Visitor Presents Talk

Dr. Yuliya V. Martsynyuk presented the talk “Probable Error of a Mean: A View of the Student t-Statistics 100 Years Later” here at the UND Mathematics Department on April 5, 2012. Dr. Martsynyuk currently serves as an Assistant Professor in the Department of Statistics at the University of Manitoba in Winnipeg, Manitoba (Canada). Dr. Martsynyuk is the sister of Lili Martsynyuk, a member of the UND Mathematics Department office staff. The Math Log would like to thank Dr. Martsynyuk for coming to see us and for presenting her talk.

New Lecturers Join Mathematics Department

The Mathematics Department welcomes Vaie Kokil as a new Lecturer. Before coming to UND, Ms. Kokil lived in Wisconsin. She holds a master’s degree in research and statistics. She also works in UND’s Office of Institutional Research, an office which gathers and analyzes data relating to the academic and nonacademic activities of the university. Ms. Kokil is originally from Mauritius, a small tropical island in the Indian Ocean near Madagascar. She enjoys cooking diverse food, and she can speak and write French fluently.

The Mathematics Department is also happy to have Aaron Novotny continue on here as a Lecturer. Mr. Novotny received his M.S. degree in Mathematics here at UND in the spring of 2012.

New GTA’s

The Mathematics Department welcomes several new Graduate Teaching Assistants (GTA’s).

Patrick Durkin is from Oakdale, Minnesota. He received a bachelor’s degree in mathematics from UND. He is interested in learning more about set theory, especially infinitary combinatorics and large cardinals.

Kaitlyn Herz is from Page, North Dakota. She also holds a bachelor’s degree in mathematics from UND. Her outside interests include art, photography, and travel.

Erikka Novacheck comes from Maple Grove, Minnesota. She attended the University of Wisconsin-River Falls, where she earned a bachelor’s degree with a major in mathematics and a minor in art. She enjoys photography and volleyball.

Alaina Sandbakken holds a bachelor’s degree in mathematics and secondary education from UND. She is from Bismarck, North Dakota.

GTA’s Graduate

Danica Allard received her M.S. degree last spring (spring 2012). The title of her independent study report was “The Richness of Generating Functions.” Her adviser was Dr. Joel Iiams. Danica is currently working as an adjunct mathematics professor at Northland Community and Technical College in East Grand Forks. She hopes to return to school to pursue a Ph.D. in mathematics sometime in the near future.

Semere Kidane Habtemicael also completed his M.S. degree last spring. His adviser was Dr. Mohammad Khavanin, and the title of his independent study report was “Methods of Characteristics.” Semere is currently pursuing a Ph.D. in mathematics at North Dakota State University.

Honor Heer completed her M.S. degree this past fall (fall 2012). She wrote an independent study report on “Inverse Problems of Differential Equations.” Her adviser was Dr. John Collings.

The title of Aaron Novotny’s independent study report was “Introduction to Attractor Reconstruction: Foundation, Methods, and Application.” His adviser was Dr. Thomas Richards. Aaron received his M.S. degree last spring. He is currently employed at two locations: He is a lecturer at Northland Community and Technical College, and he also serves as an adjunct lecturer here in the UND Mathematics Department.

Mary Townsend completed her M.Ed. degree last spring. Her adviser was Dr. Michele Iiams, and the title of her independent study report was “Predictors of Success in College Algebra.” Mary is currently pursuing a Ph.D. in...
Teaching and Learning here at UND, and she is also continuing on as a GTA in the Mathematics Department. In addition, Mary tutors veterans at Veterans Upward Bound here on the UND campus and works part-time at the Target Store in Grand Forks. Mary is active at church and serves as director of the AWANA Cubbies on Wednesday nights.

The above five graduating students all presented talks describing their independent study work. Many Mathematics faculty and students attended.

**Where They Are and What They Are Up To**

**Linda Lampman** (B.S., 1971) is employed as a Certified Financial Planner in the Private Client Group at Wells Fargo Advisors in Daytona Beach, Florida. She has lived in Florida for over thirty-five years and is currently living in Ormond Beach. She is active in the Ormond Beach Historical Society, the Halifax River Yacht Club, and the Daytona Beach Area Alumnae Chapter of the Alpha Phi sorority. She says that things have been going well.

**Ryan Wenas** (M.Ed., 2011) currently teaches and tutors at the distance learning center for the North Dakota State College of Science (NDSCS) in Fargo, North Dakota.

**Alianna Maren** (B.S., 1976) majored in mathematics and minored in chemistry here at UND. She then went on to earn a Ph.D. in chemistry at Arizona State University. Since earning her Ph.D., Alianna has taught at six different universities, but she has also devoted considerable time to entrepreneurship. She has started two different companies, and she was the first employee of a third company. She has created several new inventions, and she has received four patents. Alianna has recently published a book: *Unveiling: The Inner Journey*.

Alianna feels that her mathematical training here at UND provided good preparation for her subsequent endeavors. She says that it “put me on a par with the best students from other universities when I moved on to graduate school.” She says that it gave her “an excellent basis for studying theoretical physical chemistry” at Arizona State. Alianna took basic calculus, advanced calculus, and differential equations from Professor Ed Nelson. “He was an exceptional teacher,” she says. “His classes - the way that he taught abstract math - made it seem like poetry.” Alianna also took classes from Professor Gene Kemper. She says that while Dr. Nelson was a theoretician, Dr. Kemper was an applied mathematician. She studied applied matrix algebra, linear algebra, and numerical methods with Kemper. She specifically remembers a remark that Dr. Kemper once made in class: “When I was working at Boeing, these are the kinds of equations that we used to solve jet aircraft loading problems.” She says that this specific remark suddenly helped her to more fully appreciate the practical meaning of the equations she had been studying. After completing her Ph.D., Alianna spent the next few years in private industry. She says that her decision to do this was due in part to the influence of Dr. Kemper.

You can see a picture on Alianna on the Web by visiting http://www.aliannamaren.com.

**Travis Wolf** (B.S., 2007) is in his sixth year of Ph.D. studies in mathematics at the University of Iowa. He plans to complete his Ph.D. this spring (spring 2013). Travis’s research specialty area is functional analysis, in particular, operator theory and operator algebras. Much of his research involves C*-algebras.

Since coming to Iowa, Travis has traveled to the Great Plains Operator Theory Symposium (GPOTS) meetings in Boulder and Denver, Colorado, Phoenix, Arizona, and Houston, Texas. He has also traveled to meetings of the International Workshop on Operator Theory and Applications (IWOTA) in Berlin, Germany, and in Sydney, Australia. Last summer, Travis presented talks at the GPOTS and IWOTA meetings. The U.S. National Science Foundation (NSF) and the University of Iowa covered the cost of the trips to Germany and Australia.

In addition to studying for his own degree, Travis is also a teaching assistant at Iowa. He has taught discussion sections of several classes, and he has also taught his own section of college algebra several times. He says that the discussion sections have provided him with some very valuable experience, but he gets more enjoyment from teaching a course all on his own.

Like most Ph.D. students who are nearing the completion of their graduate studies, Travis is currently conducting a job search. He is interested in tenure-track jobs at four-year colleges and universities, but he realizes that job market conditions may force him to take a temporary position. So in addition to applying for permanent positions, he is also applying for postdocs. A postdoc is typically a temporary job which allows a new mathematician some time to conduct research and further mathematical studies.

To find out more about Travis, you may wish to visit his personal Web site. You can find this Web site at https://sites.google.com/site/wolftravis

Travis has posted some interesting color pictures on his Web site!
Minnotte Promoted

Mathematics Faculty member Dr. Michael Minnotte (pronounced min-NOT-ty) has been promoted to the rank of Full Professor. Dr. Minnotte came to the UND Mathematics Department in the fall of 2007 as an Associate Professor and received tenure here in the fall of 2010. His research specialty area is statistics. He received his Ph.D. degree from Rice University in 1993. Dr. Minnotte served at Utah State University prior to his arrival here in 2007. We congratulate Dr. Minnotte on his promotion, and we appreciate his fine work here!

2012-2013 Scholarships Awarded

The Mathematics Department has selected the following four students to receive scholarships for the 2012-2013 academic year:

Katie M. Roche (Jay O. and Marie Bjerkaas Scholarship)

Jedidiah L. Johnson (Ronald C. & Ann C. Bzoch Memorial Scholarship)

Jacob E. Denault (Paige Plagge Memorial Scholarship)

Jacob R. McConkey (Judy Ann Utton Memorial Scholarship)

We congratulate the four scholarship recipients, and we thank the donors who have made these scholarships possible.

Faculty Footnotes

Gerri Dunnigan and Cheryl Halcrow have published the article “Online Homework in Calculus I: Friend or Foe?” in the journal PRiMUS.

Kirsten Hogenson, Shannon Negaard, and Ryan Zerr have published the article “Matrix sequences associated with the Ducci map and the mediant construction of the rationals” in the journal Linear Algebra and its Applications.

Zerr Elected Chair of UND Senate

At its September 2012 meeting, the University of North Dakota Senate elected Mathematics faculty member Dr. Ryan Zerr (pronounced “zeer”) to serve as its chair for the 2013-2014 academic year and as the vice chair, or “chair-elect,” for the current academic year. The University Senate is a body consisting of elected faculty, staff, and student members, as well as certain UND administrators, such as UND president Robert Kelley, provost Paul LeBel, and the deans of all of the colleges here at UND. The Senate meets monthly in a large lecture hall here on the UND campus. It makes policy decisions relating to academic matters and other types of university business.

The Math Log editor recently visited with Dr. Zerr to discuss his new duties and the challenges he will face. Dr. Zerr’s most obvious duty as chair will be to preside over the Senate’s monthly meetings. This duty includes, of course, the task of calling on individual senators who wish to speak at the meetings. When controversial business comes before the Senate, such a task could become rather delicate! The Senate’s chair and vice chair also serve on the Senate’s Executive Committee. This committee plans the agenda of each Senate meeting. It also acts on behalf of the Senate at times when the Senate is not scheduled to meet.

As chair of the Senate, Dr. Zerr will also chair or co-chair the meetings of UND’s “University Council.” The University Council meets twice each year. At its fall meeting, UND president Robert Kelley presents his annual “State of the University” address. The membership of the University Council includes all UND faculty members, although only a portion of the faculty attends most Council meetings.

The Senate chair also has some less obvious duties. For example, the Senate chair may sometimes become involved in matters relating to employee grievances. Another example is search committees. The University often calls on the Senate chair to serve on committees searching for candidates to fill administrative positions here at UND. The chair may also be asked to serve the University in other unexpected ways.

The Math Log editor asked Dr. Zerr to comment on the events leading up to his election as Senate chair and chair-elect. This election resulted in part from some of the outside “exposure” that Dr. Zerr has gained here at UND in recent years. Much of this exposure occurred during his service as chair of UND’s Essential Studies Committee. Essential Studies, or ES, is a program which aims to have all UND undergraduates achieve certain broad learning goals. Dr. Zerr served as ES committee chair during the 2007-2008 academic year, a year of transition in which UND was preparing to implement the Essential Studies program. Throughout much of that year, Dr. Zerr had many opportunities to discuss various aspects of Essential Studies with faculty members and administrators from across the University. Dr. Zerr’s work on Essential Studies also led him to speak before the UND Senate at one of its meetings.

Dr. Zerr gained further outside exposure through his service as co-chair of UND’s Undergraduate Learning Working Group (ULWG). This group was an ad hoc committee charged with examining undergraduate education at UND and finding ways to improve it. One of Dr. Zerr’s activities as part of the group was to host or co-host a handful of campus-wide information forums relating to undergraduate education. His
activities with the ULWG also led him to speak before the UND Senate on more than one occasion.

Dr. Zerr began service on the University Senate this past fall (Fall Semester 2012), after the UND faculty elected him as a senator. Within the first few weeks of the semester, the Senate’s “Committee on Committees” approached him, asking if he would be willing to have his name placed on the ballot for election as chair and chair-elect. Dr. Zerr agreed, and the Senate elected him at its September 2012 meeting.

Dr. Zerr noted that the Committee on Committees often has difficulty finding candidates who are willing to serve as Senate chair. We are thus very grateful to him for his willingness to serve the University in this very important role, and we wish him the best of luck in his work as chair and vice chair. We also wish him good luck in his teaching, research, and other service-related activities!

Zerr Appointed Associate Chair of Mathematics Department

Mathematics faculty member Dr. Ryan Zerr has agreed to serve as the Associate Chair of the department. Two of the main duties of the Associate Chair are the supervision of the Mathematics Department’s Graduate Teaching Assistants (GTA’s) and the resolution of issues relating to the transfer of coursework that students have completed at other colleges and universities. The Associate Chair sometimes answers questions from students relating to placement into introductory Mathematics courses. On rare occasions, the Associate Chair may investigate student complaints concerning introductory Mathematics courses.

Dr. Zerr replaces Dr. Gerri Dunnigan, who has served as Associate Chair since Fall 2006. Dr. Dunnigan has performed her duties with confidence and professionalism throughout her term as Associate Chair. The Math Log wishes to thank Dr. Dunnigan as well as Dr. Zerr for their service to our department and our students!

Department Develops New Capstone Course

The Mathematics Department has recently established a new “capstone” course. The new course is Math 488, “Senior Capstone.” Math 488 is intended to be a “culminating” experience for Mathematics majors during their senior years of undergraduate study. It allows students to apply some of the skills they have acquired in previous courses and to see connections between different branches of mathematics. The Mathematics Department offered Math 488 for the first time in the fall of 2011. Dr. Joel Iiams designed the course, and he was the course instructor in the fall of 2011 and again in the fall of 2012.

The new capstone course is probably quite different from most of the mathematics courses you have previously taken, and the Math Log editor thought that you might be interested in reading about it. To learn more about Math 488, the editor visited with Dr. Iiams. Dr. Iiams discussed his experiences developing and teaching the course. The editor also investigated some other sources of information.

Math 488 is part of the recently established “Essential Studies” program here at UND. Essential Studies is a set of course requirements that apply to all undergraduate students at UND. It replaces the former “General Education Requirements,” or “GER” requirements, which you may remember. Essential Studies requires Mathematics majors to take courses in areas outside of mathematics, and it also requires students in other disciplines, such as history, foreign languages, or art, for example, to take a few courses in mathematics, science, and technology. But Essential Studies does more than this. One of the new requirements of Essential Studies is the completion of a three-credit capstone course. Many different UND departments now offer an Essential Studies capstone course, but the Mathematics Department faculty felt that we could best serve our students by offering a capstone course of our own.

Term Papers and Classroom Presentations

To qualify as an Essential Studies capstone, a course must address certain designated Essential Studies learning goals, which may vary from one capstone course to another. For Math 488, the learning goals are (1) to improve the students’ “thinking and reasoning” skills and (2) to improve their “communication” skills. Math 488 centers around these goals. Over a period of several weeks, each Math 488 student conducts a study of some particular mathematical topic. The student then writes a “major paper” describing the results of the study project. Near the end of the semester, every student gives a classroom presentation describing the student’s project and some of its results.

The major paper is formal in nature, just as the term papers you may have written in history or literature classes. Students use word processors or computer typesetting software to prepare their papers. The paper must include a major proof of at least one mathematical theorem of some kind. Dr. Iiams described some of the topics that his students have investigated in their papers. He mentioned quaternions and rotations, generalized linear regression, the Butterfly Theorem, the Fundamental Theorem of Algebra, and complex analysis. Some of these topics are very broad, of course, but the student would narrow such topics down to a subtopic appropriate for the major paper.

The student classroom presentations in Math 488 are also formal in nature. In addition to using the blackboard, the speaker uses a projector to present slides. Dr. Iiams grades the students’ presentations in much
the same way as an instructor would grade them in any public speaking class. He is concerned about such things as the organization of the talk, eye contact with the audience, the ability to speak clearly, the speaker’s coverage of necessary background material, and the speaker’s responses to questions from the audience. In Dr. Iiams’ Fall 2011 section of Math 488, most of the students’ talks were thirty to forty minutes in length, with a few additional minutes set aside for questions from the audience.

Study projects, major papers, and classroom presentations may be difficult for many undergraduate students, so to help his students with all of this, Dr. Iiams uses a “portfolio” process. This process begins with “brainstorming.” Each student hands in a list of three possible topics for the study project, along with a very brief description of each topic. Dr. Iiams then helps each student narrow or broaden the topics into projects appropriate for the Math 488 major paper. He prefers topics that “stretch” the student and yet are not overwhelmingly difficult. The appropriateness of a topic may, of course, depend on the particular student’s background.

After carefully considering the topics resulting from the brainstorming activity, each student selects a single topic and then moves on to the “fact-finding” phase of the portfolio process. During this phase, the students gather facts related to their topics, either through the Internet or at the library. Dr. Iiams then collects a list of sixteen facts from each student and grades them on the basis of “relevancy, originality, and correctness.”

In the third, or “planning,” phase of the portfolio process, students begin by handing in a rough outline of their major papers. Later on, Dr. Iiams collects a more detailed outline. Once again, he grades the students’ work.

The final phase is the “writing phase.” Each student hands in a rough draft of the major paper. In many cases, this rough draft is very close to an acceptable completed paper. A few of the rough drafts, however, require significant changes. In any case, each student hands in a second draft a few days later, and a final version at the end of the semester.

A Typical Day in Math 488

Most of the students’ work takes place outside of class, of course, but at the beginning of the semester, Dr. Iiams uses the first few class sessions to go over some guidelines, tips, and examples directly related to the students’ study projects, major papers, and classroom presentations. Much of this is at the technical level. As an example, he mentioned the problem of including complicated mathematical symbols in the major paper. Old-fashioned typewriters do not normally allow a person to type Greek letters, integral signs, or other mathematical symbols, but by following the correct procedure, one can usually produce such letters and symbols by using a modern word processor or mathematical typesetting software system. The resulting output looks much like the formulas you would see in a mathematics textbook.

After discussing guidelines, tips, and examples, Dr. Iiams uses the next few class sessions to discuss techniques for mathematical research and problem solving. He specifically mentions the problem-solving techniques from the famous book by George Polya: *How to Solve It.*

Dr. Iiams then devotes the next several weeks of class time to actual exercises in problem solving. He divides the students into small groups and has them work on problems together in class. These problems require the students to work with some of the main concepts that they have learned in calculus, differential equations, and linear algebra. Dr. Iiams usually presents a solution to each problem himself, but not until the class has completed work on the problem. He presents the solution formally, using a projector and slides. From time to time, Dr. Iiams also gives quizzes relating to the problems that the students have worked on in class. These quizzes provide the students with further practice with topics from their earlier mathematical studies.

Just before the Math 488 students begin their own classroom presentations, Dr. Iiams spends a couple of weeks discussing material from a textbook. This material illustrates some ways in which different broad areas of mathematics are connected. One example which Dr. Iiams discussed in his Fall 2011 section of Math 488 was the famous problem of using a straightedge and compass to trisect an arbitrary angle. Ancient Greek mathematicians first posed this problem many centuries ago. Amazingly, one can use algebra to show that that if one strictly follows the rules of the ancient Greek mathematicians, then it is not possible to trisect some angles.

Finally, during the last few weeks of class, the Math 488 students give their own classroom presentations. Dr. Iiams grades the presentations, but the students help him with this! Dr. Iiams has a list of certain attributes of a presentation, such as organization, justification of statements, use of examples, clarity of speech, etc. He assigns a rating to each of these attributes, and each student in the audience does likewise. After each presentation, Dr. Iiams collects the ratings from the students in the audience and combines them with his own ratings. In the end, seventy-five percent of the grade for each talk is determined by Dr. Iiams’s ratings, and the rest from the audience’s ratings.

General Impressions and Future Plans

Dr. Iiams says that teaching Math 488 has been a lot of work, but he has found this work to be rewarding. Overall, the course has been a success. Dr. Iiams has
been generally pleased with his students’ classroom presentations, their major papers, and their participation in class. The students seem to have enjoyed the class as well. Attendance has been good, even during the last few weeks of the semester, a time at which, on a typical day, the only activity for most students is to attend another student’s talk, ask questions, and help with the grading of the talk.

UND faculty, of course, continually strive to improve their teaching, but in the immediate future, Dr. Iiams anticipates only minor changes to Math 488. Enrollment in the course is increasing, and this will reduce the amount of time available for the students’ classroom presentations. But except for shorter talks, most aspects of Math 488 will likely remain about the same. Other Mathematics faculty members will soon teach the capstone course and make their own adaptations, but for the most part, the two main features of the course will probably continue in the pattern that Dr. Iiams has established: Students will write papers and give classroom presentations.

Overall, Math 488 is becoming a valuable part of the UND curriculum for students majoring in Mathematics. We would like to thank Dr. Iiams for developing and teaching Math 488 and for discussing his experiences with us!

The Pseudo-Sum

By Larry Peterson

As you can see by reading this issue of the Math Log, all sorts of things are continuing to happen here! We have instituted a new capstone course for Mathematics majors. One of our own faculty members is assuming a leadership role in the UND Senate. Scholarly talks on a variety of topics are occurring. Thanks to our generous donors, some of our top students are receiving academic scholarships. Students are graduating, and new students and lecturers are arriving, some from faraway places.

It is also interesting to hear what you are doing. Please send us news about your activities! Some of you have gone on to earn advanced degrees. Some of you have assumed leadership roles in business, government, and education. For others, your formal education may have concluded with the bachelor’s degree, and you may be more comfortable following as opposed to leading. But regardless of what you have been doing, we would like to hear from you! Feel free to tell us about your employment or education, your families, your hobbies, your travels, or any other things you may be doing. We welcome e-mail messages as well as old-fashioned paper mail. Our addresses appear on the next page. Feel free to send us several paragraphs or just a line or two, and watch for your news to appear in the next issue of the Math Log!

I hope that things are going well for you!

Mathematics Department Faculty and Staff for 2012-2013

Anthony J. Bevelacqua .......................... Associate Professor
Gwennie A. Byron .............................. Senior Lecturer and Math Learning Center Director
John B. Collings ............................... Associate Professor
Bruce G. Dearden ................................ Professor
Gerri M. Dunnigan ............................. Associate Professor
Stuart R. Farm .................................. Senior Lecturer
Thomas E. Gilsdorf ............................ Professor
Cheryl L. Halcrow ............................. Associate Professor
Doojin Hong ................................. Assistant Professor
Joel E. Iiams .............................. Professor and Chair
Michele A. Iiams .............................. Associate Professor
Mohammad Khavanin .............................. Associate Professor
Vinavtee Kokil ........................ Lecture Center Director
Liliya Martsynyuk ............................... Clerk
Jerry M. Metzger ............................... Professor
Richard P. Millsbaugh ........................ Professor
Michael C. Minnotte ............................. Professor
David P. Morstad ............................. Senior Lecturer and Math Computer Lab Director
Aaron Novotny ................................. Lecturer
Lawrence J. Peterson .......................... Associate Professor
Timothy M. Prescott ......................... Assistant Professor
Mary E. Rerick ................................. Senior Lecturer
Thomas L. Richards .......................... Assistant Professor
Jessica R. Snyder ............................. Senior Lecturer
Lona Spicer ...................................... Administrative Secretary
Shuzo Takahashi .............................. Associate Professor
Ryan J. Zerr .............................. Associate Professor and Associate Chair

Notes:
1. Some of this information is taken from the following location on the Web: http://und.edu/academics/essential-studies/.
2. Some current UND students may have arrived here prior to the establishment of Essential Studies. These students have the option of satisfying the old graduation requirements, thereby avoiding the capstone course requirement.
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!

Lancey A. Cascaden  
Richard & Annamarie Langlie  
Drs. Deann & Lee Christianson  
Burton & Judith Ferrier  
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Barbara & Gregory Weber  
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Forrest & Susan Bjerkaas  
Matching funds for Forrest J. Bjerkaas

Judy Ann Utton Memorial Scholarship Endowment  
Mark & Rachel Anderson

If you would like to make a monetary contribution to UND, to the UND Mathematics Department, or to one of our scholarships, please make checks payable to the “UND Alumni Association” or to the “UND Foundation.”

Your generosity is gratefully acknowledged and sincerely appreciated!

Let us hear from you

Use additional sheets if necessary. You can also send us news items and comments by e-mail! Just send a message to

und.udmath@email.und.edu

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

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