

The Math Log

Four Mathematics Faculty and Lecturers Honored

The UND Presidential Scholars Program recently held a special event in honor of approximately 75 UND faculty and lecturers. Each of the 75 was identified as a faculty “star” by one or more participants in the Presidential Scholars Program. The group of 75 included four people from the Mathematics Department: **Joe Champion**, **Jerry Metzger**, **Dave Morstad**, and **Ryan Zerr**. The special event was called “An Evening with the Faculty Stars” and was held on January 24, 2006. It included a banquet for the faculty stars and the Presidential Scholars themselves, as well as a welcome message by UND President **Charles Kupchella** and comments and remarks by Provost **Greg Weisenstein** and Vice President for Student and Outreach Services, **Robert Boyd**. The Presidential Scholars Program is a special program for certain talented UND students. Each Presidential Scholar receives a scholarship of some sort. Eligibility for these scholarships depends in part on high school achievement and scores on tests such as the ACT test. We are very pleased that so many people from the Mathematics Department were honored at the banquet!

Gilsdorf Speaks at Presidential Lecture Series

UND Mathematics professor **Tom Gilsdorf** recently presented the talk “Ethnomathematics: Finding Mathematics in Cultural Contexts” at the UND Faculty Lecture Series. The talk took place on November 8, 2005, at the North Dakota Museum of Art here on the UND campus and was widely publicized in advance.

Several Speakers Give Talks in the Mathematics Department

Several other people presented talks right here in our own department.

Joe Champion spoke about “A Variation on the Open Box Problem” on February 16, 2006.

Tom Richards presented a talk entitled “Calculus without limits: The Cartesian method of computing derivatives of polynomials” on March 30, 2006.

In early March, **William J. Ugalde**, of Purdue University, visited the Mathematics Department for a few days. On March 2, 2006, he presented a talk entitled “Some Conformal Invariants from the Noncommutative Residue.”

Larry Peterson presented the talk “Tools for Conformal Geometry” on February 23, 2006.

Three Mathematics Graduate Teaching Assistants (GTA's) Receive M.S. Degrees

Jeremiah Bartz will receive his M.S. degree this summer. His adviser is **Anthony Bevelacqua**, and his independent study is entitled “A Class of Simple Groups.” Jeremiah plans to continue his mathematical studies at the University of Oregon this fall.

Jason Smith is working with **Joel Iiams**. The title of his independent study is “Classifying Satisfiability Problems Using Closed Sets.” Jason will graduate this summer and hopes to teach mathematics this fall.

Elena Vinokurova will receive her M.S. degree this spring. Her independent study is entitled “Imbedding Properties of Sobolev Spaces,” and her adviser is **Tom Gilsdorf**. Elena plans to begin work on a master’s degree in electrical engineering at the University of New Hampshire this fall.

New GTA Joins the Department

Jeanna Schultz is from Litchfield, Minnesota. She received her bachelor's degree from the University of Minnesota at Morris, where she majored in mathematics and minored in physics. She is licensed to teach in public schools. Last year she taught mathematics for grades 7-12 in Hutchinson, Minnesota. Jeanna enjoys reading and currently plays tenor saxophone for the Grand Forks City Band. She is also taking mandolin lessons. Welcome to the Mathematics Department!

Department Hosts Math Track Meet

On February 20, 2006 (Presidents' Day) our department hosted the annual Mathematics Track Meet. This year 208 students from grades seven through twelve came to the campus and competed for awards by taking exams that we had prepared for them. Students came from several schools around the region. The schools from Grand Forks included Central and Red River high schools as well as Schroeder, South, and Valley middle schools. We also had students from Thompson, Hatton, Northwood, Hillsboro, and Park River.

Many of our own faculty, lecturers, and graduate students helped out on the day of the track meet. One group of people worked in the grading room, while others carried exams between the grading room and the exam rooms. Still other people proctored the exams; several of the participating schools sent faculty members to help with this. As the day progressed, we used an overhead projector to post the latest scores. During breaks, students could then check to see who was winning! The day ended with an awards ceremony.

The team winners were as follows:

Grades 7-8: The Park River Polynomials

Grades 9-10: The Red River Evil Empire

Grades 11-12: The Central Alpha Knights

It was an exciting day for our students and for us here in the department as well!

Bartz Submits Problem Solution

Mathematics graduate student **Jeremiah Bartz** submitted a solution to a squares fitting problem posed in the *Math Horizons* magazine, a magazine published by the Mathematical Association of America. Jeremiah's work is mentioned on page 33 of the February 2005 issue of the magazine. Good work Jeremiah!

Where They Are and What They Are Up To

Leroy Erickson (BS in math and physics, 1973, MS in math, 1976) lives in Roseville, Minnesota and has been working at Unisys Corporation since 1979. At that time the company was known by another name. Leroy is married to Cynthia Reimers Erickson. Cynthia received a degree in medical technology from UND in 1978. Leroy and Cynthia have three sons. Their oldest son, Christopher, will graduate from Harvey Mudd College in May with a BS in math and computer science. Bradley is freshman right here at UND and is majoring in math and physics. Mitchell is a freshman at Roseville High School and is taking calculus and serving on the math team. (651-917-1818)

Kristi Kienast (BS 2003, Sec. Ed. 2005) will soon begin work toward a master's degree in English as a second language. She will do this in Monterey, California. After graduation, Kristi plans to get a job, do some more traveling, or both.

Sashaa (Olson) Murphy (BA in math and English, 1996, BS Ed, 2001) lives in Fort Eustis, Virginia and teaches high school mathematics. She is currently teaching algebra in an urban school and works primarily with at-risk children of ages fourteen to fifteen years. Sashaa says this is a big change from an earlier job in which she was the only high school math teacher in a rural Missouri school. She is currently pursuing an MA Ed degree at the College of William and Mary. Sashaa and her husband Jason have two children: Jeremiah and Jacob, ages twelve and seven. Jason recently started a one-year tour in Afghanistan. The family is anxiously awaiting his return.

Robert Schaeffer and **Yu-chun (Yuan) Schaeffer** earned their MS degrees here at UND in 1997. They have a new child, Alisha, born on January 31, 2006. At birth Alisha weighed 7 pounds and was 19.5 inches in length. Congratulations to Alisha's parents!

Congratulations!

Taj Nawruz was born on March 12, 2006. He weighed 7 pounds and 6 ounces. His parents are **Henry Baang** and his wife **Julie Maslog**. Henry is a GTA here in the Mathematics Department.

Samuel Joseph Bevelacqua was born to **Anthony Bevelacqua** and his wife **Stacye** on April 17, 2006. At birth he weighed 6 pounds and 4 ounces and was 19 inches tall.

Math Log Editor Talks to Allan W. Bjerkaas



Allen W. Bjerkaas

One day last summer I met Allan W. Bjerkaas. Allan graduated from UND with a double major in mathematics and physics in 1966 and was in town here for a visit. Allan's academic and professional career have included some unusual experiences involving a combination of mathematics and other fields. Several weeks after his visit, I gave Allan a call and interviewed him over the telephone.

Allan spent his childhood in Fergus Falls, Minnesota, at first on a dairy farm and later in the town itself. In 1962, Allan came to UND as a freshman. For each of his four years at UND, Allan received an O'Connor scholarship, which provided \$400 of support per year. Allan also received a student loan of about \$700 per year, and throughout his four years here, he worked at various jobs, both on campus and off campus, for a couple of hours each day. He took courses in calculus, algebraic structures, differential equations, advanced calculus, and probability and statistics. He took classes from several different faculty members, of course, but the teachers he specifically remembers are **Lyle Mauland**, **Woodrow McBride**, and **John Whitcomb**. Prior to his senior year, Allan married his wife Judith (who uses the nickname Jude).

Allan received his B.S. degree from UND in 1966 with majors in mathematics and physics. He feels that he enjoyed mathematics more than physics, but in physics he could see the applications of mathematics. Also, physics involved experimentation, which was natural for him, in part because he had worked with machines while growing up on the farm. In any case, Allan entered the Ph.D. program in physics at the University of Illinois at Urbana-Champaign in the fall of 1966.

Allan financed his studies at Illinois through a full fellowship grant from the U.S. National Science Foundation (NSF). The terms of the fellowship permitted him to earn up to \$1,000 per year through regular employment, and this allowed him to do a little bit of work as a teaching assistant (TA).

Only three physics majors graduated from UND at the same time as Allan. The program at Illinois was much larger. There were about sixty new physics graduate students each year. Since the typical student took about five years to graduate, there must have been close to three hundred students in the program at any given time. Allan said that the program had a "boatload" of extremely bright students. From the beginning, he realized that he was going to have to work very hard. Looking back, Allan feels that in the physics graduate program at Illinois, he was somewhat above the middle of the pack academically; he also pointed out that he could not have reached this level of achievement without a strong mathematics background.

Graduate students in physics at Illinois were normally required to take certain mathematics "methods" courses offered by the Physics Department. But instead of doing this, Allan took some courses offered by the Mathematics Department itself, including courses in ordinary and partial differential equations, complex analysis, and generalized functions.

At Illinois Allan became interested in experimental solid state physics. Solid state physics deals with the electrical, thermal, and structural properties of solids, i.e. the physical objects we see all around us. Allan says that solid state physics provides much of the scientific underpinning of solid state device work within the field of electrical engineering.

Allan's Ph.D. dissertation turned out to be a challenge. The dissertation involved an experimental project. After he had worked on the project for a year and a half, it seemed that the project was not going to succeed. His adviser was toying with the idea of having him abandon the project and work on something else. Allan says that this is the nature of experimental research and indeed of all sorts of research. There is always a possibility that work on a research problem may not lead anywhere. It may not even be clear that the problem has a solution. But in any case, Allan's experiment finally succeeded, and he received his Ph.D. in physics from Illinois in 1971. The title of his dissertation was "The electronic thermal conductivity of superconducting thin films containing paramagnetic impurities." His adviser was **Donald Ginsberg**.

In 1971, Allan took a postdoc position (a temporary research-oriented position) at the University of Pittsburgh. For the next two years he studied light scattering from fluids. His postdoc adviser was **Walter Goldberg**.

In 1973, Allan took a permanent position as a senior staff scientist at the Applied Physics Laboratory (APL) at Johns Hopkins University. The APL focuses exclu-

(Continued from page 3)

sively on engineering, research, and development (in contrast to teaching). The university opened the APL during World War II as a way of assisting with the war effort. The APL is currently located in Laurel, Maryland, between Washington DC and Baltimore, and employs approximately 3,800 people. It receives most of its funding from US government agencies. Allan's work at the APL initially focused on oceanography and remote sensing. Allan says that most remote sensing in the ocean is done by acoustical (sound-related) methods. Indeed, sounds can carry for hundreds of miles under the ocean. Allan's work, however, involved the use of optical and electromagnetic methods for investigating trails that ships, submarines, and other objects leave behind in the ocean. Allan says that his laboratory was the ocean, but he worked mainly at the APL's main office. On a few occasions, however, Allan's work took him outside of the office. He has conducted operations on ships at sea as well as aboard aircraft, and on one occasion he rode on a submarine.

In 1976, Allan started teaching evening classes for part-time engineering students at Johns Hopkins. He taught applied physics courses and a two-semester applied mathematics course that included linear algebra, vector analysis, complex analysis, and partial differential equations. This teaching work was in addition to his job at the APL, which continued to be a full-time position. Allan feels that his teaching was a good complement to his research work. Some of his classes would meet for two and one half hours, starting late in the afternoon after a long day at his regular job. Allan remembers times when he would start teaching with a headache and be "higher than the sky" by the end of the class!

In 1989, Allan switched to a more supervisory role by becoming a technical group supervisor at the APL, but he continued his evening teaching and added the teaching of another course in technical management. Over the years, he also assumed the role of chair of two of the thirteen different master's degree programs that make up the part-time engineering program at Johns Hopkins. In 2001, Allan became the Associate Dean for the part-time engineering program (which is now called "Engineering and Applied Science Programs for Professionals" and is a part of the Whiting School of Engineering at Johns Hopkins). The new dean's job was a half-time position, and Allan's job at the APL thus became a half-time position as well. In January of 2005, the position as Associate Dean became a full-time position, and Allan retired from the APL. Even though Allan was assuming more administrative responsibility, he continued teaching two evening classes through the spring of 2005.

Although most of Allan's graduate studies were in physics, he says that applied physics is very mathematics-intensive. He says that his work in oceanography and remote sensing was a great opportunity to apply mathematics in specific situations. Throughout the years of

his work at APL, he continued to build on the mathematics that he had learned at UND and at Illinois. Indeed, he says that without his mathematical background, he would not have succeeded.

Allan has committed himself to serving as Associate Dean for another four years. After retirement, Allan and his wife Jude plan move back to the area near Fergus Falls. They have four children, two of whom have majored in mathematics. One of those also earned a second B.A. in mathematics education. Allan's hobbies include computers, model trains, and antique tractors.

Most readers of the Math Log have probably heard of the Jay O. and Marie Bjerkaas Scholarship Fund. This scholarship is named after Allan's parents. Allan came from a family of six children, four of whom graduated from UND. The scholarship was originally the idea of Allan's brother, Forrest J. Bjerkaas. One reason for establishing the scholarship was to preserve the memory of their parents. Allan says that his parents were very supportive of his academic pursuits without ever applying any pressure.

I asked Allan if he had any words of wisdom relating to careers. He said that personal and professional integrity is the most important character trait to cultivate. He also said that in choosing a career, you should do three things: (1) Think of what you like to do. (2) Of these things, pick a subset of things that you are good at. (3) Finally, of the surviving options, select one that someone will pay you to do. He says we should have a passion for what we do and always do the best we can. He suggested that some people do not always do their very best. Some people, he says, view their careers as a "means to an end." Allan feels that your career should instead be "part of your fun." At the same time, he says to avoid focusing on work *too much*, as this could begin to negatively impact your life outside of work as well as your work itself. He says to "always seek a balance in your life among the factors that compete for your time." This sounds like very good advice indeed!



Merrifield Hall on the UND Campus

Virginia Rains Discusses Work



Virginia Rains

Last fall Virginia (Ginny) Rains dropped by the Mathematics Department and visited with some of us here. Ginny graduated from UND in 2001 with a bachelor's degree in mathematics. She currently lives in Bremerton, Washington and works at the Naval Undersea Warfare Center (NUWC) in Keyport, Washington. Although warfare may be an unpleasant subject, Ginny's work provides interesting insights into the types of careers that someone with a mathematics major can pursue. The editor did not get to see Ginny during her actual visit here, but several weeks later he interviewed her via e-mail.

At what point in your academic career did you decide to major in mathematics?

I started out in college studying chemical engineering and decided during my junior year to change to mathematics.

What was your first job after you graduated from UND?

My present job is the first professional job that I held out of college.

How did you land this job?

I was offered this job through an interview set up through the UND Career Fair. I had an interview on-campus, and it was followed up by phone interviews and e-mail questionnaires.

Editor's note: The Career Fair is a one-day event that takes place here at UND once each year. Many employers send representatives to the fair, and these representatives gather in a large room. Students then drop by and visit with the employers.

Right now do you officially work for the U.S. Navy? Are you a civilian, or are you a member of the Navy?

I am a civilian. I have never been a member of the armed services.

Your job title says that you are a Submarine Combat Systems Task Lead and Alternate Task Order Manager for Submarine Alteration Installation Team Services. What does this mean?

These are two separate job titles. I am the Task Lead or Project Lead for work performed at NUWC Keyport that supports the Submarine Combat Systems. We perform in-service engineering and logistics support to fielded combat and weapon systems in the U.S. Navy. The Task Order manager position

is a separate position. In this position, I oversee and provide technical input to a contractor performing work to support the U.S. Navy.

Specifically, what sorts of things do you do on your job?

In my job, I have several responsibilities. I perform all aspects of project management from project planning, budgeting, resource loading, and execution. I have developed issue papers based on problems we have observed. I also give project presentations and make recommendations to our sponsor for resolutions to issues.

I also work with a separate aspect of submarine systems. I have been involved in the development and support of the combat systems on submarines. These systems take input from acoustic, radar, and imaging systems to develop a tactical picture for the submarine. The system also develops firing solutions that are then sent to torpedoes or missiles. The system then launches the weapons.

What is submarine alteration?

The group I work with performs industrial alterations to existing submarines. During scheduled availabilities, we remove old systems and install newer, more capable systems.

Do you supervise people? Do you work by yourself, or do you work with other people?

I do not supervise people in a personnel sense, but I assign or task activities to be performed within the project. I manage our budget and allocate resources to execute the project. There are five people that work on my team. There are instances where I work with other people, but there have also been times when I worked by myself on a project. We also work with other facilities and meet via video teleconferences or phone conferences.

Do you work mainly at a desk, or do you get your hands on things most of the time?

Most of my time is spent working at a desk, but there are many times where I have had to do hands-on work. I travel approximately once a month and perform hands-on work on a submarine or in a lab. I will be working on an industrial modification of a submarine during this next year.

How do you use skills that you learned in the course of your mathematics studies? Which mathematics courses have contributed to your career success the most?

The skills that I use are problem solving or logic skills. Many of my courses included writing a lot of proofs. I use the same skills that are used to write proofs, and I incorporate the logic into writing papers or presentations. I spend time writing program-level plans for implementation of requirements on different projects. The thought process for this is similar to the proof writing process. I have also set up tracking metrics to show the plan and status for projects. The problem solving skills are used to try to get valuable information displayed in a way that conveys progress and value to our customer.

Besides mathematics courses, are there any other types of coursework that would help prepare a person for your type of job?

I would recommend taking writing and communication courses in addition to the normal coursework required. Being able to communicate effectively is very important in my field. We spend a lot of time doing research and analyzing data, but it is extremely important to be able to communicate the results of the study to others. I give technical and project status presentations frequently in my job. We present to small audiences, large audiences, and sometimes over a video teleconference (VTC) or phone conference.

Does your job involve any computer programming?

No. I use a computer, but only basic word processing programs.

You said earlier that you travel from time to time. Could you describe this travel? Do you ever travel on ships or submarines?

I travel around once a month for a week at a time. The travel is to other military facilities around the US. I spend time in Rhode Island, Massachusetts, Virginia, DC, California, and Hawaii. I will be spending two weeks in Hawaii later this year. I have been underway on a submarine one time, but it was only for a day trip. I do not get to travel on submarines; all of the US submarines are outfitted for male personnel only. But I *have* spent many hours on submarines while they were at the pier or in dry dock.

Do you have time for very many activities outside of work? What sorts of things do you do in your spare time?

I do have time for outside activities. I play volleyball a few times a week, take a dance class, and go to the gym. I also spend time with friends and go to the movies.

Where did you grow up?

I grew up in Crookston, Minnesota and lived there until I went to UND. My parents are now living in Grand Forks. I try to get home about once a year.

Do you have any career-related advice or words of wisdom for current and prospective college students, recent college graduates, or people who have been out of college for a long time?

The best career advice that I can give would be to make sure to get good grades but get involved in other activities as well. It is important to be able to gain experience working in teams, meeting deadlines, and time management.

Thank you for your answers! Stop by the office the next time you are in Grand Forks!

The Pseudo-Sum

By Larry Peterson



One of my most enjoyable duties as Math Log editor is reading the mail that you send us. I include most of your news items in the "Where They Are and What They Are Up To" section of the Math Log. I hope that many of you continue to send us mail. Note, however, that our official mailing address is changing slightly. The Post Office now requires us to use a specific street address. This street address is as follows:

University of North Dakota
Department of Mathematics
Witmer Hall Room 313
101 Cornell Street Stop 8376
Grand Forks ND 58202-8376

But if you have a computer and an Internet connection, you need not worry about this. Just send us an e-mail message. The departmental e-mail address is

udmath@und.nodak.edu

In some cases, your stories may be appropriate for a more lengthy Math Log article. Perhaps we could do an interview over the telephone or via e-mail. This is how I conducted the interviews with Allan Bjerkaas and Ginny Rains that you read about in this issue of the Math Log. For purposes of writing the main Math Log articles, I would say that I am probably most interested in unusual activities that involve mathematics in one way or another.

At the same time, I realize that many of your activities do *not* relate directly to mathematics and that most people never earn a Ph.D. Many people never obtain professional-type jobs in industry or government either! But we are still interested in what you are doing, and I think the readers of the Math Log are as well. So tell us about your activities, no matter what they may be! And if you are in Grand Forks, stop by the office! I plan to be around most of the time this summer. And as our secretary Lona says, the coffee is always on!

Math Log Available on the Web

This issue of the Math Log is available on the World Wide Web. For details, visit

<http://www.und.nodak.edu/dept/math/mathlog>

THANK YOU !!

As of April 20, 2006, the following persons are responsible for monetary gifts to the UND Alumni Association specifically designated for the improvement of the Department of Mathematics:

Dr. Gail S. Nelson	Brian P. Beaudrie	Lyle F. Buchwitz	Rodney B. McKinney
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Ronald C. and Ann C. Bzoch Memorial Scholarship

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Your generosity is gratefully acknowledged and sincerely appreciated!

Your teachers and friends are wondering what you are doing! Help us to satisfy their curiosity. (Photos are also welcome!)

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Use additional sheets if necessary. Note that our address has changed slightly! You can also send us news items and comments by e-mail! Just send a message to

udmath@und.nodak.edu

Be sure to say that the information is for the Math Log.

Spring 2006



Let
us
share
with
you