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Math Department Newsletters

Math Department

Fall 2018

Σ -ARY

Minnesota State University Moorhead, Mathematics Department

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Leslie Miller

Madalyn Winger

Minnesota State University Moorhead *Mathematics Department*

Σ-ARY

NEWSLETTER FALL 2018



Statistically Speaking

Actuarial science is a booming field

By Leah Schmitt, MSUM Marketing Intern
Photography by Dave Arntson

Actuarial science is a hot field to be in right now, with employment of actuaries expected to grow by 22 percent between 2016 and 2026, much faster than the average of all other occupations. Students at Minnesota State University Moorhead (MSUM) majoring in actuarial science enjoy 100 percent related job placement after graduation with starting salaries around \$59,000. As of 2016, the median pay for actuaries is more than \$100,000 a year.

While the number of actuary jobs is booming, the prevalence of women in the field is growing slowly. However, MSUM women are working hard to break into the male-dominated world of actuarial science and to excel in a field they love, and the mathematics department is supporting them.

Currently of the 37 actuarial science majors in the math department, 20 are women. Two of the women who are leading the charge are Madalyn Winger and Leslie Miller. Both are majoring in mathematics with an emphasis in actuarial science. Winger is also majoring in economics.

“It’s basically just a math degree,” says Miller, “an insane math degree that uses statistics to come up with insurance rates.”

Professor Ed Chadraa has been instrumental in encouraging this change. He is welcoming to students

of all backgrounds and provides them the support they need to succeed in the actuarial science world, while maintaining a rigorous program.

Furthermore, the math department will be welcoming Dr. Hongyan Hou in August of 2018. She will contribute her expertise in financial mathematics and working with large data sets to help students prepare for a careers in Actuarial Science and Data Analytics.

“It’s basically just a math degree; an insane math degree that uses statistics to come up with insurance rates.”

– **Leslie Miller,**
MSUM Mathematics Major

“Our program combines traditional mathematics and statistics courses with a solid foundation in economics, accounting and finance,” says MSUM mathematics professor Ed Chadraa. “This provides students with a professional advantage and will set them apart from graduates of many other actuarial science programs.”

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In addition to the core curriculum, MSUM's actuarial science program offers a series of courses to prepare students for professional examinations, which MSUM students and graduates pass at a rate far higher than the national average. During the past two years, eight students passed Exam 1, twelve passed Exam 2, one passed Exam 3 and one passed Exam 4/C.

Winger and Miller both passed the probability and financial math exams this year. For each exam, there are 30 multiple choice questions, that each test taker gets three hours to complete.

Actuarial science majors, while they receive the instruction and aid they need in the classroom, are expected to study around 200 to 300 hours for each exam outside of the classroom. "I feel like I put in 500 hours for that exam," says Miller of the financial math exam.

In addition to their coursework and long study hours, these women are also active in the math department. Miller is the president of the math club, and treasurer of the actuary club, and Winger is the secretary of the math club, and tutors in the math learning center.

According to Winger, the best part of math club is building relationships. "In addition to professors, you build relationships with classmates and you can get help on your homework that way," she says.

While the job security and the pay is definitely a huge incentive, they aren't the only reason these women work so hard. "I've always liked math," says Miller. ■

Mathematics Department

Mathematics Awards for Outstanding Students

The faculty of the Mathematics Department annually selects outstanding students in mathematics for recognition of their achievements. This year 43 students were recognized and over \$24,000 was given out in scholarships and awards. This year's Outstanding Senior Awards go to *Kristen Anderson, Abi Carlson, Mason LaRock, Paige Meyer, Stefan Nelson, William Pederson and Ashley Skalsky.*

The following students received Outstanding Senior Awards:

Kristen Anderson is from Mexico City, Mexico and Fargo, ND. She currently lives with her spouse to be, Arthur Bates in Fargo, ND. Kristen's university activities include Research for the Biosciences Department (2016-17), member of the Sustainable Students Association (2016-18), recipient of Summer Institute of Biostatistics traineeship at UM-Minneapolis (2017), uCodeGirl STEM Mentor for young girls (2017-18), Office Assistant in the Math Department (2017-18), and at the Faculty Development Center (2018). She graduates with a B.S. in Mathematics with an emphasis in Computer Science

and a minor in Statistics. Kristen will have a Software Engineering Summer Internship at Sundog Interactive (2018). This may lead to full time employment but she is not ruling out graduate school. Kristen comments, "I am very glad to have chosen to come to MSUM. The small class size and personable professors provided me with a lot of support. The wonderful research opportunities that MSUM has for undergraduates helped me acquire a unique background and opened up my world to wonderful applications of mathematics. Throughout two and a half years, my academic advisor Prof. Ellen Fagerstrom and my research professor Prof. Sara Anderson provided me many times with advice, encouragement and confidence, and I owe them a lot of credit for that."

Abi Carlson is from Moorhead, MN and is the daughter of Paula and Toby Christensen and married to Tyler Carlson. She is a Noyce Scholar, has served as a learning assistant and tutor in the math department. Abi graduated in the fall of 2017 with a B.A. in Mathematics and a B.S. in Mathematics Education. She recently accepted a math



teaching position at West Fargo High School for the 2018-2019 school year.

Mason LaRock is from Tyler, MN and is the son of Sheryl and Michael LaRock. He was involved in Math Club and Actuarial Science Club. Mason will graduate with a B.S. in Actuarial Science. He will start work at North Star Mutual Insurance Company after graduation.

Paige Meyer is from Watkins, MN and is the daughter of Julie and Joseph Meyer. She was involved in the Association for Computing Machinery, Society of Physics Students, College of Business & Innovations Advisory Board, Sustainable Students' Association, Software Engineer intern at Veritas Technologies and Digi-Key Electronics. Paige will graduate with a B.S. in Computer Science, B.S. in Mathematics, B.S. in Actuarial Science, and a B.S. in Physics. She will be a Software Engineer at Site Reliability Google in Mountain View, CA.

Stefan Nelson is from Iola, WI and is the son of Jon and Gail Nelson. He was an Honors Program Assistant, in the Society of Physics Students, a Math Tutor, V.P. of Lutheran Campus Ministry, Student Orientation Counselor and participated in an REU at Iowa State University. Stefan enjoys drumming with his band "Non-Major". He will graduate with a B.S. in Mathematics with a computational emphasis and minors in Statistics and Astronomy. Stefan will attend graduate school at Northern Arizona University. He has also received the *Bill V. Ritchie Award for Excellence in Mathematics*.

William Pederson is from Moorhead, MN and is the son of Chad Pederson and Lisa Johnson. Billy was involved in Actuarial Club and was a tutor for the math department. He will graduate with a B.S. in Actuarial Science. Billy's future plans include employment as an actuary and possibly graduate school for Statistics.

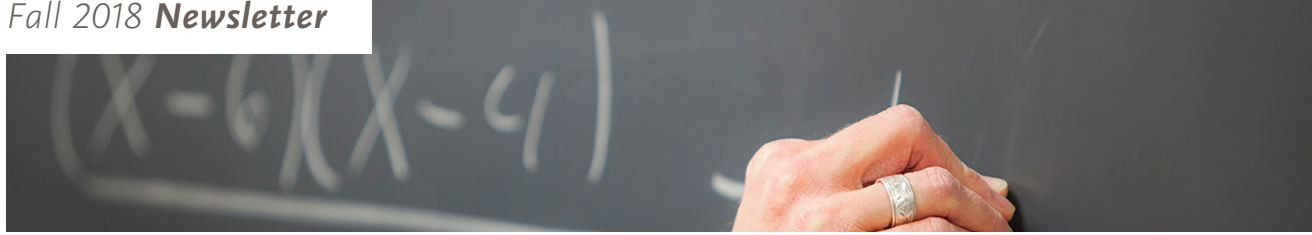
Ashley Skalsky is from Thief River Falls, MN and is the daughter of Joe and Julie Borchart and married to Isaac Skalsky. She has served as VP and President of Math Club, a Student Advisory Board representative for the Mathematics Department, a Peer Advisor, a member of

the Dragon Leadership Program, an Honors Executive Board member, a Dragon Mentor for the Honors Learning Community, a Dragon Ambassador, and a NOYCE Scholar. Ashley will graduate with a B.S. in Mathematics, B.A. in Mathematics, and B.S. in Teaching English as a Second Language. She plans to apply and interview for secondary mathematics and ESL teaching positions throughout the northern U.S. After teaching for about five years, she intends to apply for doctorate programs in mathematics. Ashley comments, "I would like to personally thank anyone who had any part in granting or funding the several scholarships and awards I have received from the Math Department during my time as a mathematics student at MSUM. I would also like to thank the Math Department for all that they do to support and encourage students throughout their undergraduate careers!"

Sophomore Actuarial Science major **Leslie Miller** was awarded the *Carl Carlson Scholarship and a Tim and Kathy Peil Mathematics Scholarship*. Leslie is from Saint Anthony, ND and is the daughter of Dale and Val Miller. Leslie is a member of the Actuary Club, Math Club, Dragon Leadership Program, MSUM Woodwind Quintet, a Resident Assistant, and a Mathematics Tutor. After college she plans to work as an actuary or attend graduate school depending on employment opportunities.

Freshman Mathematics and Math Education major **Jena Backes** was awarded a *Ken Garland Scholarship and a Tim and Kathy Peil Mathematics Scholarship*. Jena is from Osakis, MN and is the daughter of Jon and Laura Backes. She is a member of the MSUM Cheer Team, Math Club, Cru and is a tutor in the Math Learning Center. Jena plans to teach mathematics in a high school, eventually returning to school for a master's degree.

Junior Math Education and Mathematics major **Jennifer Williams** was awarded a *Ken Garland Scholarship*. Jennifer is from Montevideo, MN and is the daughter of Kathy and Brian Williams. She had a Noyce internship for the last two summers. She also works as a tutor in the Math

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Learning Center. Jennifer plans to teach math at the high school or middle school level.

Senior Mathematics and Physics major, emphasis in Astronomy, **Aidan Shafer** was awarded the *Katherine Leonard Scholarship*. Aidan is from Minot, ND and is the son of Michelle and Brandon Shafer. Aidan's future plans include graduate school for computational physics.

Junior Actuarial Science and Economics major with minors in Finance and Statistics, **Madalyn Winger** was awarded the *Marion Smith Scholarship, the Rothmann Family Scholarship and a Tim and Kathy Peil Mathematics Scholarship*. Madalyn is from Alexandria, MN and is the daughter of Randy and Maureen Winger. She is involved in Math Club, Actuarial Club, Wellness Educators and is a Math Tutor. Madalyn plans to work as an actuary following graduation.

Junior Physics and Mathematics major **Samuel Holen** was awarded the *James Wallen Scholarship and a Tim and Kathy Peil Mathematics Scholarship*. Samuel is from Fertile, MN and is the son of Allen Boit and Jewel Boit. He is involved in Math Club and is a tutor and learning assistant. Future plans include attending graduate school to become a college professor.

Senior Actuarial Science and Mathematics major with minors in Business Administration, Statistics and Finance, **Zach Snell** was awarded the *Bette G. Midgarden Scholarship*. Zach is from Grand Rapids, MN and is the son of Marla and Tim Snell. He was involved in Actuarial Science Club and is a mathematics tutor. Zach plans to work in the actuarial science field, but is also considering graduate school.

Sophomore Math Education major **Gina Holdvogt** was awarded the *Shelda Warren Scholarship*. Gina is from New Munich, MN and is the daughter of Bernie and Alvin Holdvogt. She is a tutor in the Math Learning Center and involved with Students Today Leaders Forever.

Freshman Actuarial Science, Computational Mathematics and Criminal Justice major, **Jacob Pawlowski** was awarded a *Tim and Kathy Peil Scholarship*. Jacob is from Rogers, MN and is the son of John and Julie Pawlowski. He is involved in Math Club, Actuarial Science Club, Club Tennis, and is a math tutor. After graduation, Jacob plans to enter the workforce in either Mathematics, Criminal Justice or an overlap of the two.

Transfer Mathematics Education major **Taylor Kugler** was awarded the *Dr. James and Elaine Hatzenbuehler Math Scholarship*. Taylor is from Fergus Falls, MN and is transferring to MSUM from MState in Fergus Falls for the 2018-2019 academic year.

Other Awards

Junior Mathematics Award: **Devon Binstock, Samuel Holen, Shane Kunde**; Sophomore Mathematics Awards: **Erin Dollerschell, Hyesu Lee, Alexa Johnson, Alexis Konecne, Thomas Lieser, Leslie Miller, Jacob Pawlowski, Jill Safranski, Rachel Saville, Leah Waggoner, Caleb Waldner**; Freshman Mathematics Awards: **Cameron Jennings, Jackpine Kappes, Tejendra Khatri, Yoko Kosugi, Claude Lee, Charlie Lien, Rachel Schmiess**; Freshman Renewed Mathematics Award: **Garett Scheel**; Incoming Freshman Award: **Leo Smith**





From left to right: Ann (Johnson) Gustafson, December 2005, Nancy (Martin) Daly, May 2007, Krystle (Ross) Leidholm, December 2009, and Brock Stenberg, May 1994.

Mathematics Department

2018 Alumni News

During a recent college planning day at Davies High School (Fargo, ND), co-workers and math teachers supported their Alma Mater, MSUM. From left to right: **Ann (Johnson) Gustafson, December 2005, Nancy (Martin) Daly, May 2007, Krystle (Ross) Leidholm, December 2009, and Brock Stenberg, May 1994.**

'48 Virginia (Trowbridge) Stangeland '48: I'm a 91 year old widow living alone. I raised 7 children, have 10 grandchildren, 2 great grandchildren and one due in July. I spend my summers on Lake Lizzie. We raised our family on the farm. My husband served 8 years in the MN House of Representatives and 14 years in Congress.

'57 John Haugo '57: Last summer I was awarded the Outstanding Achievement Award, the highest graduate award by the University of Minnesota where I earned my MA & Ph.D.

'59 Jerry Arzdorf '59: Electronics instructor atomic weapons (Air Force), 3 years. Math teacher 5 years in Colorado Springs, CO, grades 7 to 11. Master degree Guidance Counseling from NDSU. Counselor & Dean of Students at Roosevelt Jr. High in Blaine, MN, 5 years. Counselor at Anoka Technical College, Anoka, MN, 20 years. Have been retired for 22 years.

Ronald Johnson '59: I am 15 years retired. Main activity is challenging odds of winning at bingo and slot machines.

Richard Link '60: Is retired.

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'61 Jon N. Olson '61: Continues in retirement (since 2002) as in recent years. Mostly golf, grandpa duties and general puttering around the house. For example, putting up “grab bars” that become very useful as one gets older and starts to experience balance issues. Special thanks to math instructor Werner Brand. Queena also continues in retirement. We travelled to Croatia in April/May 2017. We spent a little time in some (Montenegro, Slovenia, Bosnia- Herzegovina) of the other 6 countries that resulted from the breakup of Yugoslavia but most of the trip was in Croatia. In June, we will go to Alaska on a two-week trip. We fly to Fairbanks, then bus to Anchorage, then cruise shipboard down the coast to Vancouver and fly home. In late June/early July, we will be in MN at Jon’s “farm”. There is no farming anymore. It is a wildlife production area, owned partially by you, the taxpayer. You can come out for a stroll at anytime. Jon’s family is having a large family get-together there. We participate in Line Dancing one evening per week. Also, nearly every day, we go for ~ 2-mile walks along the beach of the Pacific or in local parks.

Charles Bertness '62: Retired professor from Indiana University of Pennsylvania.

'63 Dr. William John Hewett '63: I have been in active chiropractic practice for 43 years in Manitoba, Canada treating people for a variety of health problems on a global scale. I have excellent health, take no drugs, have three children, two with doctoral degrees and five grandchildren and will be 80 this August!

Harold Shuckhart '64 & '66: I taught physics and many mathematics classes at Anoka Senior High, Anoka, MN, from 1966 to 2000 and then taught science at Lincoln High School, Sioux Falls, SD from 2000 to 2003. My wife, Carol (Wright) Shuckhart, class of '64, and I lived in Sioux Falls until 2017. We moved to Minneota, MN in August. Our son, Christopher Shuckhart, class of '92 from Concordia, Moorhead, teaches at Minneota High School. He, his wife, and our grandtwins live nearby. It's been fun being close to spend time with family. I have been doing some subbing at Minneota High School and enjoy being active. We did quite a bit of remodeling on our new house and still have much to do.

Thomas A. Bertek '65: Retired since 1997. Worked for King County Dept. of Public Works in Seattle, WA.

John Anderson '66: Teacher in Warren, MN from 1966-1975. Farmer from 1975-2015. Now retired.

Bill Anderson '68: I am still retired.

'68 Gerald V. Erickson '68: Celebrated 10 years of retired life on February 28, 2018. Enjoying watercolor painting and the wonderful friends I have met as I pursue that endeavor. Also, enjoy watching the grandkids in their activities: hockey, soccer, track, cross country, dance, and piano recitals. Never a dull moment!

Alfred (Jerry) Huebner '68: My wife Margaret passed away in 2015. I have married again to Sharon. You may share my thanks and info with Professor Derald Rothmann, ret.

'69 Jerome A. Degerness '69: 2017 was another good year with a wonderful family, lots of travel, and a day to day life style that is great fun. The year started off with a week in Anaheim in January at the American Baseball Coaches Association Convention. During the summer I managed three high school age teams and coached the Legion 1A team. As a player, I participated in the local over 50 league, did two March weekends



of baseball in Las Vegas, three weeks in Arizona in October and another two weeks in Ft. Myers in November. I completed my 18 months as Woodbury Lions Club President on June 30. I continue as a Board member, but my leadership role is limited to chairing two committees.

Janet Bollum '72: I am the owner/operator of “The Muse Book Shop” in downtown Deland, FL.

'72 Don Kurpiers '72: I officially retired 12/8/17 after 45 years of teaching high school math. The last 24 years at St. James teaching College Algebra as a concurrent enrollment course for Minnesota State Mankato for the last 10 years also was an enjoyable experience.

Patricia Mahan Botner '73: I am retired in The Villages, FL and loving it! Thank you to Dr. Milton Legg for all his help in determining my schedule once I declared Math Education my sophomore year.

Steven Gerjets '74: In 2012 I retired from the Lockheed Martin Corporation, located in Eagan MN, after 38 years as a software engineer. The last position I held was as the Software Integration and Test Lead for the Common Submarine Radio Room program. Since retiring, my wife Gail and I have enjoyed spending time: with our families, especially our 4 grandsons ages 1 ½ through 6; at our cabin along the North Shore of Lake Superior; and in Fort Myers Beach come January. Also, during my years at Moorhead State I was a 4-year letter winner on the Track and Field Team. Two of the teams I was a member of have recently been inducted into the MSUM Athletic Hall Of Fame.

'74 Ann Sang '74: Thank you to Dr. Milton Legg whose sense of humor carried me through my final final when I lit up a cigar as I walked away. Fifteen years into retirement I'm using my MSU math chops to figure odds on farkle throws and Mahjonn rounds. Life is so good for Jerry and me.

Spencer Hjelle '76: I retired from the Minnesota Dept. of Revenue after 40 years. I want to thank Dr. Milton Legg for all of the help he gave me while I was in his many math classes. It was his passion and patience that enabled me to graduate with a math major and accounting minor. With this degree, I was able to get the Dept of Revenue job and make a career out of it in the Virginia, MN office. I retired from the N.D. Air Guard in 1991 after 22 years of “Happy Hooligan” service. I was quite proud of being part of that unit. Like Dr. Legg, I love to walk so I have been doing a lot of that this winter. Without Dr. Legg’s inspirational proofs, I would never have received a college degree or revenue job. I never loved math like him, but I did enjoy it and ended up using my education all of my life. I saw him about 10 years ago and he still remembered me after I introduced myself. I was shocked and quite impressed that he remembered a “C” student after more than 35 years. His eyes have never changed.

ViAnn Olson '76: After 40 years of teaching mathematics I have retired. I am enjoying travel, reading, and remodeling a 1906 house.

'80 David Jacobson '80: After 31 years as a Senior Statistician at IBM Rochester, I am completing my fourth year as an Associate Professor in the Department of Mathematics and Statistics at Metropolitan State University in Saint Paul. I will be on sabbatical during the 2018-19 academic year. I will be focusing on curriculum development for two new degrees that we are introducing; Data Science BS and Industrial and Applied Mathematics BS. In addition, I serve as chair of our Industry Advisory Board and as coordinator of the internship program. In my free time, I enjoy walking and biking. My wife, Deb, and I also enjoy frequent trips to visit our son and daughter-in-law in Dallas and daughter in Ann Arbor, MI.

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Claudia Brainard Wiebold '81: I work as an application engineer on the Individual Systems Actuarial Agile Support Team at Securian in St. Paul, MN.

Barbara (Motzko) Roder'83: Retired from Chippewa County, Minnesota as Senior Deputy Auditor-Treasurer in Property Tax.

'86 Dudley Wells '86: I moved from Moorhead to Twin Valley four years ago and finally sold my house just south of campus. My daughter Kaila (Economics, 2001) lives not far away in Ada with her 3 younguns including my 3 year old grandson. There is no doubt in my mind that my BA/BS in Math from MSUM prepared me superbly for teaching at all levels, and I have had an incredible and challenging variety of teaching experiences: 4 years high school in Myrtle Beach, S. Carolina, pre-calc interactive video network to a consortium of ND high schools, 2 years math instructor at NDSU, 7 years (proudly!) summer school remedial algebra at West Fargo HS, 15 years math instructor & tutor at MSCTC (MState) in Moorhead and Detroit Lakes, and this year, my final one, math instructor/tutor at White Earth Tribal (Ojibwe) Community College (WETCC) in Mahnomen, MN.

'87 Nancy Antoine '87: I would like to thank the education department, especially Dr. Joe Thorman. Dr. Thorman's student-teaching experience in South Texas was invaluable!! I spent nine years teaching secondary mathematics before becoming a principal. I am currently the principal at Bridgewater Elementary School in Northfield, MN. I am also the current President of the MN Elementary School Principals Association, serve on the Board of School Administrators, serve on the MN Teacher of the Year judging panel, and serve on the Northfield YMCA Board of Directors. I truly enjoy serving the students, parents and teachers in my community.

'89 Karla Rothmann Herz '89: We are loving life in Sioux Falls! I am in my 21st year with the USPS and am currently working as a Health & Resource Management Specialist. I have recently taken on the challenge of training all new supervisors in our district (ND, SD, MT & Western MN) in the area of injury compensation. Glenn continues to work as Research Lead for AgPHD and we were lucky enough to ride the AgPHD float in the Rose Parade on New Year's Day. We take every opportunity to visit our grandson Thomas (3) in our spare time.



Veronica Lunde '90: I teach Mathematics at Apollo High School in St. Cloud. I am just finishing my 12th year. I teach Algebra I and AP Statistics. I work for the College Board in the summer grading AP Statistics Exams. My husband, Heath, is a MSUM graduate, working for Spartan Nash in St. Cloud. We have 3 boys aged; 22, 20 and 14. Always enjoy reading the Summary.



'93 Debra (Frank) Haglund '93: I moved to Denver, Colorado in August '93 and married Dave Haglund in April '94. I was hired by the Colorado Dept of Transportation in December '93; and I am assisting the Human Resources office as a Technician IV. My duties include updating their website, data analysis, and supporting enhancements to SAP Human Capital Management (HCM). We moved to Parker, CO, in June 2012. We have two cats.

Corey Johnston '94: I have been with Citibank for over 18 years and has been a credit bureau reporting analyst for the past 7 years. On the side I have performed in several dinner theatre shows and am currently a member of The Basement Dwellers improv troupe in Sioux Falls, SD.



'97 Tracy Sibell '97: I am an 8th grade math teacher at Conway Junior High in Conway, AR. I teach a Foundations of Math class, Math 8 (Pre-Algebra) and Algebra. I have been at this school for 5 years.

'98 Andy Martinson '98: After teaching middle and high school math in White Bear Lake for 13 years, I have been home full time with my two children. For the last two school years I have been working part-time doing math intervention with 3rd through 6th graders in Minneapolis Public Schools.

Udip Rayamahji '04: I have a 2 year old daughter and enjoying time with her. Also recently started working for Government contractor as a Senior Manager in McLean, VA.

'09 Adam Holte '09: I have been working at Bobcat Company in West Fargo for the last five years as a Supplier Quality Engineer. Main focus of my position is data analysis to find trends to help improve quality of our products.

Alyssa (Way) Dirkes '12: I have been working at Concordia College in the Dining Services department as an accounting assistant for a year. I got married in April 2017. In December 2017, my husband and I welcomed our son, Sawyer.

Jenny Glenski '13: I am a Business Intelligence Consultant for the Executive Office of Chemical, Biological, Radiological and Nuclear Defense in Washington, D.C.

Brittany (Valentien) Herrig '13: Currently in 3rd year teaching at ROCORI Public Schools in Cold Spring, MN as a 6th grade math teacher.

Karla (Schneider) Wagner '16: I work at Auto-Owners Insurance in Fargo as a commercial lines underwriter.

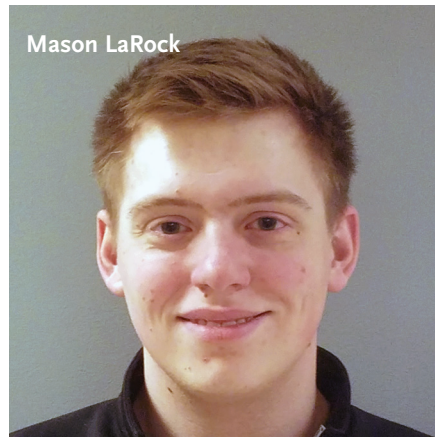
'17 Abi (Christensen) Carlson '17: I have spent the spring semester substitute teaching around the Fargo-Moorhead area, and I recently accepted a math teacher position at West Fargo High School for the 2018-2019 school year. I will be teaching Algebra I and some remedial math classes to students that struggle. I am eager to begin my teaching career! Go Packers!



Marnie Peterson '17: I am a mathematics teacher at Sheyenne High School in West Fargo, ND.

'17 Daniel Schneck '17: Everyone in the math department was so helpful and supportive as I pursued this degree. I would also like to thank Dr. Chadraa for allowing me to take an independent study with him so I could graduate a semester earlier. I work at UnitedHealth Group in Minnetonka, MN in the Medicare and Retirement Division as a Product Analyst. I find the job very interesting and love that I learn something new each day!

Mathematics Department News and Notes 2017-2018



Mason LaRock



Leslie Miller



Billy Pederson



Zach Snell



Madalyn Winger



Daniel Schneck

Actuarial Achievements

The pass rate for actuarial exams among students at MSUM (50%) continues to beat the national average (30 – 40%).

Mason LaRock passed Exam 4C this year! That is an amazing achievement for an undergraduate.

Leslie Miller passed both the P and FM exam.

Billy Pedersen passed both the P and FM exam.

Daniel Schneck passed the FM exam.

Zach Snell passed the FM exam.

Madalyn Winger passed the P and the FM exam.

Noyce Grant Recipients

As part of MSUM's National Science Foundation Grant **Ashely Borchardt, Abigail Carlson, and Jennifer Williams** have been selected as Noyce Scholars which requires



students to double major in Mathematics Education and Mathematics and commit to teaching two years for each year of scholarship funding.

Reid Barnett and Jennifer Williams are math education majors that will be working at Fargo South and Horizon Middle School respectfully. Both will be assisting teachers in summer school math programs as part of the Noyce Internship program this summer.

Student Research



Aidan Shafer

Aidan Shafer who is a math and physics double major will be participating in an REU in computational physics this summer.

Jacob Pawlowski studied models that use partial differential equations to fight crime. He presented his talk *Predictive Policing: Using Math to Predict and Prevent Crimes* at the Student Academic Conference.



Stefan Nelson



Ashley Skalsky

Stefan Nelson and **Ashley Skalsky** each presented their research at the joint meetings of the American Mathematical Society and the Mathematical Association of America in San Diego in January. Stefan presented his research on *Positivity and Slope Limiters for Lax-Wendroff Discontinuous Galerkin Methods* while Ashley presented

hers on *Standard Set-Valued Young Tableaux and Product-Coproduct Prographs*. Stefan also presented his research at the Student Academic Conference.

Math Competitions

During the academic year 2016-2017, a large number of MSUM students participated in local, regional, national, and international mathematical competitions. We are very happy that our students are getting involved in solving interesting math problems for fun.

MSUM had two teams with a total of six students participate in the 21st NCS MAA Math Competition. Our best showing was from team 112 which consisted of Pratik Dahal, Leslie Miller and Madalyn Winger. They ranked 50 out of 61 teams.

If you are a current student at MSUM and you are interested in mathematical competition, contact Dr. Damiano Fulghesu: fulghesu@mnstate.edu. You may be in the news next year!

Students, Faculty Attend MCTM Conference



Jennifer Williams

Student **Jennifer Williams** presented her talk 'Making It All Add Up for English Language Learners' at the MCTM Conference in Duluth.

Tammy Fitting presented *If not NGA's, QAS, then what?* and **Tim Harms** presented *Tools and Technology for Mathematics Instruction*.

Also in attendance at this conference were alumni **Amanda Bateman, Katie Byer, Erin Giosta, Alexis Hanson, Karin Hanson, Mara Haugen,** and students **Kyle Benjamin, Binod Rai,** and **Jennifer Williams.**

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Faculty Professional Activities

- ▶ **Sayel Ali** attended the fall and spring meetings of the NCS of the MAA.
- ▶ **Ashok Aryal** published a paper on “Geometry of Mean Value Sets for General Divergence Form Uniformly Elliptic Operators” in *Potential Anal*, <https://doi.org/10.1007/s11118-017-9672-4>. He also attended a two-day conference at Prairie Analysis Seminar, September 8-9, 2017, Kansas State University. Finally, he gave a research presentation at Prairie Analysis Seminar on the topic “Density of the zero set for a generalized Bernoulli-type free boundary problem”, and gave a talk on “The mean value theorem for Laplacian and its generalizations to arbitrary divergence form uniformly elliptic operators” at the Tri-College Colloquium, NDSU.
- ▶ **Ellen Fagerstrom** will be serving the office of the Vice President for Academic Affairs in a part time role.
- ▶ **Justin James** continues to be the treasurer of the NCS of the MAA and the director of the Faculty Development Center. His job as director brings him to many conferences and workshops on supporting and developing faculty talents. Furthermore, he organizes the annual faculty development day. This year’s theme was wellness.
- ▶ **Damiano Fulghesu** presented on “Enumerative Geometry of a Moduli Stack of Surfaces” at Missouri University in Columbia, MO. He also presented a talk entitled “Recurrence Sequences and Chaos” at the MSUM Planetarium.
- ▶ **Ed Chadraa** continues to work as the statistician member of the Data Monitoring and Safety Board (DMSB) for a clinical trial conducted by researchers at Harvard School of Public Health. This is a five-year long clinical trial, funded by National Institute of Health, to determine the

effect of Vitamin D on reducing the risk of latent tuberculosis infection in school age children in Mongolia. He will be traveling to Mongolia again this summer to work on that research.

- ▶ **Adam Goyt** attended Math Fest, a meeting of the Mathematical Association of America, in Chicago Illinois in the summer of 2017. He completed a mini-course on Euclid’s Elements there. Goyt also became chair of the mathematics department in July of 2017.
- ▶ **Olaniyi Iyiola** had the paper “Strong Convergence results for proximal split feasibility problem in Hilbert spaces” published in a *Journal of Mathematical Programming and Operations Research*. This was coauthored with Yekini Shehu.

New Hires

The Mathematics Department will be welcoming a new faculty member to the department next year.

Hongyan Hou will be joining us as the newest member of our actuarial science program. Hou has a Ph.D. in Mathematics and an M.S. in statistics. We look forward to her contributions to the growth of our program.

The Annual Faculty and Alumni Picnic

The annual faculty and alumni picnic will be held at Goosberry park on Saturday September 8 from 12 – 3 pm. Food, fun, and good conversation will take place. Please RSVP Lisa Johnson, lisa.johnson@mnstate.edu, if you plan to attend. ■

PROBLEM CORNER 2018

Compute the integral: $\int \frac{1}{\sqrt{e^{2x}+1}} dx.$

Solution to Problem Corner for 2017

Consider the **set** $\{1, 2, \dots, n\}$. This set has $2^n - 1$ nonempty subsets. For each nonempty subset, find the product of the reciprocals of each element. *Find the sum of these products.*

1. Compute this sum for the sets

$\{1\}$, $\{1,2\}$, and $\{1,2,3\}$.

You'll notice that the sums are 1, 2, and, 3.

2. State a conjecture of this sum for $\{1,2,3,\dots,n\}$.

We conjecture that the sum is n for $\{1,2,3,\dots,n\}$.

3. Prove your conjecture.

We proceed by induction. The base case was done in part 1. Now, assume that the sum is n for $\{1,2,3,\dots,n\}$. We observe that every nonempty subset of $\{1,2,3,\dots,n\}$ is also a nonempty subset of $\{1,2,3,\dots,n,n+1\}$. The sum of these will be n . We need to show that the associated sum of the nonempty subsets containing $n+1$ will be 1.

We form a nonempty subset of $\{1,2,3,\dots,n,n+1\}$ that contains $n+1$, by adding $n+1$ to any subset of $\{1,2,3,\dots,n\}$. When we take the product of the reciprocals of the elements in these sets, we get the same product as the reciprocals of the elements in the subset of $\{1,2,3,\dots,n\}$ divided by $n+1$. Thus, if we focus on the nonempty subsets of $\{1,2,3,\dots,n\}$ and add up these new products, we get $n/(n+1)$.

Now, there is one set contains $n+1$ and no elements from $\{1,2,3,\dots,n\}$ and that is $\{n+1\}$. The product of the reciprocals of the elements in this set is $1/(n+1)$. Adding this to our result from above gives us 1. Which completes the proof.

18 ONLINE A GRADUATE PROGRAM FOR HIGH SCHOOL TEACHERS

18 Online provides the 18 credits teachers need to become qualified content area concurrent enrollment instructors. It's the result of HF 3326 and SF 3026 - Northwest Regional Partnership, which appropriated \$3 million to provide curriculum development for the Northwest Regional Partnership continuing education program.

It's a collaboration between Lakes Country Service Cooperative, Northwest Service Cooperative and MSU Moorhead.

Fourteen content areas have been identified as high need for Northwest Minnesota. Legislative funding provides this program free (up to 18 credits in a content area) to qualified teachers in participating cooperatives. Teachers outside of the cooperatives may be enrolled, space permitting.

At this time, MSUM is offering courses in six of the 14 content areas, including Math. Students, teachers and school districts will benefit greatly from this program. For teachers, the benefits of enrolling now:

- **Free tuition for up to 18 credits in a content area**
- **Free books**
- **100% online delivery**
- **Streamlined admission for 18 Online participants**
- **Flexible classes delivered by MSUM faculty**
- **Ensure you have the proper teaching credentials by 2022**

Learn more about the partnership and how to enroll at mnstate.edu/18online.



"This year I would like to try something new that I learned about in my summer course (MATH 626). I would like to introduce my students to Polya and Schoenfeld's problem solving."

- Katie Byer, 2015
Teacher in Perham, Minn.



REFER A STUDENT:

We know our mathematics alumni have been transformed by their MSUM experience. Your commitment to staying in touch and sharing your stories are proof that MSUM has had a profound and lasting impact. You can help continue to shape and build the Dragon community by referring a student you think would be a great fit at MSU Moorhead.

You can refer students in several ways.

- Complete the “Request information from MSUM Moorhead” form for the student at: <https://www.mnstate.edu/admissions/undergraduate/request-information.aspx>
- Email your recommendation to: admissions@mnstate.edu
- Encourage the student to check out MSUM: www.mnstate.edu/visit/
- Call today to learn more: 1.877.678.6463 or 218.477.2161



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Want to help support the Math Department?

We encourage you to make a contribution to the MSUM Alumni Foundation when they contact you in their annual appeal. Please consider designating your donation to a mathematics department scholarship (there are several) or to the mathematics department discretionary fund. In fact, we now have an endowed fund for actuarial among them. The phone volunteer may not ask if you want to designate, but your expressed wishes will be honored. Thanks.

