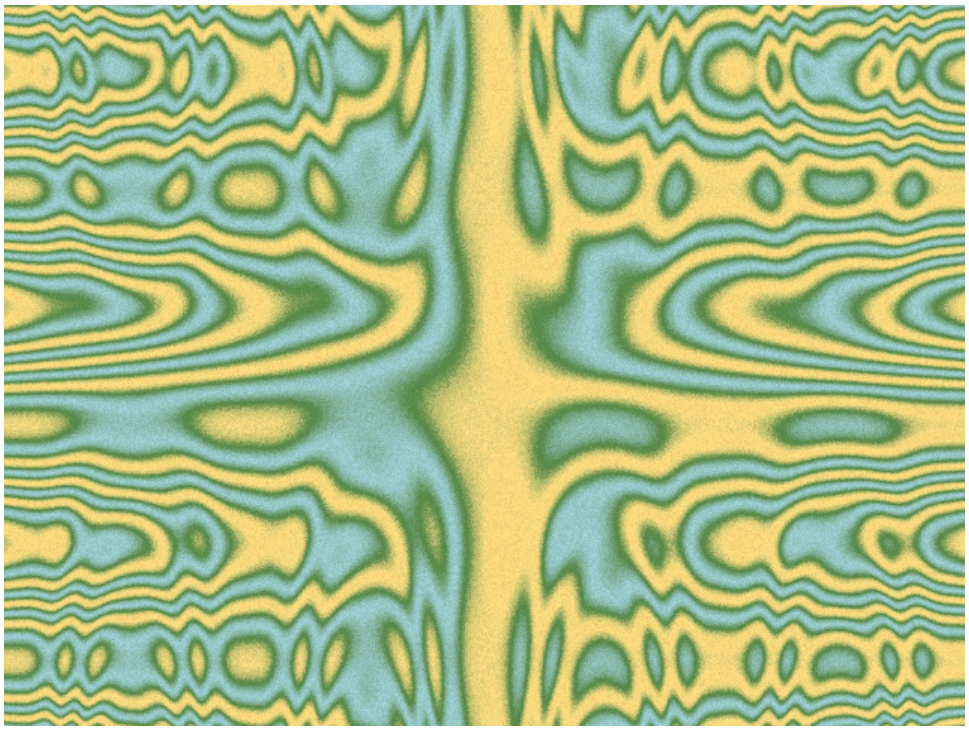
What's ν?

News from the Department of Mathematics and Computer Science



Mount St. Mary's University
Emmitsburg, MD 21727

Issue No. 20 July 2024

Contents

What I Do

By Joey Barvir, Class of 2014

Family, Faith, and Fostering the Next Generation

Life after graduation in 2014 with my BS in mathematics has been a whirlwind of joy and growth! My biggest supporters are my wife, Emily, and our three amazing children, Ellie (5), Johnny (3), and Evelyn (2), with another little one, Emma Grace, due in July! We met during grad school (thanks to some matchmaking by mutual friends – Emily's a New Yorker from Poughkeepsie who attended Catholic University of America. We got married in 2018 and began quickly growing our family. Living back in my rural hometown of Smithsburg, Maryland, just 30 minutes over the mountain from the Mount in Washington County, gives us a wonderful blend of community and adventure.

The foundation for this fulfilling life was laid during my time at the Mount. The daily rhythm of attending mass and participating in multiple retreats throughout the year nurtured my Catholic identity and was a guiding light that continues to shape me today. Working as a grad assistant up at the Grotto further deepened my faith and connection to the Mount community. I was able to pray daily in one of the world's most beautiful shrines dedicated to our Blessed Mother, all while interacting with Mount students, faculty and pilgrims. Since graduating, I attend Saint Andrew's Catholic Church in Waynesboro, PA, where I'm actively involved as a reader, serve as an Extraordinary Minister of Holy Communion, and help in teaching fellow parishioners to become Catholic through RCIA classes.

The Mount also played a pivotal role in fostering my passion for education. My professors not only helped me appreciate the complexities of mathematics, but also ignited a desire to transfer this knowledge to future generations. This passion led me to pursue my Master of Arts in Teaching in 2016 and join Washington County Public Schools. I have been teaching at Boyd J. Michael III Technical High School since earning my MAT in 2016. BJMTHS is a vibrant technical and trade school environment, where I connect with juniors and seniors as they navigate the complexities of Geometry, Algebra 2, Statistics, and Precalculus. Seeing that "aha!" moment when a challenging concept clicks – that's what makes teaching so special.

But my dedication to education goes beyond the traditional classroom. I also dedicate my time to teaching evening high school and summer school, helping students earn the credits they need to reach their goals and graduate. Witnessing their perseverance and growth throughout these programs is truly inspiring. At Boyd J. Michael III, my dedication to the school community has extended to the academic team. These talented students compete regionally and statewide for SkillsUSA, showcasing their academic and technical prowess. Being their coach for multiple years allowed me to witness their hard work and celebrate their achievements. My passion extends beyond the classroom walls in other ways too. As a proud Smithsburg High School graduate, the opportunity to coach the boy's soccer team for the past nine seasons has been a privilege. Sharing my love for the sport and mentoring young athletes brings immense joy.

Being part of the Mount alumni network is truly special. The education I received at Mount St. Mary's University prepared me not just for a career, but for a life of learning, inspiring, and giving back. Here's to many more chapters filled with family, math, mentorship and making a positive difference.

Math students at graduation: Ryan Laur, Hannah Bonson, Olivia Smeltzer, Matthew Norris, Sarah Purdy, and Sophie Allison.

Department Activities and Awards

By Brian Heinold

2023-24 was another busy year, with several new faces in the department and a record graduating class.

After the spring semester, Professor Athar Rafiq retired. He had been looking to retire for some time, and we were finally able to fill his position in early June. See a little later in this newsletter for a farewell article from Prof. Rafiq. Kevin Rittie, who taught the Network Security and Cloud Security classes in 2022 and 2023, will be taking over for Prof. Rafiq. Before coming to the Mount, Prof. Rittie worked in industry for over 30 years defining innovative systems and solutions in software and cybersecurity.

In October, Prof. Scott Weiss, Dr. Ruth Lamprecht, and Dr. Nadun Kulasekera Mudiyanselage took students to the CCSC-E Conference in Washington, DC. There the team of Graham Preston, Ethan Knarr, and Jack Hohl won the student programming competition. Christina Haspert, Connor Levinson, and Zoe Quigley also participated in the competition. Based on their experience, the students decided to form the Mount Programming Club, which met monthly throughout the year. In the spring, Dr. Lamprecht took students to a programming competition at Frostburg University. Graham, Ethan, and Jack won again in commanding fashion. The team of Joseph DuPonte, Finn O'Leary, and Derek Rivera won the award for most persistent team. Graham and Finn each won an award for most helpful teammate in their respective rooms.

In the Cyber program, we've had several students obtain their (ISC)2 Certified in Cybersecurity certification, as well as two students successfully obtain their CompTIA Security+ certification. We had students participate in both the NCL individual and team competitions for the first time. We also had a student (Claudiane Boussougou) attend the Women in CYberSecurity (WiCys) conference in Tennessee under a scholarship as well as had several students attend the Washington Center for Internships and Academic Seminars Cybersecurity Accelerator 2024. We also had guest speakers in Dr. Leary's classes, including the former Secretary of Virginia, Karen Jackson, who spoke on critical infrastructure and two personnel from Spectrum who spoke on threat intelligence.

Inductees into Upsilon Pi Epsilon: Derek Rivera, Joseph DaPonte, Grace Frizzell, Avery Lamprecht, Camron Wiles, Faith Scarpati, Connor Levinson, Garrett Buck, Tyler Crabb

Dr. Daniel Salinas Duron, in collaboration with the Frederick National Laboratory for Cancer Research, is running a summer fellowship again this year. The four students working on it are Garrett Buck, Omar Calderon, Seth Garbanzos, and Mahlaki Henry. They are building an AI/ML platform capable of proposing promising drug discovery experiments that can be run in a college wet lab.

Dr. Salinas Duron with fellowship students Garrett Buck, Seth Garbanzos, Omar Calderon, and Mahlaki Henry.

As always, the department invited speakers to campus. In the fall, Matthew McCurdy, of Ohio Wesleyan University and brother of new data science professor Jon McCurdy, gave a talk *Unraveling Epidemics: Insights into Epidemiological Modeling.* Nate Shank from Gettysburg College gave an interactive talk, *The Bean Game: How to Always Win!.* In the Spring, the AWM lecture was given by Johnna Goble of Shippensburg University. Her talk was *Using Mathematical Models to Explore Questions in Biology.* Also in the spring, Anthony Weaver, class of 1998, now with Franklin & Marshall College, spoke on *Embracing a Liberal Arts Education.*

Left: *Programming contest winners Ethan Knarr, Graham Preston, Jack Hohl.* Right: *Inductees into Pi Mu Epsilon: Natalie Wujick, Olivia Smeltzer, Lincoln Queale, Josh Braxton, Thomas Passaro, Michael Cunningham.*

At the academic awards ceremony in the spring, there are now awards for all of the majors in the department. The Richard J. McCullough Memorial Prize for excellence in mathematics went to Liliana Vargas. The other four awards are given to the student(s) with the highest

grade point average in the various subjects. In math, the McGraw Memorial Prize was shared by Hannah Bonson, Matthew Norris, and Olivia Smeltzer. The Dean's Award for Excellence in Data Science was shared by Graham Preston and Shaheer Syed. The Mariam Award for Excellence in Computer Science was shared by Grace Frizzell, Christina Haspert, John Hohl, Connor Levinson, and Graham Preston. The Pittman Award for Excellence in Cybersecurity was shared by Xavier Lipscomb and Graham Preston.

There are SPARC awards for best poster and best lightning talk in the department. Hannah Bonson and Liliana Vargas won for their poster, *An Application of Stokes Flow within the Navier-Stokes Equations and the Rising Sea Level*, while Graham Preston won for his lightning talk, *Pixel3D: A Custom 3D-Rendering Pipeline for Pixel Art*.

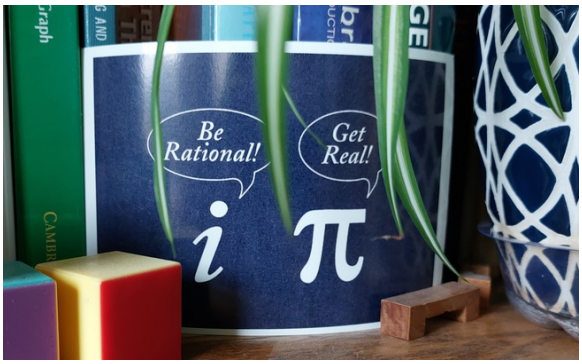
Students in the department won many other awards at the ceremony. Both Hannah Bonson and Olivia Smeltzer won the Bishop Allen Memorial Prize for the highest scholastic average throughout the four years of the University. Lexi Eastman won the Patrick Goles Award presented to a junior who exemplifies the Mount's four pillars of Faith, Discovery, Leadership and Community in his/her work on campus. The Lancer Award for outstanding performance and exemplary leadership in the Mount St. Mary's University U.S. Army ROTC program was given to Chloe Wilson. The Sister M. Basil O.S.F., Memorial prize for a student of the senior class who represents in an extraordinary way the Catholic ideals of the University was given to Hannah Bonson. The Professor Robert J. M. Henke Memorial Prize for distinguished study of the French language went to Rachel Perine. Gerald Dukuly was given the J. Daniel Larsen Memorial Prize for distinguished study of the French and/or Latin languages. The Joanne Vignali Cushman Memorial Prize for the student who consistently demonstrates those qualities essential to dedication in the field of education was given to Matthew Norris.

Dick Borst

By Brian Heinold

On November 12, 2023, former Math & CS professor Dick Borst passed away at the age of 94. Prof. Borst taught at the Mount from 1981 to 1992. His obituary, which he probably wrote himself, is well worth reading. It is at https://www.gettysburgtimes.com/obituaries/article_fd3912bc-3af8-596e-936e-5e89594ca035.html

Dick retired 14 years before I got to the Mount, but I got to meet him and his wife Lee on several occasions. I had heard many wild stories about him (see Bill O'Toole's article below for some of the stories that are safe to put in print). Into his 80s and 90s, he maintained his wry sense of humor. Below is a printout he gave me that sits on the bookshelf in my office.



I asked retired Psychology professor Bob Keefer for some memories of Dick. The first thing

he said is to be sure to mention Charlie Russquaw. I had to ask about that. Bob says this "was an alias that Dick made up, using it to (for one example) send humorous letters to the editor of the Gettysburg Times. He even had it added to the phone book (you remember those, right?) in case someone checked to see if it was a real person." Here is the rest of what Bob sent:

> I have many memories of Dick, all of them fond. I remember the time I made him laugh the hardest. Dick was not one to take himself too seriously. Once we were having lunch at Pizza Hut in Emmitsburg, and our waitress said something about how we got there so fast, and that we must have good legs. I said, "Well, you're half right," and I thought Dick would fall off his chair laughing.
>
> Dick wanted to make sure the then "computer lab" was open 24/7 for students (this was a room with eight terminals for the Prime minicomputer we had at the time). Security kept locking the room at night, so Dick filled the lock with glue! He got yelled at, the lock was replaced, but they never locked it again!
>
> Dick was also part of the "underground" resistance of the dictates of then President Wickenheiser. I have a folder labeled "The Troubles" with many of the anonymous 'flyers' that would appear in the Faculty Dining Room (known as the Tudor Room) poking fun at said president and other administration officials. Some are *very* funny, but I'm guessing that they're less funny if you weren't there...

Remembering Dick Borst

By Bill O'Toole

Richard (Dick) Borst (1929-2023) was a full-time administrator and part-time faculty member at the Mount from 1981 to 1992. He was director of the Academic Computer Center from its inception in 1981 until it was combined with the Administrative Computer Center in 1992. Dick was hired to help select and run the first large-scale computer for use by faculty and students in 1981. As such, he chaired the Academic Computer Committee for several years. The committee sent RFPs (Requests for Proposals) to several major manufacturers of systems that they deemed suitable for MSM's purposes. Some three or four of those companies came to campus and made presentations to the committee. In the end, a superminicomputer, model 570, was selected and purchased in 1982 from PR1ME Computer in Natick, Massachusetts. After a few years, it was replaced by a more powerful system, a PR1ME 9750.

Dick set about training faculty and a few computer-savvy students on the use of the PR1ME. He also taught a computer course every semester. His sense of humor was ever-present. At

one meeting of the ACC, he arrived about 15 minutes late to lead the meeting. He apologized to the group. Saying, "I'm sorry, but my meetings are scheduled by computer!" So much for being an advocate. Dick was extremely intelligent and quick-witted. Before arriving at MSM, he had written a suite of programs (in FORTRAN, of course) to perform automatic scheduling of teachers, students, classes, and classrooms. The package was called SKED and was considered by those in the know as THE best such program on the market. He sold it to several school systems, most notably the U.S. Coast Guard Academy in Connecticut, where it was used for many years.

Dick contracted polio as a toddler, resulting in a withered leg and foot, and one leg shorter than the other. As a result, he walked with a pronounced limp and had hip and knee problems all his life. Before he and his family moved to Fairfield PA, while still living in Alfred NY, he and wife Lee attended a holiday party with one of the organizations they belonged to. It was held at a local restaurant. When they arrived, all the group were told to wait just inside the door until their private room in the back was ready. The hostess came and announced, "Okay, your tables are ready. Walk this way, please." Dick told his fellow partygoers, "Walk this way please!" and they all marched through the restaurant imitating Dick's limp. Several diners were overheard saying, "Look. It must be a convention of them!"

He was in the habit of buying two pairs of shoes of different sizes at a time, and discarding one of each size that wouldn't fit his different-sized feet. One time he shopped for shoes at a Nordstrom's in a DC suburb. When he was fitted, he went to pay for both pairs and was told by the salesclerk, "Oh no, sir. You just pay for ONE pair. We will restock the shoes that don't fit you." Dick was so impressed. He told the clerk, "You have a customer for life!"

Dick was not a Catholic and wondered early on if that would be a problem at MSM. When colleagues asked about his religion, he was fond of saying, "I'm an Episcopalian. That's Catholic-Lite!" Once, when he pulled one of his frequent practical jokes, the "victim" proclaimed, "Dick, you're incorrigible!" His response? "No, I'm Episcopalian!" One afternoon he worked on the computer later than usual and decided to stop at the Carriage House Inn in Emmitsburg on the way home to pick up carryout. As he entered, he was spotted by three priests from MSM sitting at a table in the corner. Monsignor Vince Molloy and Fathers Jim Forker and "Sully" Sullivan called out to him, "Hey Borst, there's a seat here at our table for you!" As he hobbled toward their table, he announced to the diners and waitstaff, "It takes THREE priests to hear my confession!"

This writer shared an office with Dick for several years. It was obvious that he was well-loved and respected by many faculty and students. He and I attended seven national computer conferences and several local and regional meetings of PR1ME Computer users. He had close friends who looked forward to socializing with him at these meetings year after year. But some campus relations were not cordial. Dick did not suffer fools gladly, and some of those fools were high up in the MSM administration. We ran a "terminal room" near our office on the first floor of the Science Building; it had 22 terminals hooked up directly to the PR1ME. It was used by primarily students and some faculty, and we wanted it to be open 24/7. When certain administrators disagreed with that policy, Dick pointed out that there would be no vandalism or abuse because of "peer pressure" – the students would police the room because they valued the access. This was before the personal computer became ubiquitous.

Campus Security was issued a memo: NEVER lock the terminal room. It took them a while to break their habit of locking the room every night. (Dick said the mission of the Mount was to "lock and block". This did not endear him to the administration.) Dick (and I) got tired of making the several mile trip to campus every time somebody called saying the room was locked again. Every time a new security guard was hired, we found the room locked again when they made their evening rounds. Dick finally had enough of this stupidity. He poured Super Glue in the lock! Problem solved! Well, for a few days anyway,

until they replaced the lock. The administrators (widely despised by faculty anyway) would have gladly found a replacement for Dick because of this incident and others brought on by their stubbornness and stupidity. That they kept him on was probably due to his value as a computer professional and his popularity among faculty and students. The struggle between the administration and the faculty came to a head when the Board replaced the top officers on campus at about the same time as Dick's retirement.

In 1974 this writer befriended the court-declared inventor of the digital computer, Dr. John Vincent (J.V.) Atanasoff who had retired in the 1960s and lived outside Frederick. J.V. began an association with MSM that lasted from 1974 until his death in 1995. In 1992, MSM awarded J.V. an honorary doctorate. Of course, I introduced Dick to J.V. and they became close friends. More than once, Dick and I were sitting in our office, the phone would ring, and Dick spoke to J.V. for a minute or two. Dick hung up the phone and said to me, "That was the inventor of the computer. He would like for us to go to his house and fix a problem he is having with his personal computer." We never submitted a bill, of course; we loved socializing with J.V. and his wife Alice. Dick and I were invited by J.V. to many events, including when he was given an award at the Iowa State University in Ames (where he had built the world's first digital computer between 1937 and 1942) and we attended as his guests.

Dick and Lee were avid lovers of all kinds of cats, large and small. Over the years, they were "owned by" more than a dozen housecats, according to Dick's obituary. My life was certainly enriched by my close association with Dick. Many days, as I left the office for home, my sides would be hurting from laughter at Dick's jokes and antics. MSM is certainly a much better and richer campus because of his work there. Dick and Lee had two sons, Eric and Karl. I asked Karl for his thoughts on his life with his dad. Below I include what he sent me.

Bill O'Toole
Professor Emeritus of Mathematics and Computer Science (1966-2007)

Richard (Dick) Borst was born in Elmira NY in 1929. He graduated from Horseheads HS in 1947 where he was the school photographer. He worked as a freelance photographer in Rochester and met his wife, Lee while she was attending Arnot

School of Nursing and they married in 1955. Dick worked in the darkrooms of Eastman Kodak while going to RIT to learn about Photo Technology. In 1961 he went to U of R and earned a Bachelor's degree in Math. He then worked at Bausch & Lomb on early computer programs for lens design.

In 1963 he took a shot and applied to Alfred University to help the College of Ceramics set up their first computer. As a result, AU was one of the first in the nation to offer a Computer Science program. Dick always wanted students to have access, so he taught math and programming classes in addition to maintaining the system. Dick earned his Master's in Math at AU before moving to PA in 1981 to help Mount Saint Mary's University set up a Pr1me computer system. He also taught classes there until semi-retiring in 1992.

Dick had many interests, including Barbershop Quartets, handgun reloading, and at 45 he taught himself to swim. He was a Deputy Sheriff in NY for 20 years and an NRA Firearms Instructor who qualified the NY State Troopers on the range each year. Dick had the highest range score. You could say he was a good shot.

While Dick taught courses as a professor, he never stopped learning. While at MSM, he taught himself Pascal (in 2 weeks) although his favorite language was always Fortran. He took classes for poetry and Arabic in his 70s. He also was a student of bourbon varieties. He has been heard to say, "Bourbon may not be the solution, but it's worth a shot." His sense of humor will certainly be missed.

Karl Borst

Connor Levinson, Ethan Knarr, Graham Preston, Zoe Quigley, Christina Haspert, and Jack Hohl at the CCSC-E conference.

The Mount Table: Tackling Student Hunger *By Athar Rafiq*

Students today face numerous challenges, with food insecurity being one of the most pressing. From kindergarten to graduate school, hunger impacts students nationwide. At the Mount, some students lack both shelter and food and are hindered by transportation difficulties. High tuition and textbook costs often force them to skip meals.

As faculty, we see these struggles firsthand and discussing food shortages in my classes revealed that many students are also willing to donate! Last semester, one student unaware of the Mount Table, wanted to donate groceries on behalf of her grandmother.

The Mount Table provides a variety of dry goods, but students also need milk, eggs, and other perishable products. Some students feel embarrassed using the Mount Table due to

the stigma of carrying groceries out of the office. Future solutions could include Amazon-style lockers with standard supplies, allowing students to leave any unneeded items for repackaging. Locker combinations would be shared only with registered students.

We as faculty members get to know our students well and therefore we can advocate on behalf of the Mount Table as well as encourage its utilization.

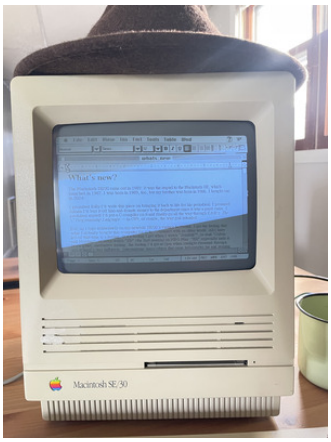
After a wonderful seven years, I will miss the students, especially those on the spectrum, as I connected with them deeply, being on the spectrum myself. Those of us out on the far end of the third sigma are often the change agents needed to address pressing issues.

Dr. Hook, Dr. Lamprecht, Dr. Gerhart, Dr. Butler, Dr. Leary, Dr. Nadun, Dr. McCurdy.

What's New?

By Daniel Salinas Duron

The Macintosh SE/30 came out in 1989. It was the sequel to the Macintosh SE, which launched in 1987. I was born in 1989, too, but my brother was born in 1986. I bought one in 2024.



I promised Billy I'd write this piece on bringing it back to life for his periodical. I promised Adnan I'd buy it off him and donate money to the department since it was a good cause. I promised myself I'd put a C compiler on it and finally go all the way through K&R's *The C Programming Language* – in C89, of course, the way god intended.

But, as I type deliberately on my new/old SE/30's vintage keyboard, I get the feeling that what I actually bought this computer for is to . . . connect with an older world. All I have left of that time is a feeling. It's a feeling I get when I watch "Seinfeld"[1], or read "Calvin and Hobbes", or even watch "ER" (the first season) on HBO Max. "ER" especially nails it. It's a quiet, meditative feeling, the feeling I'd get at 2 pm when sunlight streamed through my school's tiny hallways. Internalizing many others that came before/after me and sensing my nook in a multitude. Sensing that I am loved by those in my fragment and looked back upon fondly as a pixel.

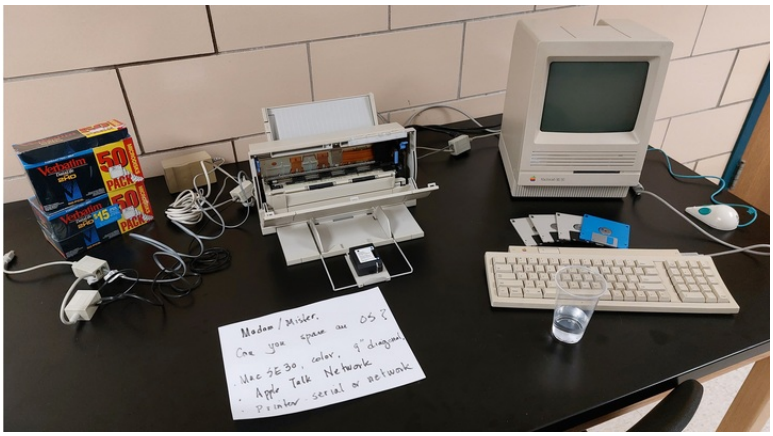
I continue writing this document, noting things about the SE/30. The compact screen is about eight inches long and monochrome – just black and white, you get gray by crosshatching. There is a 3.5" floppy disk drive on the front, opposite Apple's classic rainbow logo. This disk drive has been essential to the restoration. At first, large swaths of the hard drive

[1] A compact Macintosh (either SE or SE/30) makes a cameo in "Seinfeld" as Jerry's computer.

were no longer legible. A paper next to the computer said, in Adnan's genteel voice, "Excuse me sir or madam, could you spare an operating system?" I downloaded System 7.1, bought an external floppy read/writer from Corn, hooked it up to my M1 MacBook Air's USBC port with a USB3.0 to USBC adapter, and used diskutil to unmount the inserted floppy and dd to copy the OS at a bitrate of 512 bits/second from my laptop to the blank disks that came generously with my purchase.

It did/didn't work. The computer booted from the System 7.1 floppy disks but hung halfway through, triggering a second, miraculous reboot from the section of System 7.5 that was now legible from the hard drive. The first couple days of convalescence clicking anywhere would be a minefield, as we stumbled onto new/old regions of the hard drive. Turning it off for more than 24 hours meant it the whole process had to be restarted, right down to booting/not-booting from the floppies. I blamed the capacitors. Then I left for a week, a vacation to my old state. When I came back, I turned it on. All good. It was back, but now the hard drive was not empty anymore. Old drawings, historic programs (ClarisWorks 4.0), teenage poetry. (I assume, I didn't read it.)

"Ah yes, Yasmin is my daughter", Adnan said. "Feel free to delete her old files."



OK, but . . . when I delete the old files, aren't I just going to use the space to install old programs? Honestly, it's getting hard to remember what life was like even as late as the early 2000s. It's not that I don't have childhood memories; I just feel alienated from a time with no smartphones, social media, or 24/7 internet access.

What did I do? How did I think?

In his *Retablos*, Octavio Solis contends that "Memory is its own muse. Every time we recall a specific moment in our past, we remember it differently; [. . .] we turn it into a story or fable, something that will draw a straighter line between the person we were then and who we are now." Are there times we can no longer draw that line? I boot up MS Word on a computer that hasn't been used for writing since . . . . No other application can run in the background. I push firmly on the yellowed keys, and I listen as every stroke makes a sound. I begin to recognize the spacebar and the backspace sounds. Spacebar is thuddy and metallic, backspace is lighter, more wooden, like a marimba. After I while I notice that it's – calming?

This document was lovingly written on a Macintosh SE/30.

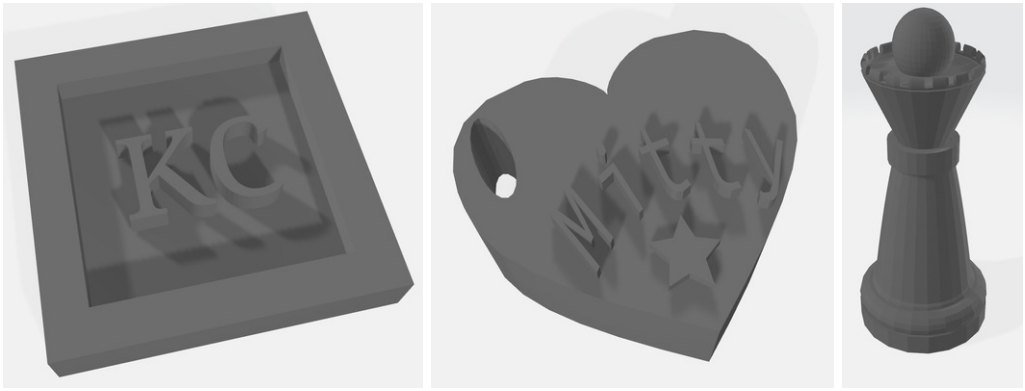
Left: *Finn O'Leary and Prof. Weiss.* Right: *Dr. Gerhart and Emily Streett.*

3D Printer

By Matt Gerhart

This year we had a couple of seminars in Coad Hubs to introduce 3D modelling and printing using our department's new 3D printer. The seminars were very successful and it was very fun watching students show off their creativity and their quick ability to work with new modelling software.

After talking with a few students, we decided on a theme where they were tasked with creating and personalizing a small trinket. For nearly all students, this was the first time using 3D modeling software. Some students created objects from scratch while others started with a premade design and then modified it. The images with "KC" and "Mitty" were from the first seminar.



During the second session we decided to create game pieces. In addition to just having fun with the modeling, we use took care to use accurate measurements. The chess piece shown here was modeled after taking measurements from real pieces that we had in an office.

Scenes from the SPARC Festival. Left: *Liliana Vargas.* Right: *Hannah Bonson and Dr. Hook.*

Math & CS at the SPARC Festival

By Brian Heinold

SPARC, as always, was a busy time for students in the department. Hannah Bonson and Liliana Vargas presented their honors project *The Rise of Mathematics within Rising Sea Levels*, advised by Dr. Melanie Butler. CS seniors presented their senior projects, mentored by Prof. Weiss and Dr. Lamprecht. Below is a list of all the presentations.

Chase Kimball	*Senior Project 2D Platformer*
Conner Cutolo	*Mount Table Mobile App*
Mia Foster	*Michelle's Fashion*
Madison Karcesky	*Streamlining Organizational Evaluations: Automated Summary Report Generation*
Fattah Animashaun	*An application to build rental websites and manage bookings*
Soorya Rajendran	*Response time data collection in Psychology experiments*
Trinity Sandacz	*The College Marketplace: A Market for all College Necessities*
Kyle Madison	*From Frames to Angles: The Birth of a Worm Tracking Software*
Mykhaela Dyer	*Biostatistics Learning Hub: Self-Paced R Programming Lessons for Students*
Tyler Crabb	*Empowering Fintech with Rust*
Cameron Cooke	*Mailroom Inventory Management*
Christina Haspert	*Pickleball Peers*
John Hohl	*Esports Analytics Web Application*
Bennett Smith	*Senior Project: The Mount Echo's New Website*
Zoe Quigley	*Music Sharing App*
Sadia Alimi	*Bootcamp.af (free e-learning platform)*
Derek Rivera	*Twin Oaks Tech Company Website*
James McInerney	*Senior Project: Pep Band Database*
Connor Levinson	*Muscle Length-Tension Curve Web Application*
Ethan Knarr	*An Imposter Among Us*
Esha Patel	*ITSC Pickup and Return*
Takesa Gambrell	*Website for the peer mentor program*
Gerald Dukuly	*Navigating the 2D Odyssey: Crafting a Platformer Adventure*
Sasha Shandrenko	*Mental Health App*
Madison Prudnick	*PAC Portal: Connecting Communities Through Information*
Grace Frizzell	*Frequency-filterable hearing aid*
Graham Preston	*Pixel3D: A Custom 3D-Rendering Pipeline for Pixel Art*
Myron Solorzano	*Appvertisement: A Social Media Advertisement App*

Below are the poster presentations given by students in Dr. Butler's Math Seminar class.

Emmanuel Oladapo	*Abacus in early childhood development*
Allison Guzman	*The Connection between an Agricultural Engineer's Work and Math*
Ian Schwing, Josh Braxton, Thomas Passaro	*The 21 Bot*
Matthew Norris, Ryan Laur	*Graph Theory Applications to Sport Drafts and Scheduling*
Olivia Smeltzer	*Wealth in the Northeast: A Geographic Expansion to California and Iowa*
Lincoln Queale, Anthony Zaccaria	*Applications of Rainbow Connected Graphs*
Sarah Purdy	*The math behind water*
Alexandra Eastman, Carly Hinkhaus	*Applied Mathematics in Cryptography*
Hannah Bonson, Liliana Vargas	*An Application of Stokes Flow within the Navier-Stokes Equations and the Rising Sea Level*
Devin Chavez, Dola Adebayo, Emmanuel Oladapo	*Probability in Sports Betting*
Graham Preston	*Type Theory and Algebraic Data Types*

Also at SPARC, Cybersecurity senior Jacob Moquete presented a lightning talk, *Biometric Authentication Systems in The World of Cybersecurity.*

Left: *Graham Preston, Finn O'Leary, Joseph DaPonte, Derek Rivera, Jack Hohl, and Ethan Knarr at a programming competition.* Right: *Dr. Heinold with Career Panel speakers Esha Patel and Trinity Sandacz. In the back are Summer Nelson, Faith Scarpati, and Meshari Alanazi.*

Coad Hubs

By Ruth Lamprecht

The department Coad Hubs was reorganized this year to be a collaborative experience involving all four of our majors. There were 14 meetings that covered programming, capture the flag, logic puzzles, team puzzles, 3D printing, cryptography, games, Arduinos, computer vision, math fun, and debugging. Many of the department faculty took a turn leading one or two of the meetings, sharing their expertise and interests with over 200 students. Meeting times varied by time and day to accommodate different faculty schedules, allowing for students to attend meetings around their schedules. It was a fun and exciting variety of meetings that we look forward to continuing.

Women in Computing

By Ruth Lamprecht

The Women in Computing group held seven meetings in the 23-24 academic year, led by Dr. Ruth Lamprecht and Dr. Margaret Leary. We started with a meet and greet (with cupcakes!), then had a career panel with two women working for the Cybersecurity Work-

Dr. Lamprecht, Grace Frizzell, and Summer Nelson.

force of the U.S. FDA, a resume and game night just before finals in December, a resume/career/internship meeting (with specials guest from Maxar and career services), two afternoon fellowships with faculty (both inside and outside the department), and ended with a movie night just before finals in May.

Students helping out at STEAM Night: Liliana Vargas, Olivia Smeltzer, Matthew Norris, Lexi Eastman, Hannah Bonson, Avery Lamprecht, Thomas Passaro, Josh Braxton.

MAA Club Report

By Hannah Bonson

For the second year in a row, the Mathematical Association of America joined up with the Association of Women in Mathematics. We had quite the eventful year including two math circle events in partnership with Mother Seton School, a STEAM night at Monocacy Middle School, along with bingo, times tables competitions, talk series, a panel presentation, and so much more!

At the beginning of the fall semester, the association held a career/internship panel with students from the Math and Computer Science Department with experience in applying and completing internships. The students on the panel were Thomas Passaro (C'24), Graham Preston (C'24), Olivia Smeltzer (C'24), and Hannah Bonson (C'24). Each of these students were able to bring their unique perspectives and experiences as well as offer advice to the underclassmen.

In October, we held a times table competition while tabling in Patriot Hall. Our goal for the event was to spread awareness of the clubs as well as promote a little healthy competition.

We had many participants, but our winner was Annabelle Colton (C'25) with a speedy time of 36.35 seconds.

Our first math circle of the academic year was held in December. We had the privilege of working with a 4th grade class at Mother Seton where we introduced them to graph theory. We talked about paths, cycles, complete graphs, as well as the uses of graphs. We also gave them a hands-on activity to complete after the presentation to better understand what types of graphs we were discussing.

In the spring semester, we held a pizza-pi party on March 14th with math bingo and prizes. We had a good turnout, even some non-math/cs majors joined in. Our bingo cards required some math to solve each space, most of the time it was simple arithmetic, but we were sure to include some tricky questions as well.

We also participated in a new event this spring: STEAM Night at Monocacy Middle School. For this event, we prepared a trifold presentation talking about the mathematics program at the Mount as well as introducing the Fibonacci sequence. We had a hands-on craft for the children to complete as well. Since we were presenting the Fibonacci sequence, the students created Fibonacci flowers out of pipe cleaners and tissue paper. Each color of tissue paper represented a different number in the Fibonacci sequence. For example, a student could create a flower out of one red pedal, one yellow, 2 blue, 3 green, 5 pink, and so on. The students really loved the activity and had a wonderful time.

Finally, we wrapped up the semester with our second math circle at Mother Seton. We did the graph theory lesson again, but this time we worked with 1st graders, so we made it more rudimentary. The students had a fun time making graphs out of pipe cleaners, pom-poms, popsicle sticks, and stickers.

Overall, the MAA and AWM wanted to focus on community service events such as the math circle and STEAM Night along with more outreach events for our clubs. The clubs are looking for more officers to replace our graduating officers. If anyone is interested or would like to know more about the club, please email Dr. Butler or Dr. Hook.

Students running a math circle. Front: *Natalie Wujick, Marianna Quineche, Lexi Eastman, Hannah Bonson.* Back: *Jacob Moquete, Anthony Zaccaria, ?, Thomas Passaro.*

AWM Club Report

By Lexi Eastman

This was a great year for AWM. Alexandra Eastman and Hannah Bonson continued to serve as president and vice president, and we welcomed sophomore Trishelle Leal to serve as treasurer, and senior Olivia Smeltzer to serve as secretary.

We worked closely with MAA (Mathematics Association of America) to plan events like an ice cream social, math bingo, and finals goodie bags. We plan to continue this relationship in future.

This spring, Dr. Johnna Goble, assistant professor of mathematics at Shippensburg University, joined us for a well-attended talk on "Using Mathematical Models to Explore Questions in Biology," where she incorporated mathematical modeling to explore mechanisms involved in the progression of prostate cancer.

We also continued the new tradition of hosting a math circle at Mother Seton School, during which Mount students travelled to the school to teach an interactive lesson on graph theory. While we typically host math circle in the spring, this year we had on in the fall as well. We had a growing group of Mount students attend this event and we hope to continue the tradition.

We will be welcoming Gabrielle Stine as our new president and Natalie Wujick as vice president next year!

Hannah Bonson, Lexi Eastman, AWM speaker Dr. Johnna Goble, Olivia Smeltzer.

ACM Club Report

By Emily Streett

This year, the ACM club continued in fostering a community for students interested in computer science and technology. We kicked off the year with an interest meeting and to get feedback to see what ACM members wanted to get out of the club for the year. With this feedback the club leadership organized a computer science Jeopardy night, which proved to be a fun and interactive way for participants to test and expand their knowledge of the field. The club also hosted a night to improve coding skills in the form of an escape room which proved to be a collaborative experience for members to work on specific challenges. Looking forward to next year, ACM is excited to have alumni come speak for the club to share their experiences in the workforce after graduation. The club also aims to host resume workshops to help encourage members to improve these skills to be able to highlight their qualifications for future employers.

PME members (left to right): Dr. McCurdy, Prof. Weiss, Dr. Nadun, Daquan Briggs, Anthony Zaccaria, Natalie Wujick, Dr. Hook, Nik Santorelli, Olivia Smeltzer, Lincoln Queale, Thomas Passaro, Josh Braxton, Dr. Heinold, Michael Cunningham, Graham Preston, Hannah Bonson, Sophie Allison, Carly Hinkhaus.

PME and UPE Induction

By Brian Heinold

On April 21, the department held its annual Pi Mu Epsilon (PME) and Upsilon Pi Epsilon (UPE) induction ceremonies. Ben Wilson of Stevenson University was the invited speaker. His talk was *Could Shakespeare Solve Today's Wordle?*, about how well it would work to solve current Wordle puzzles using only words from Shakespeare.

The student PME inductees were Joshua Braxton, Michael Cunningham, Thomas Passaro, Madison Prudnick, Lincoln Queale, Olivia Smeltzer, Emily Streett, and Natalie Wujick. Faculty inductees were Nadun Kulasekera Mudiyanselage, and Jon McCurdy.

The student UPE inductees were Garrett Buck, Tyler Crabb, Joseph DaPonte, Rex Flanagan, Grace Frizzell, Gavin Hamrick, Shawn Harriett, John Hemling, Avery Lamprecht, Trishelle Leal, Connor Levinson, Xavier Lipscomb, Riya Mathur, Seth Merson, Austin Mosmiller, Derek Rivera, Faith Scarpati, Bennett Smith, Gabriel Wigington, and Camron Wiles. Alumnus Michael Hawkins of the Class of 2000 was inducted. Faculty inductees were Nadun Kulasekera Mudiyanselage, Margaret Leary, and Jon McCurdy.

UPE members (left to right): Carly Hinkhaus, Anthony Zaccaria, Sam Bell, Zoe Quigley, Derek Rivera, Christina Haspert, Grace Frizzell, Joseph DaPonte, Thomas Passaro, Avery Lamprecht, Dr. Heinold, Camron Wiles, Faith Scarpati, Graham Preston, Garrett Buck, Connor Levinson, Tyler Crabb, Prof. Weiss, Dr. Lamprecht, Dr. Leary, Dr. McCurdy.

Mount Math Madness

By Matt Gerhart

The 2024 edition of the annual Mount Math Madness competition had 66 participants putting their knowledge to the test. Over four weeks they competed with each other earning points by completing weekly questions. At the end of those four weeks, nine students with the most points were placed into a single elimination bracket. Carter Zwirz and Rebecca Valentine quickly rose to the top with Carter claiming the top prize. Thank you to all the participants who played!

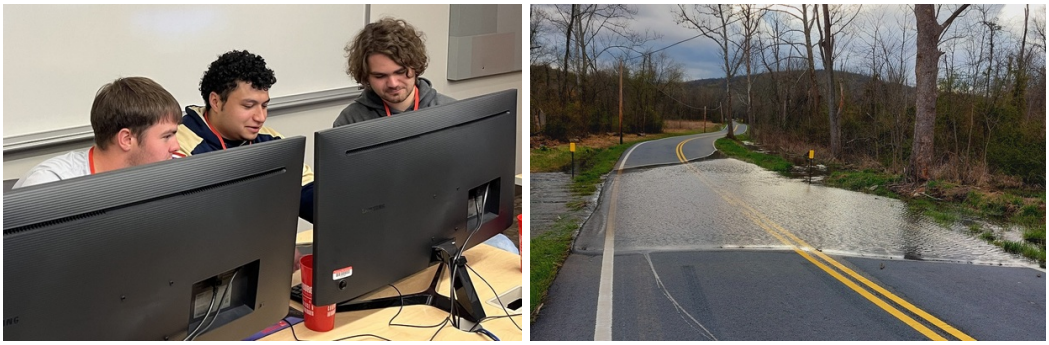
Mount Math Madness overall winner Carter Zwirz and runner-up Rebecca Valentine.

Below are the weekly winners:

Weekly winner #1: Travis Cleveland
Weekly winner #2: Travis Cleveland
Weekly winner #3: Carter Zwirz
Weekly winner #4: Graham Preston

Here are a few sample questions.

1. Rearrange the following numbers and symbols to make a correct statement: 1 1 1 4 5 + =.
2. Consider the numbers 1 to 100 including both 1 and 100. What digit, 0 through 9, appears most frequently?



Left: Programming contest team of Finn O'Leary, Derek Rivera, and Joseph DaPonte. Right: One of the many arduous trials Dr. Heinold has to endure on his way to the Mount every day.

Smalltalk

By Brian Heinold

This was the 16th year of the Smalltalk series. Talks are limited to 30 minutes and are given mostly by students and occasionally by faculty or others. Here is a list of all the talks this year.

Ben Smith	*Empowering Your Apps with Conversational AI: A Guide to OpenAI's ChatGPT API*
Rachel Perine	*Is accelerometer data tracking a remedy for rough roads?*
Jon McCurdy	*Predictive Politics: Forecasting Elections using Statistical Learning*
J.J. McInerney	*The Meta Quest 3*
Graham Preston	*Intro to Uiua: a Modern Approach to Array Programming*
Claudiane Boussougou	*Optimizing Productivity: School-Life Balance Using Tech Tools*
J.J. McInerney	*The Digital Consciousness*
Alyssa Alexander	*Art of Low-Tech Exploits*
Grace Frizzell	*The Evolution of Spiderman Web Swinging Mechanics*
Graham Preston	*Monads: A Powerful Abstraction and Functional Design Pattern*
Gabe Wigington	*Automating Content Creation with Python*
Sasha Shandrenko	*Github Copilot: The Future of Coding*
Grace Frizzell	*Evaluation and Integration of Large Language Models into Summary Building for BLAST Results*
Tyler Crabb	*Oxidize Your Code*
Shaheer Syed	*From Concept to Application: Unleashing Streamlit's Potential in Professional Settings*
Avery Lamprecht	*AI In Customer Service: What's Wrong, and How Do We Fix It?*

Left: Tyler Crabb, J.J. McInerney, Jahlil Owens, Myron Solarzano, Sadia Alimi. Right: *Prof. Weiss, Shawn Harriet, Avery Lamprecht.*

Jack Hohl, Connor Levinson, Cassidi Park, Mahlaki Henry.

An Interview with Dr. McCurdy

By Brian Heinold

Where are you from?

> Memphis, Tennessee.

What did you do when you were a kid?

> A lot of running and a lot of outdoor activities. I was part of Boy Scouts. We did quite a lot of hiking and backpacking.

Still now?

> Yes. I haven't had to chance to backpack hike too much. I am starting running again. There are a lot more hills up here.

How did you get interested in data science?

> I started out in statistics. I did math in undergrad and then I took a stats class. I enjoyed that and decided to go to grad school for stats. Data science was a natural stepping stone for me.

Where did you go to school?

> Undergrad and grad at the University of Memphis. I did spend a year at a liberal arts school in Georgia called Berry College as a freshman.

Which undergraduate classes did you like best?

> Probability classes as well as graph theory I really enjoyed.

Which was the hardest?

> Abstract algebra or Calc II. I think Calc II was only class I got a C in.

What classes did you like in graduate school?

> I enjoyed statistical learning. We had two courses of that. Then we had a couple of classes on visualization techniques. It was enjoyable to communicate a story in our findings.

What didn't you like?

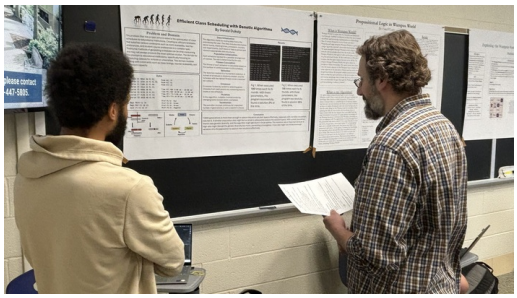
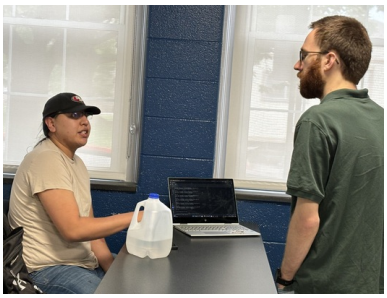
> SAS programming. It was expensive so we couldn't have it on our computers. It wouldn't save properly, so I had to do it all in one sitting. Plus the class was Friday 4-7 pm.

What are your favorite classes to teach?

> I enjoyed both data science courses I taught, 200 and 210. I was impressed with students' final reports in 210. I just gave a general prompt to go into the wild to find a data set and do analysis. I wanted an abstract, background, what they did, and a conclusion. There were some really good reports in there.

What do you like about your subject?

I like how interdisciplinary it is, being able to combine math and CS with some additional topics. With the project I gave, one of the students focused on decriminalization of marijuana and how that has affected crime rates. I have no background on that. He is an Economics and Criminal Justice major, and he was able to bring that in and apply the technical parts to answer a question.

Left: Gerald Dukuly and Dr. Heinold Right: *Myron Solarzano and Dr. McCurdy.*

Who or what has most influenced you in your field?

My first intro to stats was from sabermetrics in baseball. I don't do anything with baseball stats, but that's the thing that roped me in.

What do you research?

My dissertation was in random number generators, on the statistics and probability side of things. For data science, I've been looking at a few problems predicting election results based on demographic data. I want to look at how NCAA tournament experiences affect student enrollment.

Any hobbies?

I enjoy running. When I'm back in Memphis and have access to a garage, I like to do woodworking and furniture restoration. I haven't been able to do that in my apartment. I fixed up a table and set of chairs that I have in my apartment now.

Tell me about your family.

I'm the youngest of three children. My brother got his PhD in math and is teaching at a university in Ohio. My sister has a bachelor's in math and is down in Birmingham working on logistics in cataloging. My dad is a recruiter and my mom is an administrative assistant (both of whom dislike math).

What is a typical day like for you?

I probably wake up around 6 am. If it's not raining or cold I like to go on a run. I normally clock in around 8 in my office. There I am getting ready for classes or trying to reduce grading notifications on Canvas. I normally leave around 4 to go home make dinner and do some reading before bed.

Any future plans?

This summer, I am working with two students on two research projects. One is looking at random numbers to see if prime numbers produce random bits. The other is working to improve the decriminalization of marijuana project to take it further and add new analysis.

2024 Seniors

By Brian Heinold

We have 56 seniors graduating this year. Many of them had two majors in the department.

CS seniors. Front row: *Takesa Gambrell, Esha Patel, Sadia Alimi, Sasha Shandrenko, Madison Karcesky, Zoe Quigley, Grace Frizzell, Mia Foster.* Middle Row: *Derek Rivera, Ben Smith, Kyle Madison, Jack Hohl, Christina Haspert, Madison Prudnick, Mykhaela Dyer, Soorya Rajendran, Trinity Sandacz.* Back row: *Tyler Crabb, J.J. McInerney, Myron Solarzano, Connor Levinson, Cameron Cooke, Graham Preston, Ethan Knarr, Gerald Dukuly, Fattah Animashaun, Connor Cutolo.*

Math seniors. Front row: *Carly Hinkhaus, Sarah Purdy, Hannah Bonson, Liliana Vargas, Olivia Smeltzer, Allison Guzman.* Back row: *Ryan Laur, Matthew Norris, Graham Preston, Josh Braxton, Thomas Passaro.*

Data Science seniors. Front row: *Liliana Vargas, Katherine Stern, Madison Prudnick, Mykhaela Dyer.* Back row: *Jack Hohl, Laurian Kimolo, Graham Preston, Shaheer Syed.*

Cybersecurity seniors. Front row: *Eric Delaplaine, Zoe Quigley, Esha Patel, Michelle Zelaya.* Middle row: *Nana Owusu-Ansah, Soorya Rajendran, Cameron Cooke, Chloe Wilson, Trinity Sandacz, Claudianne Boussougou.* Back rows*: Ethan Miller, Luke Hahn, Connor Cutolo, Adeayo Gbadehan, Graham Preston, John Tarawali, Jacob Moquete, Sam Bell, Xavier Lipscomb, Kameka President.*

Here are all the graduates, broken down by major or double-major.

Computer Science: Sadia Alimi, Fattah Animashaun, Tyler Crabb, Gerald Dukuly, Mia Foster, Grace Frizzell, Takesa Gambrell, Christina Haspert, Chase Kimball, Connor Levinson, Kyle Madison, James McInerney, Derek Rivera, Alexandra Shandrenko, Bennett Smith, Myron Solorzano.

Cybersecurity: Samuel Bell, Claudiane Boussougou, Eric Delaplaine, Adeayo Gbadehan, Luke Hahn, Xavier Lipscomb, Sigrid Mendoza-Fernandez, Ethan Miller, Jacob Moquete, Austin Mosmiller, Evan Mosmiller, Nana Owusu-Ansah, Kameka President, John Tarawali, Chloe Wilson, Michelle Zelaya.

Mathematics: Hannah Bonson, Joshua Braxton, Allison Guzman, Carly Hinkhaus, Ryan Laur, Matthew Norris, Thomas Passaro, Sarah Purdy, Olivia Smeltzer

Data Science Katherine Stern, Shaheer Syed.

Computer Science and Cybersecurity: Cameron Cooke, Conner Cutolo, Madison Karcesky, Ethan Knarr, Esha Patel, Zoe Quigley, Soorya Rajendran, Trinity Sandacz.

Computer Science and Data Science: Mykhaela Dyer, John Hohl, Madison Prudnick.

Mathematics and Data Science: Liliana Vargas.

Computer Science, Cybersecurity, Data Science, and Mathematics: Graham Preston (who also majored in French).

We asked the graduates for a little about their plans after graduation. Here's what some of them told us.

Fattah Animashaun: "I plan to spend the first couple of weeks relaxing and catching up with friends and building a new PC while also applying to jobs and getting more practice with C++ as a language. This is because I hope to work in game development at some point and even if I don't get to do that C++ is just a very versatile language."

Josh Braxton: "I am currently enrolled at the school in the MBA program and will be serving as the SNSM grad assistant. I am also submitting applications to PhD programs for Cosmology, Astrophysics, or Optics."

Hannah Bonson: "Upon graduation, I will begin working as a credit analyst at Horizon Farm Credit. I also will be working on my family's farm and assisting my mother with her sewing business."

Cameron Cooke: "After graduation, I'm going to Spain for a month to study Spanish. Then I'll be a camp counselor for the remainder of the summer. Then I'll start my full-time job at Capgemini Government Solutions as a technical consultant in the fall."

Tyler Crabb: "I plan to continue working on my senior project and build it into my own fintech business to help advisors and investors throughout the US. I'm also eyeing up some other cybersecurity opportunities that have been made available to me, and I plan to get several certifications (especially the OSCP) in the coming months."

Chase Kimball: "After graduating I plan to get certified in C# and Unity as I work towards getting a job in game development."

Ryan Laur: "After graduation, I plan to receive my secondary education teaching certification in Maryland. I plan to teach math back home in the Calvert County Public Schools system."

Sigrid Mendoza-Fernandez: "After graduation, I plan to work full-time and am currently in the recruitment process for a chief security officer position at the US Department of Housing. Additionally, I intend to take my Security+ certification and pursue my master's

degree in cybersecurity from Hood College. Throughout college, I ran a lash extension business and am currently a certified lash technician. My next steps include becoming a licensed lash technician later down the line."

Matthew Norris: "After graduation, I plan to teach secondary math at the high school level."

Nana Owusu-Ansah: "After graduation I will be working full time at Evapco as a cybersecurity analyst. I also plan to do more certifications such as Comptia CySA+ and ISC2 SSCP. I do plan on doing my masters sometime time soon."

Thomas Passaro: "After graduation I will be joining FOCUS (Fellowship Of Catholic University Students). I will be assigned to another college campus and will be with them for the next few years."

Kameka President: "After graduation, I will be moving to Kansas in search of job opportunities in cybersecurity/computer science. I know this will not be easy as an international student, but I'm trying, and will continue to try, my best!"

Graham Preston: "After graduation, I will be working as a software engineer for Jataware, a contractor primarily dealing with research and development for new governmental projects."

Sarah Purdy: "I plan on completing my master's in material science and engineering at the University of Virginia. At UVA I will be on a research team led by Dr. Opila where I will be working with materials for use in extreme environments such as the materials used in aircraft engines and rocket engines."

Soorya Rajendran: "After graduation, I am actively seeking opportunities in the computer science and cybersecurity field, alongside taking CC and Security+ certifications."

Trinity Sandacz: "After graduation, I will start working at Kearney & Company as an IT audit associate under the DoD."

Sasha Shandrenko: "I will be working for Kearney & Company as an IT associate. I am looking forward to the opportunities this role will bring, allowing me to continue learning and growing in my career."

Olivia Smeltzer: "After graduation, I will be working in industry for a gap year before pursuing doctoral programs in applied economics."

Liliana Vargas: "After graduation, I will be attending the College of Charleston to get my master's in data science."