



the Alworth REPORT

ALWORTH MEMORIAL FUND NEWSLETTER

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Eric Lake: Science is a Journey

"If you keep tunnel vision on one particular goal, you'll miss other opportunities," says Alworth Scholar and Pharmacologist Eric Lake.

"My journey in science over the past 16 years has been more exciting than the trajectory I could have planned."



Eric had an innate curiosity while growing up on a dairy farm in McGregor, Minnesota. "I would take things apart to see how they worked. My dad would get mad because I didn't always know how to put them back together."

In high school he liked science, but his small school lacked the resources to really let him explore what science truly was. He was encouraged to become a physician. An Alworth Scholarship helped him pursue his curiosity for science, and he majored in biochemistry at The College of St. Scholastica. Just before taking the MCAT, he experienced what he calls a 'graduation crisis.' "I knew I didn't want to be a doctor. I had been committed to the lie that I would go to medical school. I graduated with a biochem degree and thought, what do I do with this?"

He spent the next four years working different jobs. His first job was testing urine samples for drugs. "We had a big panel we would test for. I'd see this list of drugs that would come back. I was very interested in how drugs work. I grew up in a house where my dad had bipolar disorder. There were always bottles around the house. I was always reading those labels."

That early and ongoing curiosity about drugs, plus a desire to help people, led him to study pharmacology (how drugs work) and earn a PhD at the University of Minnesota. His graduate school research in structural biology explored protein kinase activation dynamics using fluorescence.

He completed a post-doc at the University of Wisconsin-

Madison, where he led the production and purification of proteins and antibodies derived from the immune system of sharks, a unique and promising source of nanobody scaffolds. A 2021 article in Nature reported how shark derived antibodies could be used to target COVID.

"It's just another demonstration of how unexpected things happened on my journey. I never thought I'd work with live sharks."

After his post-doc, Eric went on to his current position at Illumina in Madison, where he is involved in developing enzymes involved in genomic sequencing. Improvements in sequencing can help to detect of cancer and create targeted treatments. Instead of developing drugs, he's part of a mission to develop gene-sequencing tools to better understand the human genome and identify a specific person's needs, which might enable drugs to work more effectively for that particular person.

Though he did not set out to develop gene-sequencing tools, his work supports his personal mission to serve people and improve healthcare through pharmacology. "The reason I went into pharmacology was to help develop ways to better categorize each drug and develop drugs tailored to a specific person." Rather than developing the drugs, he's part of a team to measure the personal genetics that will open doors to better, more personalized medicine.

The end goal is still there, he says, but the road to achieve it has changed.

It's one more example of how science has been a journey of pursuing his natural curiosity. "Science is not one result or destination," says Eric. "The journey enables a lot of things." ■

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Applications are accepted from November 1 to January 15.

Recipients receive \$24,000 distributed over eight semesters providing they maintain our eligibility requirements in a STEM field of study.

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Dream it. Achieve it.



Avery Mulholland 'I Heart Infrastructure'

Avery Mulholland is genuinely in love with infrastructure. At Brainerd High School, Avery had a passionate female engineering teacher for Introduction to Engineering. This class awakened Avery to the many career avenues open to students of engineering. This same teacher wrote letters of recommendation when Avery applied for a summer job with the City of Baxter. She landed that job, made great connections in her career area, and was able to observe field inspections on projects involving city planners and engineers.



Now a Civil Engineering student at the University of St. Thomas, she continues to work and grow at Widseth, a full-service architecture, engineering, environmental, and surveying firm located in the Brainerd/Baxter area. She works remotely during the school year, and in-person on location during summer breaks. Avery shared that something she really loves in her work is engaging with community members to gather information and help write grants to fund civic projects. As part of her work at Widseth, she wrote a report on public street projects in

the City of Baxter. When that report was submitted, she attended the public hearing to review it, and was thrilled to hear the community perspective and see how engineers responded to the community's feedback.

Engineering is generally a field dominated by men, and Avery noticed even back in high school that she was one of only three women in her engineering class. Even now, she says there is only one other woman in her department at work. She talked about

attending meetings at job sites with construction workers, and said it has been a really great experience and that everyone is "getting used to it." When asked about her dream job, Avery did not hesitate to say she would love to be a City Planner or Public Works Director, which seemed to fit her perfectly. It's wonderful to think that the next generation of civil engineers is as committed to excellence as Avery.

While she is shaking up the world of engineering, she still enjoys the slower pace of small-town life. She loves hiking and camping and trips to the north shore of Lake Superior. ■

Tobey Haluptzok The Clown Started It...



Parental Advisory: Apparently, a simple toy purchase for your toddler can lead to an extremely promising future in math and physics.

It appears that when Tobey was but a toddler, his parents purchased a toy which prompted the user to answer simple math problems. Upon correctly answering a certain number of questions, a clown positioned over a cup of water would fall dramatically into said tiny pool. This activity so riveted young Tobey that he played it joyfully and constantly to see the clown fall in the water, and thus, an early love of math was born.

In addition to the clown's influence, Tobey had teachers in junior high and high school who were instrumental in expanding his interest into the science fields. Growing up about 25 miles north of Bemidji, he attended Black Duck High School, where he was introduced to Life Science, Earth Science and Physical Science. Physical Science is essentially an introduction to Physics, and these classes were so well-taught, that Tobey was already ahead of the curve when he decided to attend the University of Minnesota - Twin Cities. He sailed through Chemistry 1 and 2, as well as the Intro to Physics class.

Tobey received the Alworth Scholarship for all of his undergraduate studies from 2016-2020. He credits the

Alworth for allowing him to be a tutor during those years, instead of having to have an outside job schedule that limited his academic efforts.

While at the university, he worked in the BioPhysics lab with a professor who was exploring super resolution microscopy - light microscopes - making even microstructures of cells visible. This is where his interest in imaging technologies really soars.

As a student, he had

access to arguably the world's foremost facility for imaging research, The Center for Magnetic Resonance Research (CMRR). Because of this facility, he decided to stay at the University of Minnesota after graduating Summa Cum Laude with a double major in Math and Physics. He is now working at CMRR, developing hardware and tools needed to achieve much higher resolution imaging, for use across medicine and other sciences.

As for his dream job, he is currently doing it. His future could include working for companies that manufacture MRI technology or staying on the academic side to do research and teach. Whatever he chooses, Tobey will be a leader in moving imaging technology into the future and expanding our ability to see ourselves and the world around us. ■



Our conversation with Physics major Bianca Lott covered a great deal of territory. But, before we impart the whole story, let us first answer your most burning question: Yes, when Physics students go to parties, they talk about Physics. We don't blame them. It's fascinating.

So, let us begin at the beginning. In Bianca's case, long before she was a student at East High School who loved math, she was a young girl who loved astronomy and space. She spent endless hours looking skyward. In high school, she realized that her math interest converged with "learning cool things about space" in the field of Physics, and she has never looked back.

Now a sophomore at Carleton College in Northfield, Minnesota, she is actively engaged in research as an undergrad, working on the Laser Interferometer Gravitational-Wave Observatory (LIGO) project, a nationwide collaboration identifying and measuring gravitational waves in space. Bianca was also recently selected to be part of a Carleton Leadership Seminar at the



Johnson Space Center in Houston, Texas.

Bianca's passion for space has not dimmed since childhood, and she said she wants to be part of discovering how the universe works.



Bianca Lott She's Ready for Liftoff

Her enthusiasm rises when she talks about how much there is still to learn, saying there are always new puzzles, even as our knowledge grows.

Earlier this year, she attended the Conference for Undergraduate Women in Physics (CUWIP) at the Missouri University of Science and Technology. The conference features panel discussions and presentations, which included Bianca presenting a poster on gravitational wave data quality.

When we asked Bianca about her dream job, she immediately pointed to NASA, sharing that she would love to be doing research there, studying

relativity and gravity, because there is still so much to be discovered.

In the true spirit of the Alworth Scholarship, Bianca's impressive academics are balanced by other interests. She is a member of the Carleton College Track & Field Team, and enjoys walking and biking in her free time, along with Sci-Fi movie nights with friends.

Since both Bianca and her sister Gabriella are Alworth Scholars, we inquired as to the clearly successful home environment which produced such excellent students of science. Bianca said that her parents were "really good with breathing room" and that she was allowed to learn and grow at her own pace, finding her own interests naturally.

While the transition to college was not easy, she said that the Alworth community gave her an important sense of validation by believing that she was a worthwhile investment.

After our conversation with her, we can say with certainty that the Foundation's investment in Bianca will pay dividends long into the future. ■



Emma Ambrosi

Finding Beauty in the Insect World

Emma Ambrosi grew up in Duluth, and she said it was around 8th grade when she suddenly started actually seeing the things that lived in her own back yard. She became fascinated by flowers and insects, realizing that she didn't even know the common names for the wide variety of living things in her back yard.

She began photographing the flowers and insects that populated her yard, adding her own artistic vision to a growing interest in how they fit into the larger ecosystem. By the time she was a student at East High School, she was captured by her two passions - insects and art.

This led her to create a few calendars featuring her insect photos, to share with family and friends.

It was also during this time that Emma had the opportunity to connect with a Professor at UMD who was supervising the UMD Land Lab. She was able to participate in designing, building and maintaining a working beneficial insect garden while still in high school. She treasures the experience.

Now a Fisheries, Wildlife and Conservation Biology major at the University of Minnesota - Twin Cities, Emma's minor is in Entomology (the study of insects). She works as an Undergraduate Assistant in Media Production at the University's Center for Climate Literacy, creating

illustrations to promote climate literacy and the work of the Center.

She said that she would really love to combine the science of field work and insect data collection with her art, and some day possibly publish her own insect guidebook. Emma speaks passionately about the key role of insects in conservation and how important they are to human life on this planet. She recently created a Beatrix Potter style picture book of insect characters featuring her illustrations.

This past summer of 2024, Emma took an entomology course and prepared for an internship at the St. Paul campus' Heimpel Lab, which studies biological control interactions (crop and landscape pest control) using parasitic species. Specifically, they will be studying the potential for the use of parasitic wasps in controlling the proliferation of invasive stink bugs.

As for the future, Emma says graduate school is a strong possibility and that ultimately, she might want to work for some sort of conservation-focused non-governmental organization, the Xerces Society or the Nature Conservancy, where she can make a real contribution to conservation entomology. She also hopes to continue her dual science and art passions going forward. ■



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SCHOLARSHIP SPOTLIGHTS



ERIC FORT

There is no more delightful conversation than speaking to someone who positively radiates gratitude and happiness through the phone. Such is the case with Professor Eric Fort, 2001 Alworth recipient and Hibbing High School graduate, as he talks about his work at the University of St. Thomas in St. Paul. Eric has been teaching Chemistry for fourteen years, and has served as Chair of the Chemistry Department for the last three years.

St. Thomas was not unfamiliar to Eric, as he had visited there for the Science Olympiad program through Hibbing High School. After receiving the Alworth Scholarship, he went back to St. Thomas for undergraduate studies in Chemistry, a subject about which he is deeply passionate.

Following his undergraduate degree, Eric went on to earn a Doctorate degree at Boston College. There he worked as a Teaching Assistant and discovered his second passion: teaching and finding new ways to help students understand Chemistry.

Eric said he feels blessed to be able to both teach Chemistry and also run the research program, working with undergraduate students. Serving as the Director of the Honors program, Eric views the program as a way to help students connect to the resources they need to find their passion.

Eric Fort found and lives his passion for Chemistry every day, and like so many Alworth Scholars, he has made it his mission to help others do the same. ■

SCHOLARSHIP SPOTLIGHTS



HAILEY CODA

Hailey Coda was born and raised in Duluth. Most of her family lives here. She grew up loving the nearness of Lake Superior, and all the natural beauty that makes life in the northland so unique.

Hailey, 2020 graduate of Duluth East High School, found more to explore through math and science. In her eighth grade year at Ordean Middle School, Cirrus Aircraft held a model plane building competition, and students were invited to visit Cirrus and go for a plane ride. Hailey found it all amazing, and as she progressed through East High School, she determined that Aerospace would be her focus. She was interested in the Illinois Institute of Technology, planning to major in Aerospace Engineering. And then the Covid pandemic came.

The arrival of Covid put a pause on, well, everything... so Hailey spent time doing what she loves: camping and enjoying the outdoors. On one trip, she camped with a family friend who had known her for many years. Although she didn't know it at the time, their conversation would alter the course of her future.

In the fall of 2021, Hailey began her studies at the University of Minnesota in the Twin Cities, intending to major in Aerospace Engineering. Hailey confessed, "I didn't love living in a big city." She was used to being close to Lake Superior and having easy access to natural spaces. She also hadn't forgotten the camping conversation with her friend - wherein this friend pointed out that Aerospace Engineering was, in certain ways, in conflict with her love of the natural world and a deep desire to sustain it.

Not long after that, Hailey realized that she needed to shift her focus in the Engineering field to something more in line with her dedication to the environment. So, she returned to Duluth, enrolled at UMD and changed her major to Civil Engineering. Now in her senior year, she is part of the "Engineers without Borders" program and hopes to travel with the group to a small village in Kenya, where they will build a water distribution system.

Ultimately, Hailey wants to focus on Geo-Technical Engineering, which is working with natural ground structures for sustainable building needs while minimizing impact to the natural world. As for her dream job, Hailey would really enjoy working for a government or environmental agency, utilizing natural assets and techniques to improve the ground for building purposes and disaster mitigation.

Although she does want to live elsewhere for some portion of the future, in the end she wants to return to Duluth to raise her family. Someday, she wants her children to have access to the natural world that she enjoyed as a child, and that ultimately, she will spend her career protecting. ■



GABRIELLA LOTT

The Alworth Scholarship helped propel Gabriella (Gabi) Lott from her Biochemistry major at the College of Saint Benedict and Saint John's University (CSB&SJU) into medical school at the University of Minnesota - Twin Cities.

As an undergrad, Gabi was involved with cancer research through the Chemistry department, where she was also a Teaching Assistant. During that time, she also studied abroad for five months in London, where she interned at Muscular Dystrophy UK.

In her first year of med school, Gabi is not only carrying her medical school studies, but is very active volunteering in the community. She volunteers as a Community Health Worker at the Phillips Neighborhood Clinic. She is a 2024 Program Leader for a Hennepin County Medical Center program called the NICU Reach Out & Read Program, which involves holding, and reading to, neonatal babies in the NICU. And lastly, Gabi volunteers with Partners in Dementia, a care-coordination effort for patients with dementia and their caregivers. It is an extremely demanding schedule.

While she has not yet selected her medical specialty area, Gabi said she would love to work with people of all ages and make a meaningful difference in their lives. She also hopes to continue pursuing her passions outside of medicine, including figure skating, playing the viola, and spending time with friends and family.

A 2018 graduate of Duluth East High School, Gabi has a gift for making time for things that matter. Looking into the future, we have complete confidence that she will find time for all of life's most important things and that she'll manage it all beautifully. ■

SCHOLARSHIP SPOTLIGHTS



CARTER NORTHEY

Visiting Concordia University in Ann Arbor, Michigan, Carter Northey had a chance encounter with perhaps the city's most famous resident – iconic Michigan Wolverines football coach Jim Harbaugh. Carter snapped a photo with Harbaugh, who now leads the NFL's Los Angeles Chargers, but even that starstruck meeting wasn't enough to keep the Esko native in town.

Instead, Carter chose to attend Des Moines University Medicine and Health Sciences in Iowa, which had just moved into a brand-new \$250 million campus. Carter was there for the Master of Science in Physician Assistant Studies program. The buildings were pristine, the technology state-of-the-art. Like the campus itself, the curriculum was new as well. Des Moines University had undergone a drastic transformation. Carter and his cohort of 65 PA students would help to break it in.

"We kind of just hit the reset button," the 2018 graduate of Esko High School said. "It's an honor to set the tone and establish a culture that we can make our own."

Carter attended the University of Minnesota as an undergraduate, where he majored in human physiology. He took a year off school before starting at Des Moines University in June 2023. Carter will begin clinical rotations this fall and expects to be done in August 2025. He's not sure what he will specialize in, but expects a diverse clinical experience over the next 12 months to provide some clarity. Carter enjoys building relationships, so family medicine would be a natural fit. But the former three-sport athlete at Esko also is intrigued by orthopedics and sports medicine.

One of Carter's favorite aspects of studying to be a physician assistant is what he calls the "shared experience of going through something so difficult. The bonding that comes with that is so cool." Those relationships, forged while grinding through intense coursework, will last a lifetime.

The 25-year-old says he couldn't have gotten to this point in his educational career without the Alworth Scholarship, which he was immensely proud to receive.

"There's some prestige that comes with the Alworth," Carter said. "It's a really cool feeling to belong to that group." ■



KIARRA DIXON

Many Alworth Scholarship recipients formed, very early, an interest in science. They tell stories of childhood projects and discoveries that started them down the path they are now pursuing as adults.

That is not the case with 2022 Denfeld graduate Kiarra Dixon. As a child, she entertained dreams about her future that included farmer, astronaut and princess. It wasn't until she was twelve years old – and needed a heart transplant – that she discovered the world of medicine. She almost certainly would have preferred to make the discovery in another way. But at twelve years old, she found herself listening to doctors at the Mayo Clinic explain what was going on with her heart, how they were going to fix it, and what it would require of her. She says now that it's probably for the best that she didn't fully grasp the gravity of the situation at the time.

It was this interaction and process that led her to a love of science and medicine in particular. She wants to do for other kids what those doctors did for her, explaining such a complex topic in an understandable way.

She still sees her doctor at the Mayo Clinic twice a year for checkups. But this doctor is more than just a doctor – he has become a mentor in her pursuit of medicine. Kiarra shadows him at the Mayo Clinic on her summer breaks and has the opportunity to learn from him and his colleagues. She recounted with great excitement that last summer she was able to observe a heart transplant being done by the same surgeon who operated on her all those years ago.

Now a Genetics major at UW-Madison, Kiarra is fully immersed in pre-med courses. When she graduates in two more years, her goal is to attend the University of Minnesota Medical School. She is certain she wants to be a pediatrician, although she has not yet decided a specialty. She does not rule out eventually working at the Mayo Clinic, a place she has remained connected to since the age of twelve. ■