, Grant, and Gunner. We all enjoy baseball, biking, and fishing”

We welcome Yong and Brian to the IUP Mathematics family!

**Dr. Tom Short Honored by
American Statistical Association**
by
Dr. Gary Stoudt

Dr. Thomas Short of the Mathematics Department and coordinator of IUP's Applied Research Lab, has been named a fellow of the American Statistical Association (ASA). He is the first IUP professor to be so honored.

Only one-third of one percent of the membership of the ASA can be chosen as fellows. According to the ASA, to be honored with the title of fellow, members must have an established reputation and have made outstanding contributions in some aspect of statistical work. Dr. Short was honored primarily for his work in statistics education. He is past editor of the *Journal of Statistics Education* and served on the ASA Committee on Publications. He is currently the chairperson of the ASA Advisory Committee on Teacher Enhancement, co-editor of the *Pennsylvania Council of Teachers of Mathematics (PCTM) Magazine*, and is the co-founder and organizer of the Pennsylvania Statistics Poster Competition. In addition to his work in statistics education, Dr. Short is also active in statistical consulting.

“In 1995, my undergraduate role model and mentor, Jerry Moreno from John Carroll University, was named a fellow of the American Statistical Association. He was one of the first statistics educators to be named a fellow exclusively for his efforts and advocacy on behalf of the teaching of statistics at the K-12 and college levels,” Dr. Short said. “Now that I have been named a fellow of ASA for many of the same reasons, I hope that I can inspire my

students and colleagues as Jerry Moreno inspired me to enjoy analyzing statistics, communicating statistics, and teaching statistics,” he said.

“It's humbling to read the names of ASA fellows and realize that someone out there appreciates the work I do enough to nominate me to join the list. I am grateful to my students, to my colleagues both at IUP and at Villanova, and to my family for all that they have done for me throughout my career,” he said. “I look forward to keeping up the good work!”

Dr. Short came to IUP from Villanova University in 2002. He also taught at Carnegie Mellon University, where he received his doctoral and masters degrees in statistics. His bachelors degree in mathematics is from John Carroll University.

The American Statistical Association, a scientific and educational society founded in Boston in 1839, is the second oldest professional society in the United States. For 160 years, ASA has been providing its nearly 16,000 members serving in academia, government, and industry and the public with up-to-date, useful information about statistics. The ASA has a tradition of service to statisticians, quantitative scientists, and users of statistics across a wealth of academic areas and applications.

Undergraduate Profiles

**Profile: Brigid Mooney
Class of 2005**

Brigid Mooney is a senior Mathematics major. She is a graduate of University

High School in Tucson, Arizona, class of 2001. Brigid is spending her senior year studying mathematics at Cambridge, England.

Brigid has been an exceptional student in a number of ways. As a high school student, she completed AP courses in Calculus, Physics, American Literature, Economics, European History, US History, and American Government. As a result, Brigid had twenty-eight college credits from AP exams when she matriculated at IUP. Needless to say, very few students from Tucson choose to attend IUP, and then begin their first year one credit short of being classified as a sophomore. She was recruited to IUP by the Robert E. Cook Honors College and has successfully completed all of the Honors College requirements. Brigid expects to graduate in May 2005 with a major in mathematics and a minor in physics. She has a 4.0 grade point average and made the Dean's list every semester. Brigid was awarded a highly prestigious Barry M. Goldwater Scholarship during her junior year. This is a federally funded scholarship designed to encourage outstanding students to pursue careers in the fields of mathematics, the natural sciences, and engineering. The Goldwater Scholarship is the premier undergraduate award of its type in these fields.

Editor: What brought you to IUP?

Brigid: I came to visit IUP as a senior in high school because I was interested in the Honors College. Over the course of the visit, I was impressed by the quality of the programs as well as the care and support provided by both faculty members and students. It was

really that attitude that brought me to IUP.

Editor: As a mathematics/physics/Honors College student, tell me about your daily schedule.

Brigid: I'll admit I stay quite busy, but some days are more scheduled than others. But that isn't necessarily because of my studies but rather what I do outside of them; working as an RA, IUP Ambassadors, Walking School Bus, Phi Sigma Pi honorary fraternity, not to mention relaxing and laughing with my friends. But between classes and activities, I do study quite a bit. I try to make the middle of the afternoon my prime study time. In my spare time I enjoy pretty much anything relaxing, from watching reruns of "Trading Spaces" until all hours of the morning to watching snow fall outside my dorm window to hiking through the middle of the desert when I'm home.

Editor: What are the challenges and rewards of your academic involvement at IUP?

Brigid: As with any situation, I only get out as much as I am willing to put in, so the biggest challenge is probably trying to find the balance between what I want to accomplish and what I, realistically, have time to do. But the biggest reward throughout my academics at IUP has been the faculty. I've found that faculty members across campus are more than willing to talk to students and help them or offer ideas with almost anything, even if the problem you're working on is from another class or another department. The faculty members here genuinely

care about students, and that is a huge benefit of being at IUP.

Editor: What characteristics do you have that help you deal with your daily challenges at IUP?

Brigid: In general, I think I have a positive attitude and surround myself with people that I care about and who care about me, so that support network really helps me deal with just about any challenge I face.

Editor: Tell me about the unique educational experiences you have had outside of IUP.

Brigid: The summer after my freshman year, I participated in and REU (Research Experience for Undergraduates) in Algebraic Representation Theory at Temple University. Following that experience, I traveled to Cambridge University in England to take part in their three week Science Summer School. The following spring, I studied in Budapest, Hungary through the Budapest Semesters in Mathematics Program at the Technical University Hungary.

Upon my return to the States, I worked for the Department of Defense as part of a cryptology mathematics program. This summer I will again work for the Department of Defense as part of the Director's Summer Program. I have recently accepted an offer to spend the 2004-2005 academic year as a visiting student at Sidney Sussex College, Cambridge England, where I can study in their mathematics program for the final year of my undergraduate studies.

Editor: What are your career aspirations, both short- and long-term?

Brigid: Short term, I'd like to learn as much as possible about different areas of mathematics, especially cryptology. Longer term, I'd like to get my Ph.D. in mathematics and eventually work in an area of cryptology, probably for the Department of Defense.

Profile: Jacqueline Martin
Class of 2005

Jacqueline Martin is a senior Secondary Mathematics Education major. She is a graduate of Garden Spot High School in New Holland, PA, class of 2000. Jacqui is currently student teaching and plans to graduate from IUP in December 2004.

During her matriculation at IUP, she made a name for herself as an outstanding scholar/athlete. She has a 4.0 grade point average and made the Dean's List every semester, was awarded the Mathematics Department's Ida Z. Arms Scholarship for Excellence in Mathematics, and was a member of the honorary societies Kappa Mu Epsilon, Kappa Delta Pi, and Phi Kappa Phi. She is also a member of Fellowship of Christian Athletes.

Jacqui also excelled on the basketball court, where she was a member of the IUP women's basketball team. At the end of the 2003-2004 season, she was named as a first team CoSIDA Academic All-American and for the second year in a row, was placed on the PSAC West second team. Last year, Jacqui was a third team Academic All-American. She received the PSAC Top Ten award for academic and athletic

achievement for both of her last two seasons. Jacqui was also a recipient of the IUP Scholar Athlete Award. The capstone of her basketball career came during the 2003-2004 season when her scoring total surpassed 1000 points. Jacqui is only the fourteenth player to accomplish this feat at IUP. Also, she is only the ninth player to score 1000 points and collect 500 rebounds.

Editor: How did your interests in mathematics and basketball develop?

Jacqui: In elementary school I was much taller than my peers and self-conscious about my height. My parents wanted me to be confident with who I was and they thought that if I played basketball I might begin to appreciate my height. They signed me up for my school's basketball program in 3rd grade. My size got me immediate attention and my success increased my self-confidence. I went to camps and played on club teams that took me all over the country and allowed me to meet many new people. It was in middle school that I decided that I enjoyed basketball enough that it was something I wanted to continue after high school. I have learned so much from basketball and the successes and failures that I have experienced.

I have received high grades in math class ever since I can remember, but it was not until 8th grade that I actually really began to enjoy math. I had an 8th grade algebra teacher named Mrs. Good that greatly influenced my academic career and my choice of major at IUP. Mrs. Good was very tough and I knew going into her class that it would be a challenge. She always knew the right questions to ask to help us figure things out for ourselves and she never let us give up when things

got tough. She showed me the connections in mathematics and the great things mathematics allows us to do. Even as I went on to higher levels of math in high school I could see areas where her preparation made my journey much easier and clearer.

I enjoy youth, so being a math teacher makes perfect sense. It allows me to include many different things that I enjoy. I get to be around youth, teach them math and maybe also coach basketball.

Editor: What brought you to IUP?

Jacqui: I originally began looking at IUP when the head coach of the women's basketball team contacted me. I came for a visit and I liked the campus and the basketball program, so I did some research on the math and education departments. I found out that IUP is a highly respected school in both areas. I was looking for a place where I could play basketball and more importantly, get an education that would prepare me for my future. IUP was a great fit for my goals and for me.

Editor: What are the challenges and rewards of being a student-athlete?

Jacqui: I believe that the rewards of being a student-athlete far outweigh the challenges. Practicing good time management skills is a constant struggle. It can be difficult to get all of my schoolwork and studying done to the extent that I want. Sometimes I have to sacrifice time with my friends in order to get my work finished and the team often has to stay at school during times when the rest of campus is on break. On the other hand, there are many benefits and

rewards of being a student-athlete. Playing on a team together and spending a lot of time with my teammates has given me friends that mean so much to me. I have been able to meet many people through athletics, and basketball has placed me in the local and state spotlight many times. I have learned lessons that will help me as I enter the teaching field and continue in life. I have been able to develop my leadership skills and I have learned how to work together with many different kinds of people. I have learned what it means to be a role model and coaching young girls has allowed me to gain valuable teaching experience. Basketball gives me one more way to relate to youth and show them that it is possible to be successful on and off the court. Playing basketball has taught me how to take criticism, how to endure success and failure and that hard work does pay off. These are all things that will help me throughout the rest of my life.

Editor: What are your career aspirations, both short and long-term?

Jacqui: My first goal is to be a high school or middle school math teacher. I want to get my master's degree and maybe eventually my doctorate. I am interested in the possibility of getting involved with school administration or teaching at the college level, but both of those would be in the far future. I am currently planning on teaching math in the public schools for a long time. I love what I am preparing to do and I cannot wait to have my own classroom.

We get letters....

We want to thank the alumni who sent us the following, and we invite our readers to send us letters or e-mail messages for inclusion in the next edition of our newsletter.

Dear Dr. Buriok,

My PHEAA job starting in the fall of 1965 was working in Dr. McKinley's office, right after Indiana State College became IUP. He was tall, but nowhere near 6'8", if that helps. This brings back the memory of my first assignment – 10 cases of envelopes with (Indiana) State College in the return address that needed to be X'd out (on a manual typewriter) and University of Pennsylvania typed above. I can still type the words 'University' and 'Pennsylvania' without thinking!

Does anyone remember Dr. Simmons? His differential equations class began with "I began teaching at Georgia Tech in 1919." Dr. Simmons was amusing, always with a bit of shirttail hanging out and crooked glasses. He was amazing because he never forgot anything! Once he called roll on the first day of class he remembered everyone's name – even if we sat in a different spot! Years later when I returned for grad school and saw him in the hall, Dr. Simmons remembered my maiden name, what year I'd taken his class, and the grade I got. This dear man had to be near or over 80 at the time!

I doubt if any one besides Dr. Simmons remembers me, as I worked a 25 hour/week PHEAA job and two 8-hour nights at a pizza shop on weekends, but I would love to hear from anyone who

might remember ol' Doc Simmons quirky ways.

After graduation, I worked at US Steel as a programmer/analyst, took 8 years off to be a full-time mom, and have been teaching adult education in Altoona since 1982.

Janet (Hunter) Schmittle, Class of '69

Hi Dr. Stoudt,

How are you? Great here! I just wanted to drop a little note to say how I was doing and ask a favor.

When I graduated from IUP, I accepted a job working for Computer Sciences Corporation as a Computer Programmer. I worked on programming the AEGIS Display System, one of five systems within the Navy's AEGIS Weapon System. It was a wonderful learning experience – I was challenged and overcame many obstacles to perform my job to the best of my ability. The hard work paid off when it was time for my review. On a five scale system, I was rated a two (with one being the best). I was told that I was performing at a level above a junior programmer and that being rated a two within a 6 month period was a wonderful accomplishment. However, even though I was "told" that I was doing great, I still had a lot of uncertainty with the position. The system was very large and complex and the work entailed programming in a C++ / UNIX based environment. I was told that as hard as I tried, I was never going to learn and understand every concept in the AEGIS Display System Department. That just didn't sit well with me. I did learn a lot but did not feel comfortable

for one day in that position. Yes, I had a Computer Science minor, and my minor focused on C++ but I felt that I did not master the concepts enough for my primary and sole job function to be a programmer.

I started looking for a new position in March and was offered a position with Lockheed Martin as an Engineering Planner Associate working on COTS Obsolescence and Diminishing Manufacturing Sources (DMS) Management for the AEGIS Weapon System. I was able to jump right into the position because of my prior AEGIS knowledge from CSC and now, two months later, am performing as a full functioning member of the DMS Team. This position is exactly what I wanted when I graduated! After adjusting in my new position, I have decided to return back to school for my Master's Degree. I am going to go to Drexel for a Master's Degree in Engineering Management. Fortunately, Lockheed Martin had a tuition reimbursement program so I am definitely taking advantage of that! Classes start near the end of August and I am very excited!

Also, I wanted to let you know that Lockheed Martin is in a huge hiring spree. Right now, we have over 800 requisitions open with more to come. I have attached two specific job descriptions for our department. One is for a Cost position and the other is for a Lifecycle DMS position for the new Littoral Combat Ship (LCS) win. We have four of each position open. If you know of anyone looking for a job that is willing to move to the Philadelphia/New Jersey area, please have them contact me via email or phone. Also, I would encourage them to go to the Lockheed

Martin job website:
<http://Impeople.external.Imco.com/careers/search/search.asp>

Tessa Polenik, Class of 2003

We received the following letter from Dr. Daniel A. Griffith, Professor of Geography in the Department of Geography & Regional Studies at the University of Miami.

Dear Newsletter Editor:

Enclosed is a copy of an article of mine that recently was published in *Linear Algebra and Its Applications*; this is the second paper I have had published in *LA&A* (see vol.321, 200, pp. 95-112). This latest paper principally draws upon my undergraduate and graduate work in mathematics at IUP (B.S. 1970; graduate work 1970-72). Training by three of my IUP instructors – Mr. D. McBride (retired), Dr. J. Hoyt (retired), and Mr. C. Maderer (retired) – helped make this article possible.

This eigenfunction work is sufficiently innovative that I have just received a grant of \$159, 778 from the Division of Mathematical Sciences, National Science Foundation, to continue the work.

While I have been publishing in statistics journals since 1989, I am pleased to be able to make contributions to the linear algebra literature. And, I continue to appreciate the mathematics training I received at IUP that has enabled me to do both.

Sincerely,

Daniel A. Griffith, Ph.D.
 Professor of Geography

Where are they now?

Carl Oakes – Retired Faculty

We didn't include Carl's address in the last issue, so add this one to your list:

Carl P. Oakes
 147 Greenview Drive
 Indiana, PA 15701
 e-mail: cdoakes@yourinter.net

Dominika Polkowska – Class of 1999

Dominika is currently working on her Ph.D in mathematics at the University of Illinois at Urbana-Champaign. She is writing her thesis in model theory under Professor Anand Pillay and is expecting to complete her degree in May 2005.

Jennie Day – Class of 2000

Jennie completed an MS in Civil Engineering at San Jose State University in California, and this fall is beginning studies at the University of California at Berkeley toward a Ph.D. in City and Regional Planning.

Jennifer Franko – Class of 2001

Jennifer is currently working on her Ph.D. in mathematics at the University of Indiana in Bloomington, Indiana.

Tiffany Pritt – Class of 2001

Tiffany completed her masters degree in mathematics at Penn State University and is now employed at Rochester Institute of Technology in their developmental mathematics program.

Nicholas Early - Class of 2004

Nicholas spent the spring semester of 2004 studying mathematics at the Independent University of Moscow in Russia. He is currently attending graduate school in mathematical physics at Duke University with a Charles H. Townes Teaching Fellowship.

HOME PLaTe – the Successor to SEQual

by
Dr. Larry Feldman

Those of you who have been careful readers of *Stright Lines* are aware that the SEQual (Statistics Education through Quantitative Literacy) grant had been around for a long time. SEQual began in 1992 and died in 2003. However, we have a new \$475,000 grant to fill its place. It's called HOME PLaTe, which stands for Hands-On Mathematics Education for Pennsylvania Learning and Teaching. HOME PLaTe began in March 2004 and is planned to continue at least through 2006.

Our main goal is to help K-12 teachers find fun, hands-on, and mathematically sound ways to teach concepts from the high-stakes statewide tests. We believe that learning will be more powerful and effective if teachers provide interesting and mathematically sound hands-on data collection activities. We don't have to give in to the drill and kill mentality that at first glance seems to be the obvious reaction to the high stakes tests at grades 3 through 8 and 11.

For the 2004 workshop, HOME PLaTe partnered with 3 school districts – Homer Center, Penns Manor, and

Purchase Line. For 2005, we will continue with these schools and expand to schools in the Erie City School District through a workshop at Edinboro University, led by Dr. Patricia Flach.

The secondary team for 2004 was composed of IUP's Francisco Alarcon, Indiana Senior High's John Uccellini, and Homer Center Junior / Senior High's Anita Smith. They did a fantastic job of breaking down the stereotype that secondary math can't be both fun and challenging at the same time. For example, they brought in bicycles and had the senior high teachers trying out potential trig and ratio / proportion lessons. At the same time the junior high teachers were working with over-sized hinged cut outs of geometric shapes to figure out how to get students to discover properties on their own rather than just read about them.

The elementary team was composed of Horace Mann fifth grade teacher Katie Bungo, Dr. Flach from Edinboro University, and me. We also were able to work through exciting activities for children that were mathematically sound. For example, while the primary teachers were going through the amazing number of mathematics concepts that can be taught in the context of the calendar, the intermediate teachers were learning how Katie had her students creating their own cereal boxes from poster board. Not only were they learning about the geometry of creating a rectangular prism (the box) but they were working with ratio and proportion to determine nutritional facts for the pretend cereal they developed.

SEQual began in 1992 and had been funded most years for close to \$200,000

up to last year. The founding group was Jack Shepler (the “godfather” of SEQuaL), Fred Morgan, Ann Massey, Barb Lamberski, John Uccellini, and myself. It had sites at ten locations across Pennsylvania for K-12 teachers.

Francisco Alarcon and I wrote the HOME PlaTe grant with Lynnann Mocek (the previous program coordinator). John Uccellini is the evaluation specialist. HOME PlaTe differs from SEQuaL in that its focus is on improving learning of all five of the Pennsylvania mathematics anchors. SEQuaL had its origins in the teaching of probability and statistics.

We are very pleased to have Mary Jane Hodak as our new Program Coordinator. We hired her a few weeks before she retired from over thirty years teaching at Purchase Line South Elementary School. She is incredibly organized and amazingly successful at keeping Francisco and me organized. Except for Francisco and me, all the HOME PlaTe staff are IUP graduates, some with more than one IUP degree.

If you know of a K-12 teacher who might be interested in coming to one of our workshops or if you would like to receive our free newsletter (“At Bat” – formerly “Quantitative Literature”) please contact Mary Jane (Mary.Jane.Hodak@iup.edu, 724-357-6239) or me (Larry.Feldman@iup.edu, 724-357-4767).

An International Connection

Earlier in this newsletter, we introduced Dr. Yong Colen, a new faculty member in our department who was born in Korea. Dr. Colen is not the first Korean

mathematics teacher with whom we have been impressed, and we introduce another to you now.

The following article was submitted by Dr. Woo Hyung Whang at the request of the editor. Dr. Whang received a B.S. in Mathematics Education from Korea University in 1982, an M.Ed. in Elementary and Middle School Mathematics Education from IUP in 1988, and a Ph.D. in Mathematics Education from The University of Georgia in 1993. He returned to Korea where he taught at Chunchon National University of Education and then Korea University. Dr. Whang was granted a sabbatical leave by Korea University for the 2001 calendar year, and he spent the year at IUP teaching and working on research. Dr. Whang has extensive knowledge of mathematics education in both the United States and Korea. I am grateful to him for writing this article.

My Journey with Mathematics and Education in Two Cultures

by
Woo Hyung Whang
(Korea University)

When Jerry Buriok, the editor of this newsletter, requested I write this article I was honored, yet I hesitated for a moment. Anyone who has experienced learning a foreign language can understand how difficult it is to write an article in one’s second language. When I visited IUP as visiting faculty, it was a precious experience but I had to be continually alert because of language-related pressures. I would like to thank Jerry Buriok, not only because he helped arrange my time as visiting faculty at IUP with Larry Feldman, but also

because he offered me another opportunity to write about experiences in two cultures.

There is little worthy of comment here concerning my high school mathematics study. I remember only that I avoided any distraction to study just like other college bound students, at least I tried to. Even now many high school students who want to study at the college level in Korea do their best and in many case their parents push them to the limits. An article in the NY TIMES detailed one Korean student's daily schedule and most Americans who read it found it unbelievable. I think the current study trends in South Korea will continue as long as this nation remains so densely populated, and people do not change their view toward education or life itself.

During my college years I had more social life than in my high school days. At that time, students could earn a bachelors degree without considerable effort. It was a good opportunity for me to experience many aspects of adult life and learn to function efficiently in Korean society. During that time I met my wife, whose major was also mathematics education. In my junior year I began to prepare for the graduate entrance exam, as I knew only eight among my class of forty mathematics education graduates could pass the exam and go on for further study. I was able to enter the masters program in mathematics, but beyond that would not be able to continue my study.

South Korea has a compulsory military service system. I took another exam to be an army officer and served for three years as a platoon leader, munitions officer, and a company commander.

After my discharge from the army, I continued my study but I wanted to study mathematics education in a program not available in Korea. At the U.S. Culture Center in Seoul I was able to gather information on U.S. graduate level programs in mathematics education. I decided to attend IUP, which attracted many foreign students at that time, partly due to a ten percent tuition discount for international students.

My first semester at IUP was a mixture of excitement and fear. It was not different when I came to IUP the second time as a visiting faculty member. When I began graduate study at IUP, everything was new and interesting. Time passed with the speed of an arrow. All the professors were generous and encouraged me throughout my M.Ed. program. At the end of the second semester, I received admissions letters from several Ph.D. programs, including the University of Georgia. I had only the summer term to complete the M.Ed. work. With special permission from the department, I took four courses that summer and earned my degree. As a Christian, I believe my Lord guided me with special attention during that time. Dr. Giambrone, my advisor, recommended strongly that I attend the University of Georgia, which he had visited with his major professor. He had taught undergraduate courses there and also wrote his dissertation there.

My life as a graduate student in Athens, Georgia was different from graduate student life at IUP. All the professors and graduate students focused on research. I needed to shift my mode from class room oriented activities to research oriented activities.

Furthermore, my work assignment was quite different. At IUP I organized manipulatives and worked at a computer lab. My work assignment at UGA was supervising student teachers at public schools in the area.

Studying mathematics education at the doctoral level was challenging for me. To complete the program, I need to take coursework in mathematics, mathematics education, and research methodology. Also it took more than a year to prepare for the comprehensive exam, and another year and a half to complete my dissertation. When I was searching for a dissertation topic, I wanted to develop something that other researchers could not do. So I explored the relationship between Korean-English bilingualism and solving mathematics word problems. Later it was published in *Educational Studies in Mathematics* (1996).

After earning my Ph.D. from the University of Georgia in 1993, I returned to Korea and began work as an instructor. After six months I started teaching at Chunchon National University of Education as full time tenure-track faculty. After one year I moved to Korea University in Seoul where I had earned my undergraduate degree. This spring (2004) I became a full professor and associate dean of the graduate school of education. Currently I have 25 advisees at the graduate level, including five doctoral students. I continue to teach a full course load as well.

When I think of my second experience at IUP, it was valuable time for me and for my family. Returning to the place where I began my life in America was a

pleasure itself and it was a precious experience to know more about the department and people. I also learned a lot from the students as well as many friends I made while I was in Indiana. There were moments that demanded some level of patience, but these experiences because valuable lessons. I recall very clearly that I rehearsed my lesson plans so thoroughly each weekend that by Mondays they were memorized. It was much easier the second semester, but still it was challenging.

Now I would like to wrap up my personal stories and introduce the Korean education system, also compare it with the U.S. system. I wrote a similar article in *NCTM Dialogue* a few years ago. The main focus was on the high achievement of Korean students. It is true that Korean students perform better than American students in international mathematics competitions, but I do not think many Korean students do math with any meanings attached. They do know how to solve problems, because they practice similar problems over and over at school and private institutions, but they do not understand why they use the specific methods they are using, and meanings behind the manipulations.

There is a reason why Korean students spend many hours practicing mathematics. It is the significance of mathematics for every student's successful future. In an extremely competitive society such as Korea, parents believe that graduating from a prestigious university can be an important first step for their children's successful future. The belief is that finding jobs and succeeding in one's profession is much easier when a student

graduates from one of the top universities. And without excellent performance in math, it is not possible to get in those universities regardless of the intended major. To prepare themselves for acceptance at a prestigious university, students are encouraged by their parents to attend after-school programs that are operated by small private institutions. Alternately, many parents hire private mathematics tutors. Such lessons begin as early as elementary school or in some cases in kindergarten. Many parents spend a small fortune for their children's private mathematics lessons during their high school years.

After studying and teaching in the U.S., now I begin to see the differences between two cultures regarding the importance of mathematics in people's lives. In the U.S., mathematics is not a subject all students must do well, but in Korea all students must do well in math regardless of their prospective occupation. They just cannot attend a good college with poor math scores, and they begin life with disappointment at the freshman year of college. Also, in reality, they face all kinds of barriers in finding jobs and in promotion if they have not graduated one of the prestigious universities. The reason is simple. We are a very highly populated and educated, group-centered society. Once someone gets in those groups, the members of that group support him or her in many aspects, and this trend is prevalent in all areas, including university societies.

In short, Korean students study mathematics hard not because they prefer it to other subjects, but because they have no real choice. After teaching

math to American prospective elementary teachers for one year, I realized their mathematical abilities are typically not as good as those of their Korean counterparts. The reason does not lie in teaching methods, curriculum, or the quality of instruction. The whole of the circumstances surrounding students in the two cultures makes those differences. In that sense, I envy American society. Many people can have a good life without good math scores in the States, but in Korea it is not easy to do so.

Archimedes

Dr. Phillip Ray came across an article titled "Archimedes' Engines of War" in the October 2004 issue of the magazine *MILITARY HISTORY* which he wants to recommend to our readers. Thanks to a 17th-century painting by Giulio Parigi depicting defenders of the island city of Syracuse using mirrors to focus the sun's rays and set Roman ships afire, most of us are aware of the legend of Archimedes applying scientific principles to warfare. This article describes some of principles actually applied by Archimedes in defending Syracuse from attack by the Roman general Marcus Claudius Marcellus in about 214 BC.

Thanks to Dr. Ray for making us aware of this interesting and informative article.
