

Millersville University, Department of Mathematics **♦** www.millersville.edu/math

Note from the Editors: Due to disruptions due to covid, the last departmental newsletter was released in Winter, 2019. This issue will largely focus on events through Spring 2022. Events from Summer 2022 will be shared in the next issue.

New faculty and staff in the math department, and some retirements

In August, 2020, Dr. Patrick Stewart joined the statistics group of the math department as an assistant professor. In August, 2022, Dr. Lindsay Dever joined the pure math group of the math department as an assistant professor. Also in August, 2022, Mrs. Linda Mellinger joined as the new math department secretary. We will share more about these fascinating individuals in our next issue.



Dr. Patrick Stewart

Dr. Lindsay Dever

Mrs. Linda Mellinger

The math department has also seen some retirements in the last few years. In June 2020, Drs. Ximena Catepillan, Bruce Ikenaga, and Ronald Umble retired, and we share more about what they are up to in this issue. Also, in June 2022, Dr. Zhoude Shao and Mrs. Kathy Cody retired from the department. We will share more about how they are enjoying their retirements in our next issue.

Congratulations to Drs. Catepillan, Ikenaga & Umble on Retirement!

In June 2020, the math department saw three retirements. Drs. Ximena Catepillan, Bruce Ikenaga, and Ronald Umble have all moved on to the next phase of their lives. We caught up with each of them to find out how they were enjoying retirement and were not surprised to find that all of them are not only enjoying retirement but staying very active in their love of mathematics.

Towards the end of Dr. Catepillan's tenure at Millersville, she devoted much of her time in mathematical research to the area of Ethnomathematics, creating a Millersville course, Math 102: Survey of Mathematical Ideas in Non-European Cultures and co-writing a textbook, *Mathematics in a Sample of Cultures* (with Waclaw Szymanski), as well as presenting numerous talks nationally and internationally within this area. In retirement, Dr. Catepillan has continued to work very actively in this area, publishing papers, giving presentations, and organizing research sessions at conferences internationally. With more talks planned as well as a research trip to Rapa Nui in 2023 with a group of archaeologists to collect data, Dr. Catepillan shows no signs of slowing down.

When Dr. Ikenaga, walked out of Wickersham Hall on March 13, 2020, he had no idea that he had taught his last class at Millersville. He wrote that the pandemic has been a surprise in how it has developed and a great lesson in humility: "One cannot predict the future and so it makes sense to not take things for granted." With a freer schedule, Dr. Ikenaga has done more math since retirement than in years previous. Ever the pragmatist, he finds it simultaneously discouraging that that he will not have time to study the many things about which he is curious and yet loves that he will never run out of things to investigate. He writes that he misses his friends in the department and work life more generally, and that "I will miss my students till the day I die." Unpredictability of the future aside, we all hope that day is a long way away.

Never one for lukewarm expressions, Dr. Umble reports that retirement is "glorious – like an endless sabbatical." Though he misses the classroom and daily interactions with colleagues and students, he now relishes the freedom to do whatever strikes his fancy on any given day. And what strikes his fancy in retirement? Not surprisingly, he continues to do research, but he also finds times for activities as wide ranging as travel, fishing, gardening, woodworking, cooking, and biking. And he especially enjoys the extra time he now has to spend with his wife, children, and grandchildren. One thing that has surprised him in retirement is that he feels no desire to return. "I'm quite happy to leave the task of educating the next generation in the competent hands of my colleagues."

Day of Caring Fall 2021

On Saturday, September 11, 2021, 16 students from the mathematics department's first semester freshman seminar participated in the annual United Way Day of Caring—a tradition that has stood for 20 years at MU in commemoration of the attack on the World Trade Center on September 11, 2001. Hundreds of MU students across campus volunteer within the community to participate and this year the mathematics majors spent the morning cleaning tables, chairs, and items that were part of interactive displays at the Lancaster Science Factory. The Day of Caring shows that for a few hours on a Saturday morning, many hands have the opportunity to make a difference when giving back to the people and community around Millersville University.

MU Alum/Math Majors Featured During MU/F&M Joint Colloquia



Dr. Cynthia Taylor and 16 students from the first semester freshman seminar, *From pi to e through i*, volunteered at the Lancaster Science Factory on September 11, 2021.

MU Math Alum Peer-Reviewed Publication

Megan McKay (nee McGee) had her first publication in a peer-reviewed journal based on her department honors thesis: Megan McKay, Baoling Ma, and Lisa Marano, *Quantifying the Recovery of the Active Nesting Bald Eagle (Haliaeetus leucocephalus) Population in New Jersey*, Maryland Birdlife, 70 (2021), 25–40.

MU Alum/Math Majors Featured During MU/F&M Joint Colloquia

- Spring 2021—Rebecca Grube ('17) participated in an Alumni Career Panel
- Fall 2021—Katherine Pheysey (senior) and Sara Stinchcomb (senior) participated in a panel discussion centered around their research experiences.

MU Math Majors who presented at EPaDel Spring 2022 Meeting

- *Fire risk assessment and analysis in Columbia Borough and the City of Lancaster, Pennsylvania* Alana Danelski, Dylan Roeder, Jared Chin, and Megan Clayton
- *Temporal patterns of different types of fire incidents: A case of the City of Lancaster, Pennsylvania* Justin Sellman, Samuel Urban, and Simon Joseph

Dr. Taylor's Spring 2021 Sabbatical

Dr. Taylor spent Spring 2021 working on two separate projects. One project was co-authoring two books and the second project was researching ways mathematics teacher educators may provide opportunities for prospective teachers to develop an equity-centered orientation.

Project 1:

Dr. Taylor received an invitation from the National Council of Teachers of Mathematics (NCTM) to co-author a book series on underrepresented mathematicians and she spent Spring 2021 working on two books in the series. The first book is titled *Powerful Mathematicians who Changed the World from A to Z*. This book focuses on underrepresented mathematicians (i.e., people of color and women) for each letter of the alphabet. For each letter, a short mystery story was written that includes the contributions of the mathematician for that letter, as well as a brief introduction to the mathematician, an audio biography where the mathematician is talking in first person, and a short section that dives deeper into the mathematics for the mathematician. In addition, several classroom activities for K-12 teachers were also written to align to each mathematician along with several discussion questions for K-12 teachers to engage their students in conversation with prior to reading / after reading about each mathematician. Finally, additional resources (e.g., books, weblinks, videos) were collated for each letter as well.

The second part of the series contains three books for each grade band (i.e., K-2, 3-5, 6-8, and 9-12). The storyline for each book is grounded in equity/social justice and includes the contributions of selected mathematicians. Dr. Taylor also worked on the first of the three grade 6-8 books titled *The Mystery Underground: Powerful Mathematicians who Changed the World*, Agnes Meyer Driscoll, Grade 6–8 Book 1. Pottersville, the small town where this fictional story is set, is dealing with an environmental crisis as well as gentrification. Hundreds of fish are dying in the local river at the bottom of the hill in town. Five friends investigate the issue, find clues that are coded, break the codes, and eventually figure out that the problem is stemming from contamination from a solar panel company in the town. Cryptography, the mathematics that Agnes Meyer Driscoll was recognized for, is present in the story. The reader is given the opportunity to code and decode messages that are related to the story as well as additional mathematical problem solving opportunities.

Project 2:

Dr. Taylor, along with colleagues Dr. Christa Jackson (Saint Louis University) and Dr. Kelley Buchheister (University of Nebraska—Lincoln) have been researching ways mathematics teacher educators may provide opportunities for prospective teachers to develop an equity-centered orientation. Attending to these practices in teacher preparation programs may help prospective teachers to observe actions that occur in classrooms and determine effective strategies that provide the opportunity to enhance all students' access to high quality mathematics instruction. However, currently "very few teacher education programs have successfully tackled the challenging task of preparing teachers to meet the needs of diverse populations" (Watson et al., 2006, p. 396), and few mathematics teacher educators are prepared to do this work on their own; in fact, many feel ill-prepared to incorporate issues of equity in their mathematics methods courses. Their current work is focused on helping mathematics teacher educators facilitate conversations with their prospective teachers on equity and equitable issues that other mathematics teacher educators can use to help their prospective teachers attend to cultural influences in the K-12 classroom. A recent 2018 book chapter publication is where they share results from a discussion of a vignette implemented with their own students that indicates prospective teachers are beginning

to attend to cultural influences. The student responses reveal differences not only between races, but also between males and females. This book chapter is based on results from conversations centered on one of six vignettes and Spring 2021 they analyzed participant responses to questions centered on the other five vignettes. They are in the process of writing up the results in the form of several manuscripts to be submitted for publication where they will share the vignettes with other mathematics teacher educators so they may use them with their own prospective teachers in order to provide an opportunity to enhance all students' access to high quality mathematics instruction.

Dr. Taylor shares that the interplay between her research and her role as a mathematics teacher educator is critical for effective teaching. She has learned much from the participants she has interviewed in her research studies and has applied that knowledge to better her own classroom teaching and learning environment in order to carry out powerful ways for prospective teachers to learn together about what really good teaching looks like, as well as integrate new learning strategies to help enhance the learning opportunity for her content and methods students. During the Spring 2021 semester, her learning about mathematicians that will appear in the *Powerful Mathematicians who Changed the World from A to Z* book and issues of equity that she learned about in her analysis of data related to the vignettes and literature she read aligning to the project continued to grow and develop and she anticipates integrating the new ideas she has garnered in future courses that she teaches. This learning has helped her grow as a mathematics teacher educator and provides a level of energy, excitement, and enthusiasm for teaching that she needs to be an effective instructor in the classroom.

If you are interested in discussing this work further, please contact Dr. Taylor: cynthia.taylor@millersville.edu.

References

Jackson, C., Taylor, C. E., & Buchheister, K. (2018). Seeing mathematics through different eyes: An equitable approach to use with prospective teachers. In T. Bartell (Ed), Toward equity and social justice in mathematics education (pp. 263-285). Cham, Switzerland: Springer.

Watson, D., Charner-Laird, M., Kirkpatrick, C. L., Szczesiul, S. A., & Gordon, P. (2006). Effective teaching/ Effective urban teaching: Grappling with definitions, grappling with difference. Journal of Teacher Education, 57(4), 395-409.

Math Majors at Made in Millersville 2022

Title: *Fire risk assessment and analysis in Columbia Borough and the City of Lancaster, Pennsylvania* Jared Chin, Megan Clayton, Alana Danelski, Dylan Roeder, and Sara Stinchcomb

Title: *Spatial Analysis of Fire Incidents in Lancaster County, Pennsylvania* Savannah Bell, Molly Longo, Jhimm Mejia, and Chen Zhang

Title: *Temporal analysis of different types of fire incidents: A case of the City of Lancaster, Pennsylvania* Simon Joseph, Justin Sellman, Samuel Urban, Matthew Valentin, and Lauren Watkins

Title: *Mathematical Models for White-Tailed Deer Populations Incorporating Annual Harvest in New Jersey* Sara Stinchcomb

Summer 2021 Research Experiences for Undergraduates

Katie Pheysey's REU Experience

I attended a (virtual) REU through the University of Iowa from June 7th to July 23rd of 2021 called the Iowa Summer Institute in Biostatistics. The first four weeks of the REU consisted of a lecture period in the morning and a computer lab in the afternoon. The lecture period went through the basics of statistics and probability theory, with some applications and examples. The computer lab consisted of instruction in R and breaking into groups to work on related problems. The last three weeks consisted of a research period, in which I was assigned to a project focusing on analyzing a COVID-19 dataset from the CDC. I worked in R and met two or three times a week with the faculty advisor and my project partner over Zoom to discuss the work. There were also various talks from faculty, graduate students, and alumni in the field in place of the morning lectures. At the end of the program, my partner and I presented our research, and we got to see the research projects from the other participants as well.

I learned a lot about biostatistics from this REU, in both the content/academic aspect and in the career aspect. Biostatistics is an essential part of medicine and medical research today, and biostatisticians are very in-demand. There is a wide range of career possibilities, from sports medicine to clinical trials to epidemiology. You do not need to be a statistics major in undergrad to study and work in biostatistics – many of the field professionals who spoke had been in applied math or had a general math concentration before they went into biostatistics, and most of the REU participants had an applied math or science background. You also don't need to know anything about coding to apply to/participate in an REU. There were some participants who already had a few years of coding in R under their belt, but most had very little coding experience or none at all. Overall, I highly recommend applying to REU's; it's a good way to explore possibilities in a certain field and to get some initial experience in research.

Sarah Stinchcomb's REU Experience

This summer I participated in an REU affiliated with James Madison University studying using the Power Series Method to Solve (Highly!) Non-linear Ordinary Differential Equations. Over this eight week period I worked in a team of five other students and three professors to solve, model, and derive approximations for mathematical models. We looked at equations such as the Flame Equation, the Van Der Pol System, and the Lorenz Equations.

My REU experience gave me confidence that I not only wanted to go into research, but could also contribute to the expansion of knowledge in mathematics. Perhaps the most valuable part of this program was learning about all the different types of tools used in mathematical research. By the end of the program, I knew how to code in LaTeX (which pre-REU I never heard of), how to use Overleaf to share code, and how to program in MatLab. The content I worked with over the summer, or even content we just discussed, quickly translated to the classroom in the fall, which allowed me to have a stronger understanding of concepts and forced me to make connections about the content of my classes and how it can be used to solve real world problems.

Julia Geesaman's REU Experience

This past summer, I participated in the University of Colorado Anschutz Medical Campus' Summer in Biostatistics program (CoSIBS). The program took place virtually from June 21st until July 30th with about 30 participants. Each week, we spent our mornings and afternoons attending Biostatistics and R for Data Science

classes with short breaks in between. One of my favorite parts of attending these classes was getting to learn from so many different professors. A new professor would lecture every week, and it was so great to experience many different teaching styles within one subject.

A few weeks into the program we split into groups to work on research projects. My group's project was "Investigating the Role of Guilds in Microbiome Data." With one of the program leaders as our advisor, we were responsible for analyzing current microbiome data our advisor provided. This project was part of her current ongoing research, and we would meet with her once a week to go over any questions we had. There were six groups in total and at the end of July, each group set up virtual tables and presented our findings.

The final activity we did in the program was called a Hackathon. The Hackathon was my favorite part of the program. In our same research project groups, we were given access to Colorado Department of Public Health & Environment (CDPHE) data. We spent the day deciding on a research question, analyzing, performing tests, and designing visual aids using the data provided. At the end of the day, each group presented their unique research ideas and findings.

The CoSIBS program was a great experience for me. Although it was virtual, the program leaders made an effort to host different virtual social events like trivia and movie nights to make it easier to connect with other participants. I learned a lot in a short amount of time, and this program really opened my eyes to a very impactful career option.

Brian Fodale's REU Experience

This past summer I participated in the University of Iowa's Summer Institute in Biostatistics. The program began with three weeks of virtual instruction where I, along with ten other students from around the country, learned some basics of biostatistics. What I enjoyed was that while I learned most of the statistics from my classes at Millersville, I got to see how they apply to the field of public health. After the virtual component, I spent the remaining four weeks at the University of Iowa campus in Iowa City. There, I participated in a research project where my group used statistical methods to detect areas of skin cancer in melanoma images. The summer institute concluded with a symposium presentation of the final projects.

Overall, I had an amazing experience throughout my REU. The time spent in Iowa was easily my favorite part of the program. Not only did I get to meet my wonderful peers within my cohort in person, but I also got to meet some biostatistics graduate students. They introduced me to what is required and expected if I decide to attend graduate school. And after participating in the program, I can confidently say that biostatistics and graduate school is the direction I want to head in after graduation.





2021 PreService Teacher Day at Millersville University

On Saturday, November 6, 2021, nearly 100 preservice teachers, faculty, and presenters from the eastern portion of the state attended Preservice Teacher Day at Millersville University. The day started with a keynote presentation by Dr. Fran Arbaugh who talked about her top five reasons to get students reasoning more in math class and the give-away of six (three elementary and three secondary) *Success from the Start* books.

Three different sessions, 50 minutes in length, were offered and attendees had three different sessions to choose from for each time slot. A total of 10 presenters, comprised of K-12 classroom teachers, retired teachers, and university faculty, facilitated the sessions.

- Elementary/Middle school topics included: technology based math activities and math stations.
- Middle/High school topics included: medical and mental health issues students are dealing with today, classroom discourse and teacher questioning, and classroom activities modeled after the game Clue.
- General interest topics included: reflections of teaching in both suburban and rural schools, preparing for student teaching and preparing for interviews, classroom management strategies to create a positive climate in the classroom, and handling difficult students.

The day ended with a brief presentation by financial advisor Mr. James Williams who provided an overview of financial literacy related to 403B and PSERS investment options. To conclude the event, over 15 mystery bags were awarded raffle style, where PTs received a bag that contained a selection of books, manipulatives, and other donated or purchased prizes.

A special thank you to the following sponsors: PCTM, PAMTE, Heinemann, EAI Education, and SIAM for their donations!



Dr. Fran Arbaugh presenting the keynote session on *Fran's Top* 5 Reasons to Get your Students Reasoning More in Math Class



Ms. Courtney Bussard, MU Alum (2018), presents on *Handling the Difficult Student: Perspectives From a Newer Teacher (K-12)*





Sara Stinchcomb, poster presentation: *Reducing fire risk in Columbia borough and Lancaster city in Pennsylvania*



In 2005, Wickersham was under construction and the Sextant you see here found a new home in a garage. It was forgotten, but was recently returned. This instrument was used by Dr. George Anderson in a course he designed for teachers in the late 1940's. Dr. Anderson was a professor at Millersville University from 1946 to 1969, and taught the one week course for many summers. One of the course projects was to survey the pond in front of Wickersham Hall and then create a scale drawing. Mr. Charlie Wolf took the course himself (as a student) around 1955 using the same equipment that you see here. Mr. Wolf stated that he was pretty sure

Back in Wickersham After 17+ Years...

that Dr. Anderson had bought the equipment as navy surplus right after the war as the military was selling a lot of things they no longer needed.

Mr. Wolf was hired as a professor at MU in 1961, and after Dr. Anderson retired in 1969, the course was dormant for several years. Mr. Wolf decided it was worthwhile and brought it back with his own modifications; teaching the course for about 15 years in the summer until his retirement in 1991. Mrs. Patricia Brislin took the course in 1990 and said she remembered Mr. Wolf taking the students around campus to determine height, slopes, and distances of various areas. Mr. Wolf also started the annual Women in Math and Science Conference.

In addition to Dr. Anderson being a professor, MU band director, and the official campus photographer, he had a program in the late 1940's on WGAL called the Anderson Project, where he used a simulated cockpit to teach navigation to pilots. He and his wife were world travelers.

If you are interested in borrowing the equipment for use in your own classroom, please contact the mathematics department office.

Did we miss you? Has something new happened? Send updates to Linda.Mellinger@millersville.edu.

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