Faculty Notes - continued from page 3

Korean American University Professors Association (KAUPA). Additionally, he is working as a co-editor on the KAUPA conference book project, which will be published by CRC if successful. He also has a paper titled "Guided Inquiry Learning (GIL): Enhancing Student Engagement through Direct Instruction and Active Learning" published in *KAUPA Letters*.

Larry Lehman had his book, Quadratic Ideal Numbers: A Computational Method for Binary Quadratic Forms, published with De Gruyter, a German publishing house. This book studies quadratic ideal numbers, introduced as a notational device in Prof. Lehman's previous book, Quadratic Number Theory, as objects in their own right, with applications to quadratic forms and other topics in elementary and algebraic number theory.

Suzanne Sumner presented the lecture "Alcuin of York and the Origins of River-Crossing Puzzles" for the Joint Mathematics Meeting in Seattle. In August 2025 Dr. Sumner and **Emerita Professor Marie Sheckels** gave the presentation "The Helen of Geometry and other Fateful Mathematical Shapes" for the Mathematics of Various Entertaining Subjects (MOVES) conference in New York City. Ω

Alumni Spotlight: Sara Coleman, Class of 2013

Tell us about your education and/or career path since graduating from UMW. What is your current role? How did your time at UMW prepare you for your career?

Since graduating, I've been employed at the Naval Surface Warfare Center Dahlgren Division, where I had an internship the summer before my senior year. NSWCDD paid for some of my tuition and books my senior year, as well as my Masters of Engineering degree from Old Dominion University, which I completed remotely while working full-time. I'm currently the Missile Integration Project Lead, doing systems and mechanical engineering for US Naval missile launching platforms. While I'm not doing much, if any, pure math these days, my time at UMW certainly helped pave the way for my career by teaching me how to think critically, interact with lots of different people, and ultimately how to learn.

What class or UMW experience did you have that has been surprisingly useful to you in your career path?

I worked as a stage carpenter for the Theater Department for 3 years, and although the actual work has nothing to do with my degrees or my career, I think regularly being around people with different interests and personalities from me was really valuable. I learned how to get out of my comfort zone, how to take charge of a group, and how to divide up work and make sure a project got completed.

What non-math skill did you acquire at UMW that has been helpful in your life after UMW?

I think the most important thing I learned from UMW is that there is a lot of knowledge and information out there, and the more you can absorb, the better. The beauty of a liberal arts degree is the wide breadth of learning you're exposed to, and I think that's really helped me be adaptable in my career and everyday life.

What advice do you have for a current or prospective student?

Try everything. Take a class just because it sounds interesting, sign up for tons of clubs, and go to all the on-campus events. Push yourself, not only academically, but also socially. Learn as much as you can from the great environment you're in, and have fun! Ω

Check out our website
cas.umw.edu/math

View our page devoted to our alumni and, better yet, email Dr. Esunge at jesunge@umw.edu to get yourself included!

SCAN ME

Are you a member of our Facebook group? Look up UMW Mathematics and join today!

Mathematics at UMW

a newsletter of the Department of Mathematics at the University of Mary Washington

Welcome from the Chair

We are delighted to welcome you to this phenomenal academic year. Our tracks in the mathematics program are gaining steam, as more students choose wisely. In the age of artificial intelligence, the ability to think critically and analytically is in great demand. Our program equips students with important skills in actuarial science, data science, mathematics or statistics. These skills will always be in high demand.

My colleagues and I are also delighted to welcome Dr. Keith Nabb to our program. He brings wide experience in teaching and the scholarship of teaching and learning, and is very engaged with active learning. This is a huge advantage for us as we strive to strengthen the sense of community and inquiry in all of our classes here at UMW.

This fall, we will welcome the regional mathematics community to our campus in November for the sectional meeting of the Mathematical Association of America. Hosting this great group of professors and students from institutions in DC, MD and VA will put the spotlight on the excellent work we do here, as well as showcase our beautiful campus.

In class, in James Farmer Hall, around campus or at some event, know that my colleagues and I cannot wait to share with you as we partner in the process of discovering knowledge and transmitting it. With best wishes for a fruitful year,

Julius N. Esunge
Professor and Chair, Department of Mathematics, UMW

Honors Projects

Joshua Taylor completed his honors thesis under the direction of **Dr. Debra Hydorn**. Josh's thesis focused on factors that impact the WAR (Wins Above Replacement) baseball statistic. He accessed and combined a lot of data from several sabermetrics sources and explained the different components used to calculate WAR. With guidance from Dr. Hydorn, he used R to fit his models and to graph the results.

Abby Beckelhimer successfully completed her honors thesis under the guidance of **Dr. Leo Lee**, focusing on the numerical analysis of the Susceptible-Exposed-Infected-Recovered (SEIR) model to study disease spread within a population. Her research centered on comparing various numerical methods—including Euler's Method, Taylor's Method, Runge-Kutta Methods,

Continued on page 2

University of Mary Washington

Honors Projects - continued from page 1

and Multi-step Methods—for solving the SEIR model. By applying these techniques to hypothetical scenarios with altered parameters, Abby investigated how changes in model variables influence the trajectory of an epidemic. Her work demonstrated the power of numerical approximations in forecasting the behavior of infectious diseases, offering valuable insights into how pandemics might evolve under different conditions. Abby's thorough and methodical approach culminated in a detailed thesis, showcasing her strong command of both mathematical modeling and computational analysis. Ω

Irene Piscopo Rodgers '59 Summer Science Institute

Juniper Creskoff worked with **Dr. Randall Helmstutler** on a problem related to the infamous birthday paradox. This well-known phenomenon explains why there is a somewhat surprisingly high probability of two people having the same birthday, even among relatively small groups of people. If one plots the differences in these probabilities as one extra person is added to the pool, a striking pattern arises: the graph appears to have a unique maximum value. If one alters the number of available birthdays, the same pattern arises. Juniper's work sought to understand why this occurs and provide a mathematical justification of this behavior. She was able to find two good arguments to explain this maximum, arguing from both the discrete and continuous sides.

Ashton Crawford also worked with Dr. H, but in a problem related to cryptography. David Chaum's "dining cryptographers problem" from 1985 provides a way for a trusted network of people to verify that one of them holds a token, but without revealing the true owner. Ashton's project searched for ways to extend this to allow the token to be shared by two people, while also maintaining the secrecy and anonymity of Chaum's original scheme. In order to do this, Ashton had to completely rebuild the protocol, changing the algebraic platform of the scheme to accommodate the sharing of the token. In the end, Ashton was able to show that her new protocol works and also subsumes the original scheme by permitting a single token-holder in addition to sharing. Both Juniper and Ashton plan on presenting their research at math conferences this fall.

Delaney Thomas and **Kannon Baker** worked with **Dr. Debra Hydorn**, investigating using mutual information (mi) as a measure of association between two variables. They completed simulations to compare the value of mi to correlation coefficient (r) to two nonparametric measures of association (Spearman's rho and Kendall's tau) for linear and non-linear associations. They also explored how mi, r, rho and tau behave with non-normal errors and when the data includes outliers. They applied what they had learned to find the mi between the ground water level and lake level for eight lakes in Florida.

Aloysious Kabonge and **Belen Telahun** presented their 2024 SSI projects, completed under the supervision of **Dr. Melody Denhere**, at the 2025 Meeting of the American Association for the Advancement of Science in Boston. Ω

Moore wins Darden Award

Mathematics and Applied Physics double major **Austin Moore** was awarded the Colgate W. Darden award at this year's commencement ceremony. The Darden award is given to the graduating senior(s) with the highest cumulative GPA. Austin was one of seven graduates to receive this award, with all seven recipients achieving perfect 4.0 GPAs. Math faculty praised Austin's mathematical maturity, potential, and motivation for growth. Since graduating, Austin has been working as a mathematician at the Naval Surface Warfare Center in Dahlgren, VA, supporting analysis and software development for defense projects. Ω

University of Mary Washington • Department of Mathematics • Fall 2025

Bullock wins Oscar Schultz Award

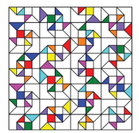
Jennifer Bullock received the Oscar T. Schultz award in April. This award is given by the mathematics department to the student who best demonstrates "the desire and potential to master the art of mathematics." Department faculty describe Jen as a "patient, diligent, and hardworking student." Jen served the department for 5 semesters as a Peer Mentor for Calculus I and II, and is a currently a student in the Masters program in Mathematics at George Mason University. Ω

Faculty Notes

Melody Denhere served as a 2024–25 AAAS Science & Technology Policy Fellow at the National Science Foundation, contributing to impact storytelling and data analytics in the Geosciences Directorate. This prestigious fellowship places scientists and engineers in federal agencies to apply their expertise to policy and public service.

Julius Esunge continued on a three-year appointment from the American Mathematical Society to the AMS Committee in charge of planning and hosting the annual AMS department chairs' workshop and submitted two research articles for publication.

Randall Helmstutler chaired a special session on alternative assessment at MathFest, the national meeting of the MAA, in Sacramento this August.



Debra Hydorn's piece *CP 2: Waterfall*, was accepted for the Mathematical Art Exhibition at the 2025 Joint Mathematics Meetings.

Leo Lee has been serving as Associate Editor-in-Chief of *KAUPA Letters*, the journal of the

Continued on page 4

Department Transitions

At the end of the 2024-25 academic year, Senior Lecturer **Kelly Perkins** retired, after ten years of service to the math department. Professor Perkins mentored hundreds of students through introductory statistics, as well as numerous general education classes. Professor Perkins was well-known for his patience and willingness to work with students until they achieved understanding. We wish him well in his retirement.

This academic year, we welcome **Dr. Keith Nabb** to the department as a Lecturer. Dr. Nabb earned a PhD in Mathematics Education at the Illinois Institute of Technology in 2013, and has been teaching classes in mathematics and mathematics education since 2001. His research interests are in Student Questioning, Formative Assessment, Active Learning (Five Practices, Building Thinking Classrooms, Inquiry Based Learning), Mathematical Knowledge for Teaching PK-16, and Equity-Based Teaching Practices. When Keith is not working with students, he enjoys spending time with his family, cooking, painting with acrylics, origami, and reading. He lives with his wife Megan, two daughters Chloe and Elsie, German exchange student Clara, dog Roxie, and cat Gleb. Ω