New Faculty Member Joins Department

Dr. Jeremiah D. Bartz joined the UND Mathematics Department as a tenure-track faculty member in the fall of 2016. His research specialty area is arrangement theory. In the course of his research activities, he studies geometric objects from combinatorial, algebraic, and topological viewpoints.

Dr. Bartz completed his Ph.D. degree at the University of Oregon in 2013 and served as an Assistant Professor at Francis Marion University, in Florence, South Carolina, from 2013 to 2016. Over the course of his career, Dr. Bartz has given numerous scholarly talks in the U.S. and abroad. He has given talks in Italy on two occasions, and on one occasion he gave a talk at a high school in Bogotá, Colombia.

Dr. Bartz is originally from Bismarck, North Dakota. Before earning his Ph.D. degree, he attended UND, where he earned a B.S. degree with a double major in Mathematics and Mechanical Engineering. In 2006, he completed an M.S. degree in Mathematics here at UND.

Dr. Bartz enjoys hockey. He has obtained “Level I” certification for refereeing youth hockey games. He also enjoys playing the guitar. He plays in an informal musical group with UND Mathematics Professor Gerri Dunnigan and UND Mathematics Professor Emeritus Dr. Michael Gregory.

Dr. Bartz says that he is excited to be back here at UND. We hope that things go well for him here!

Richards Promoted

UND Mathematics Department faculty member Dr. Thomas L. Richards has been promoted to the rank of Associate Professor. Dr. Richards received his Ph.D. degree from Washington State University in 1991. His research specialty area is dynamical systems. Dr. Richards has done good work here, and we congratulate him on his promotion!

Scholarships Awarded

The Mathematics Department has selected the following students to receive scholarships for the 2016-2017 academic year:

- Marika J. Diepenbroek (Ronald C. & Ann C. Bzoch Memorial Mathematics Scholarship)
- Allan L. Millar (Deann & Lee Christianson Scholarship)
- Jennifer M. Allen (Paige Plagge Memorial Mathematics Scholarship)
- Karlee J. Westrem (Diana L. Wells Memorial Mathematics Scholarship)
- Steven E. Miller (Judy Ann Utton Memorial Mathematics Scholarship)
- Paige A. Relling (Jay O. & Marie Bjorkaas Mathematics Scholarship)
GTA Graduates

Mathematics GTA Erich Jauch completed his M.S. degree in May of 2016. As part of his graduate studies, he prepared an independent study report entitled “Galois Embedding.” His academic adviser was Dr. Anthony Bevelacqua. Erich is now a Ph.D. student at Iowa State University in Ames, Iowa. His long-term goal is to become a mathematics professor. He will be getting married in July of this year (2017).

New GTAs Join the Department

Menu Pathirana is from Sri Lanka. She completed her undergraduate degree at the University of Ruhuna, where she majored in Mathematics, Physics, and Computer Science.

Jarod Olson is from Lakeville, Minnesota. He completed his bachelor’s degree here at UND, where he majored in Mathematics and minored in Physics.

Speakers Present Talks Here

Mathematics graduate student Erich C. Jauch gave a talk entitled “Galois Embedding” here at the Mathematics Department on May 4, 2016.

Mr. Sean Bailey, of Utah State University, gave the talk “Facebook and Penguins: How to Connect the Dots” on March 24, 2016.

Dr. Jeremiah D. Bartz gave the talk “Induced and Complete Multi-nets” on March 23, 2016.

Dr. Bartz also gave the talk “If you give a mouse a knife . . .” on October 26, 2016. This talk was part of the Ed Nelson Memorial Lecture Series.

Faculty Footnotes

Dr. Anthony J. Bevelacqua has published the article “A Family of Non-Euclidean PIDs” in the American Mathematical Monthly.

Where They Are and What They Are Up To

Ryan Larson (B.S., 1972) is now retired and lives in Scottsdale, Arizona. Prior to his retirement, he served as an actuary in the U.S. life insurance industry. Over the course of his career, he worked for three different companies, and he says that all of them were fine companies. When Ryan retired in 2010, he was a Senior Vice President and Chief Life Actuary for the Farmers Insurance Group. “I found the actuarial profession to be a challenging and rewarding career,” he says, “effectively merging my math skills and business interests.” Ryan is particularly grateful to Dr. Milton Winger for suggesting actuarial science as a possible career. Ryan currently serves as a treasurer for a nonprofit organization. You can reach Ryan at 41608 N 108th Street, Scottsdale AZ 85262. His telephone number is 480-575-9973.

Kirsten Hogenson (B.S., 2010) completed her Ph.D. degree in Mathematics from Iowa State University in May of 2016. She is currently a Visiting Assistant Professor in the Department of Mathematics and Computer Science at Colorado College, in Colorado Springs, Colorado. Kirsten and her friend Todd Noha enjoy living in Colorado Springs. (Todd also received a B.S. in Mathematics from UND in 2010.) Kirsten and Todd plan to join a curling club, and they have purchased season tickets for Colorado College Tigers men’s hockey. They will be particularly excited to watch the Tigers play UND!

Dr. Laurie Geller (M.S. 1998) was appointed to the position of Vice President for Academic Affairs at Minot State University in Minot, North Dakota, in June of 2016.

Daniel Leingang (M.S., 1997) is currently the Dean of Humanities, Arts & Sciences at Bismarck State College in Bismarck, North Dakota.

Rebecca Kyler (M.Ed., 1998) is currently a Co-Chair of the Mathematics Department at Sierra College in Rocklin, California.

Sympathies

UND Mathematics Professor Emeritus Dr. Lyle E. Mauland passed away on October 20, 2016 at the age of 87. He had suffered from dementia for the past few years. Dr. Mauland first taught here in the Mathematics Department in 1959. He retired in 1991. An interview with Dr. Mauland appeared in the 2011-2012 issue of the Math Log.¹

UND Associate Professor Emeritus John L. Whitcomb passed away on October 21, 2016, one day after the passing of Dr. Mauland. He was 90 years old. Professor Whitcomb began service here in the UND Mathematics Department in 1960 and retired in 1988. An interview with Professor Whitcomb appeared in the Fall 2005 issue of the Math Log.¹

Obituaries of professors Mauland and Whitcomb, including color photographs, appear on the Web in UND’s University Letter.²

1. Recent past issues of the Math Log newsletter are available on the Web at arts-sciences.und.edu/math.
2. To see the obituaries, visit blogs.und.edu/uletter, and click on “In Remembrance.”

**Department Adopts Free Calculus Textbook**

The UND Mathematics Department has begun using a free textbook in its three-semester undergraduate calculus course sequence. This textbook was produced by APEX. “APEX” stands for “Affordable Print and Electronic Texts.” APEX is a group of authors who have used widely available computer typesetting software to develop a quality three-volume calculus textbook. This textbook is available as an electronic computer file which one can download from the Internet free of charge.3

The APEX calculus textbook is licensed under a Creative Commons Attribution-Noncommercial 3.0 license. This means that anyone may download the computer files for the book free of charge and print, copy, and distribute them as he or she desires. In fact, the source files for the APEX calculus textbook are also available on the Internet free of charge. (The “source files” are certain computer files that the APEX authors used to produce the book.) Anyone may download the source files and use them to modify the content of the APEX book. One can then print, copy, and distribute the modified book. Certain restrictions apply, however. Book vendors may sell paper copies of the APEX textbook, but they may only charge students for the cost of duplicating and selling the textbook. Also, modified versions of the book must contain a statement indicating that the book is a modified version of the original APEX textbook.

The APEX group does not have the resources that would normally be available to a commercial textbook publisher, and for this reason, you might think that its calculus book could not possibly measure up to the standards of a book produced by a regular textbook publisher. But when you look at the APEX book, you might be surprised. The book looks very much like any textbook from an ordinary publisher. It has computer-generated diagrams and graphs. Many equations and inequalities are set off on separate lines with extra blank space above and below the line. A typical page has a heading indicating the chapter title and number or the section title and number. Theorems and definitions are enclosed in rectangular boxes. The book makes good use of boldface type in appropriate places. At the back of the book, you will find an index and answers to most of the odd-numbered problems. Finally, the book has a table of integrals, tables of trigonometric and algebraic identities, and a list of geometric area and volume formulas, many of which are accompanied by computer-generated diagrams.

One of our main reasons for switching to the APEX calculus textbook was to save our students some money. Up to now, we have been using a calculus textbook produced by a commercial publisher. New copies of the hardcover version of this book are currently available from book vendors for approximately $300. On the other hand, paperback copies of the APEX calculus textbook are or will be available at the main UND bookstore for approximately $15 for each of the three volumes.

Another reason for switching to the APEX calculus textbook was flexibility. As we noted above, teachers and mathematics departments may modify the APEX textbook to suit their instructional needs. In our Calculus I and Calculus II classes, we are currently using a modified version of the APEX textbook prepared by four UND Mathematics Department members: Mrs. Gwennie Byron and Drs. Michele Iiams, Richard Millspaugh, and Tim Prescott.4 Byron and her three colleagues started with the first two volumes of the original APEX calculus textbook and made many changes. Another group here will be making modifications to the third volume, and we plan to begin using the modified third volume in our Calculus III courses this summer (the summer of 2017).

In the course of their work, Byron, Iiams, Millspaugh, and Prescott reordered some of the sections of the book, added some additional material and exercises, and in some cases rewrote entire sections of the book. By the time they had finished, they had made changes to every section of the first and second volumes of the book, and these volumes had become approximately twenty percent larger than the corresponding volumes of the original book. One of the main changes that the group made was to have the book discuss derivatives of transcendental functions (the natural exponential function, the natural logarithm function, and the inverse trigonometric functions) in volume II (Calculus II) instead of in volume I (Calculus I).

At various points of the book, Byron and her colleagues added links to videos available on the Internet. Students with Internet Web browsers can type the link (or Web address) into their computers, and the computer then displays a video presentation in which an instructor explains a particular topic. The group also included “QR codes” for the videos. A QR code is a picture similar to the bar codes on merchandise at retail stores. If the student has a smartphone, iPad, tablet, or similar electronic device with an appropriate optical

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3. The APEX calculus textbook is available on the Web at www.vmi.edu/APEX.
4. You can see our modified versions of volumes I and II of the APEX book by visiting arts-sciences.und.edu/math. Click on the link to “Calculus I & II Texts.”
scanner and suitable application software, he or she may view the Internet video by simply holding the device close to the QR code. The device reads the QR code and then automatically plays the video. The student does not have to actually type the link into the electronic device.

Mathematics Department members Dr. Anthony Bevelacqua, Dr. Tim Prescott, and Mrs. Jessica Snyder will be working on modifications to the third volume of the APEX textbook. They are planning to combine parts of the APEX book with portions of another free textbook, namely the book *Vector Calculus*, by Michael Corral. Michael Corral is an adjunct faculty member at Schoolcraft College in Livonia, Michigan.

The *Math Log* editor would like to thank Dr. Michele Iiams for providing much of the above information. We would also like to thank those members of the Mathematics Department who have helped with the modifications to the APEX textbook and with the adoption of this book in our calculus courses. Our thanks also go to UND’s College of Arts and Sciences and UND’s Office of Extended Learning for providing modest supplementary summer financial support for some of the Mathematics Department people who have worked on the APEX project here. Finally, we would like to thank Michael Corral for making his book *Vector Calculus* available to us and Dr. Gregory Hartman, of the Virginia Military Institute, and his collaborators for making the APEX textbook possible. The new modified APEX calculus textbook will help our students learn an interesting and important subject effectively and at a reasonable cost!

**Department to Change Format of Instruction in Introductory Courses**

Beginning with the 2017 fall semester, the Mathematics Department will use a new instructional format in several introductory courses. The courses affected will be College Algebra, Precalculus, Trigonometry, Transition to Calculus, and two beginning algebra courses.

Under the new format, students will no longer attend traditional classroom lectures. Instead, they will work at their own pace in a new learning lab, which will be known as the “Math Active Learning Lab,” or “MALL.” In the MALL, students will study with the assistance of ALEKS. ALEKS stands for “Assessment and Learning in Knowledge Spaces.” ALEKS is an instructional computer software system provided by an outside software provider. Students at the MALL will log in to the ALEKS system and complete homework assignments and practice exercises by typing their answers at a computer keyboard. Graduate students and advanced undergraduate tutors will be available to assist the students, but students may also obtain help from the ALEKS software system itself.

Under the new instructional format, each student will attend a “focus group” meeting once each week. Each focus group will consist of an instructor and approximately thirty students. During a typical focus group meeting, the instructor will guide the students through various classroom learning activities and address any questions or concerns the students may have. Old-fashioned written midterm exams and quizzes may occur during focus group meetings, and students will take a final exam at the end of the course.

One of our main reasons for using the new instructional format is to improve our students’ success in Mathematics courses and in courses they take later on in other departments here at UND. For many years, education experts have insisted that students tend to learn more effectively if they are actively engaged in some sort of learning activity as opposed to passively sitting through a classroom lecture. We believe that the MALL and the new instructional format will provide our students with engaging activities.

To make the MALL a success, we are planning it very carefully. The Mathematics Department has consulted with people from other universities who have previously used lab-oriented instructional techniques in mathematics courses, and we plan to use techniques that have succeeded at these other universities.

Specific planning for the MALL and the new instructional format is already well underway. The MALL will be located on the ground floor of O’Kelly Hall, not far from Witmer Hall, the home of the UND Mathematics Department. UND is currently remodeling the rooms which will contain the MALL. Three current members of the Mathematics Department will play key roles in the MALL. Dr. Michele Iiams will be the MALL Director, and Mrs. Gwennie Byron will be the Tutor Supervisor. Dr. Tim Prescott will serve as the “Data Manager” for the MALL. Dr. Prescott will manage the ALEKS system. He will set passwords for exams, compile student progress reports, and transfer data between different software systems.

Drs. Iiams and Prescott and Mrs. Byron will bring extensive experience to their work at the MALL. Dr. Iiams has experience supervising the Mathematics Department’s GTAs, and her area of mathematical interest is mathematics education. Mrs. Byron has experience supervising the tutors in the Mathematics Learning Center that our department currently operates, and Dr. Prescott has gained extensive computer experience by

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6. Traditional classroom lectures will still be available to students who wish to attend them, but experience at other universities suggests that very few students will attend the optional lectures.
teaching on-line Mathematics courses for the last few years.

The MALL and the new instructional format will be a major change in the way that we teach several courses here in the Mathematics Department. Establishing the MALL and implementing the new instructional techniques will be a significant amount work for many people, but we believe this work will result in improved success for our students. Watch for more news about the MALL in future issues of the *Math Log*!

**Mathematics Graduate Discusses High School Teaching**

The *Math Log* editor is always interested in reporting on the careers of students who have graduated from the UND Mathematics Department. Many students of mathematics choose high school teaching as a career, so last summer, the editor paid a visit, by telephone, to Katie Roche.7 Katie graduated from UND in the spring of 2015 and currently teaches mathematics at Chaska High School in Chaska, Minnesota. Chaska is located in the southwestern part of the Twin Cities metropolitan area. We discussed Katie’s background and her teaching experiences.

Katie grew up in Minnetonka, Minnesota, one of the western suburbs of the Twin Cities. She began her studies at UND in the fall of 2010 and eventually completed three majors here: Mathematics, Spanish, and Middle Level Education. She received the Jay O. and Marie Bjorkoas Mathematics Scholarship for the 2012-2013 academic year and the Judy Ann Utton Memorial Mathematics Scholarship for the 2013-2014 year.

Katie has broad mathematical interests. She likes geometry especially well because of its visual nature, and she says that statistics is probably her second most favorite subject in mathematics. She says that her interest in any given mathematical subject always seems to increase when she teaches it!

**A Semester in Spain**

When Katie first came to UND, she had a strong interest in study abroad. She felt that UND had strong programs in support of study abroad, and this was one of her reasons for originally coming to UND. Katie had studied Spanish throughout high school, and she continued her Spanish studies here. Early in 2012, she traveled to Bilbao, Spain. Bilbao is on the northern coast of Spain in the Basque region of Spain and southwestern France. During the spring semester of 2012, Katie studied at University of the Basque Country in Bilbao. Scholarships from the University Studies Abroad Consortium (USAC) and the Foundation for Global Scholars helped to make Katie’s study abroad possible.

During her semester in Spain, Katie lived with a host family and took further courses in Spanish. She also took a course in art history and a course in surfing. The surfing course often met at the beach! In all of these courses, the instruction was in Spanish. Many people in the Basque region speak the Basque language, and during her time in Spain, Katie learned a few words of Basque.

In the spring of 2015, just prior to her graduation from UND, Katie did her practice teaching at Red River High School here in Grand Forks. She taught geometry, statistics, and English Learners Algebra (EL Algebra). EL Algebra is an algebra course for students who do not speak English fluently.

Throughout the period of her practice teaching at Red River, Katie received guidance from her teaching mentor at Red River, Mr. Luke Glasoe.8 Katie says that Luke was very willing to allow her to try new things in her teaching. As the semester progressed, Luke gave Katie more and more independence. By the end of the semester, Katie was going to class on her own. Luke was no longer present in the room when Katie was teaching.

**Teaching Mathematics at Chaska High School**

In the fall of 2015, Katie began her service at Chaska High School. I was particularly interested in Katie’s teaching experiences at Chaska, and we discussed this topic in some detail. During her first year at the school, she taught geometry and algebra. Most of her students were in grades nine and ten. The school day at Chaska

7. Katie’s last name is pronounced “roach.” It rhymes with “coach.”
8. Luke is also a graduate of the UND Mathematics Department. He graduated from UND in 2008.
Katie is always interested in learning about new ideas and new things to try in her classes. She gets many ideas from her colleagues at Chaska High School, of course, but she also gets ideas by reading teaching-related blogs. A blog is an Internet Web site that interested people can use to exchange comments, ideas, stories, news, and other information relating to some particular topic of interest. Most of Katie’s blog-related activities take place at home in the evening, on weekends, or during school breaks.

Katie also serves her school as a volunteer. A few teachers and several parents operate a food shelf program for needy students at Chaska High School. Many teachers and families donate both food and money to the food shelf. Katie assists the school staff members who gather the contributions and distribute the food to needy students. Katie notes that the food shelf program is especially important during school breaks and vacations. When classes are in session, most students eat lunches provided by the school cafeteria. This is not possible during the breaks and vacations.

**General Thoughts about Teaching**

Katie enjoys her teaching and volunteer activities at Chaska High School. She says that she enjoys working with students of diverse backgrounds. Some of her students come from low-income homes, and others come from more affluent ones. She has many Caucasian students who grew up here in the U.S., but she also has students of African, Middle Eastern, and Hispanic origins. She sometimes observes students speaking in foreign languages.

Katie also likes the diversity of the faculty at Chaska High School. Some of her fellow teachers grew up in the Twin Cities area, and a few of them even graduated from Chaska High School itself. Other faculty members have come to Chaska from more distant parts of the country.

I asked Katie if she had any advice for students who might be considering a teaching career. She said that she would encourage them to take risks and to try new things. She feels that her semester in Spain was very helpful. Her travel abroad involved some risk, of course. But she says that if you try such things, you never know what you will gain from it or what new people you will meet.

I would like to thank Katie Roche for sharing her stories and thoughts with all of us. I hope that she keeps us informed of her activities!

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9. Moodle is an “open-source” system. This means that it is available free of charge. For more information, see www.moodle.org.
The following persons are responsible for monetary gifts to the UND Alumni Association specifically designated for the improvement of the Department of Mathematics. We thank you for your generosity!

Col (Ret) Greg & Jey Stolt
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If you would like to make a monetary contribution to UND, to the UND Mathematics Department, or to one of our scholarships, please make your check payable to the “UND Foundation.”

Your generosity is gratefully acknowledged and sincerely appreciated!

Let us hear from you

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

NAME (Include previous if changed): _____________________________________________________________

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Just send a message to

und.udmath@email.und.edu

2016-2017
The 2016-2017 UND Math Log newsletter is here!

In this issue:

- Dr. Jeremiah D. Bartz joins department.
- Students use free textbook.
- Department changes instructional format.
- Editor visits with high school mathematics teacher.
- Past students report on activities.