Infinite Possibilities: Profiles of Summer Research from The Gatton Academy of Mathematics and Science in Kentucky

Volume Ten - Summer 2021

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THE GATTON ACADEMY of Mathematics and Science

Infinite Possibilities:
Profiles of Summer Research from
The Gatton Academy of Mathematics and Science in Kentucky

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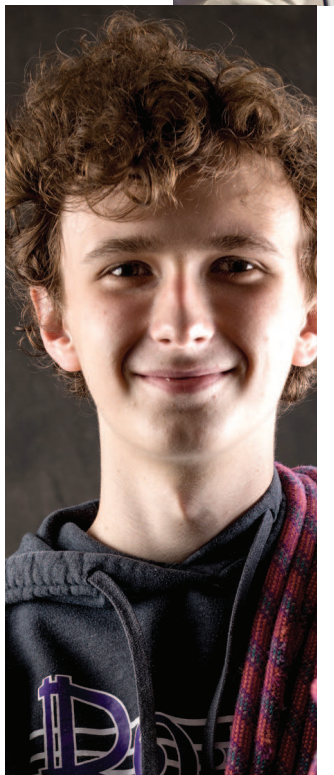
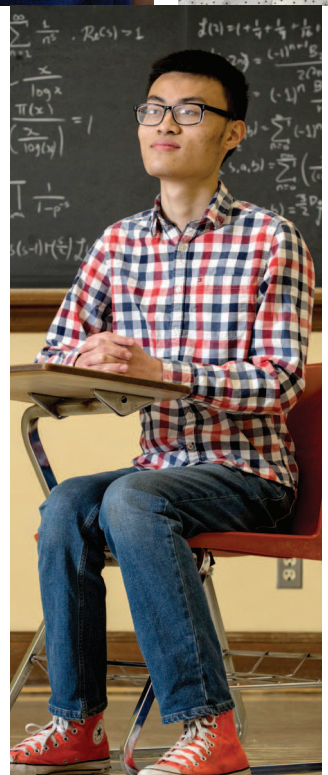
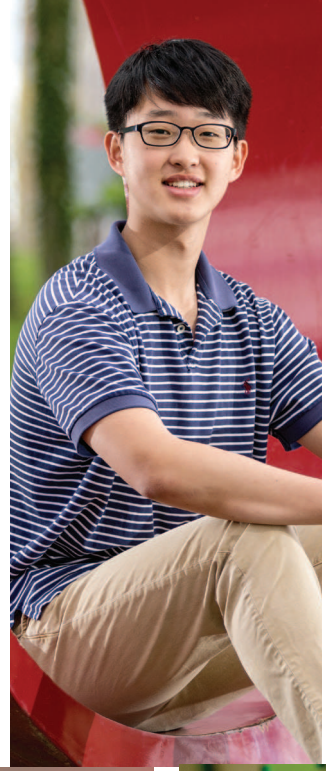
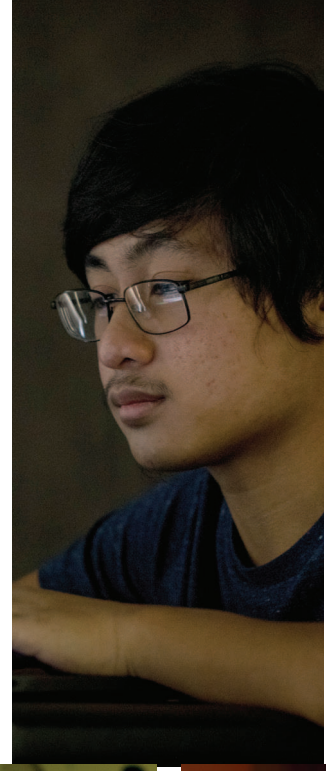







About the Gatton Research Internship Grant Program

The Gatton Academy of Mathematics and Science in Kentucky created the Gatton Research Internship Grant in 2010. Made possible from a gift from Mr. Carol Martin "Bill" Gatton, the program offers grants to Gatton Academy students between their junior and senior years to support summer research internships across the Commonwealth, the USA, and the world. By providing funding, the program directly creates research internships that otherwise would not have existed for Gatton Academy students. In its first 12 years, the program has created 181 research internships for Gatton Academy students to study STEM problems in their areas of interest in devoted, full-time research settings.

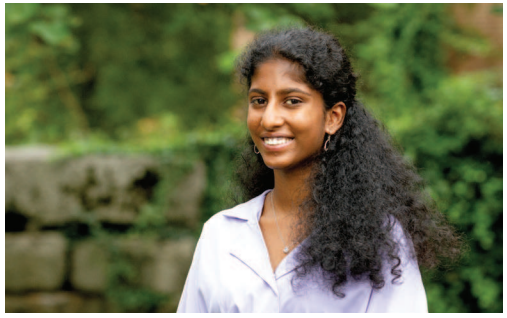
Each year, the research funded by the Gatton Research Internship Grant program yields significant outcomes for recipients. Although COVID-19 restrictions canceled our usual RIG for the summer of 2020, all 13 recipients persisted and, in many instances, continued their research virtually. For example, Jason Zhang was able to complete his research looking at less harmful ways to create pharmaceutical chemical compounds. As a result, he was able to complete his application for the Regeneron Science and Talent Search, the nation's premier competition for high school students who conduct research, becoming Gatton's first finalist. Gloria Huang virtually presented her research predicting the healing algorithms of diabetic foot ulcers at the American Mathematical Society's Fall Southeastern Section Meeting, while Krupa Hegde presented virtually her sleep apnea findings to the Alzheimer's Association International Conference. Ahmad Ateyeh earned first place at the virtual Louisville Regional Science and Engineering Fair in the Environmental Engineering category for his research, "Estimating the Effectiveness and Financial Practicality of Deploying a Space Mirror to Combat Climate Change." Diksha Satish presented her research, "Calculating Individual and Population Parameter Values in the Healing of Chronic Wounds through Mixed-Effects Modeling," at the 12th Annual Undergraduate Research Conference at the Interface of Biology and Mathematics. Altogether, this resilient batch of RIG recipients made 32 presentations at national and international conferences and competitions over the course of the pandemic year.

This year the Gatton Research Internship Grant program funded 11 rising high school seniors during the summer of 2021. In addition, the WKU Sisterhood funded an additional three female students from underrepresented populations for their own Research Internship Grant program. The following pages feature these students.

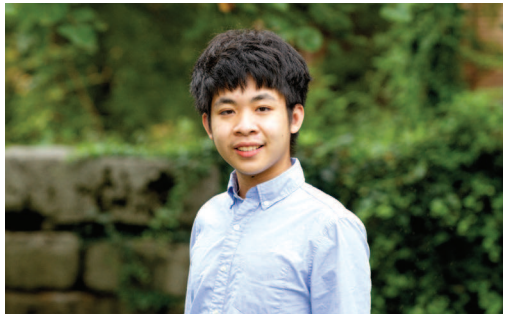
Ahmad Ateyeh

Krupa Hegde

Gloria Huang



Diksha Satish



Jason Zhang

Dear Mr. Gatton,

Gatton Academy students were thrilled to return to summer research and to do so mostly in person. They delved into numerous areas, working to answer complex questions, contribute to our understanding of the world, and expand their knowledge. Eleven Gatton Academy students participated in faculty-mentored research this summer due to your generosity. The WKU Sisterhood Research Grant funded the experience for three additional students. The grants provided support for laboratory materials, as well as student housing and living expenses. Students explored areas from prime numbers and number theory in mathematics, to cloud architecture in computer science, and proteins to combat neurological disorders in biology.

These summer experiences build on those offered at The Gatton Academy during the school year. Our students explore their infinite possibilities through study abroad, research, and a rigorous course load at Western Kentucky University, all within a community of peers. Your generosity and that of the Kentucky Legislature has allowed hundreds of students, fourteen graduating classes, to grow and develop in an unparalleled living and learning environment.

Thank you for your commitment to Kentucky's future. Our students and staff are grateful for you building a bridge for Kentucky's remarkable students. As they continue to grow and develop as leaders and experts, they are sure to continue your legacy of contributing to Kentucky and beyond.

With deepest gratitude,

Lynette Breedlove, Ph.D.
Director


Carol Martin Gatton
Academy of Mathematics & Science in Kentucky

Sahil Chhabra
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

My parents immigrated to the U.S. from India almost 25 years ago. They said the money they had amounted to pocket change and that some meals were only a shared slice of pizza. However, they were ambitious and determined to complete their training, and now they are both physicians at Graves Gilbert Clinic. They instilled in me a strong value for education and hard work. Thus, when I heard about The Gatton Academy in seventh grade, I immediately knew I wanted to go there. They told me about their friends whose children went to Gatton and how they went to top-tier universities, which further propelled me to apply. Now, as a current Gatton student, I find myself challenged for the first time, which is one of the reasons I like this school.

My career goal is to obtain an MD/PhD and become a physician-scientist. I know this requires long and rigorous schooling, but I believe it will be worth it. I have wanted to become a doctor since I was young because I want to help others in a meaningful way. However, I did not know I wanted to do research until I started lab research at Gatton. The Gatton Research Internship Grant is another step in the right direction. My research involved altering a virus's genome to determine the effect on its method of killing its host. I am primarily interested in the genomics/genetics subfield within biology, so I found this project very interesting. I imagine myself doing similar projects in the future and potentially applying my research to the medical field. Thank you for your contributions to The Gatton Academy, which has allowed me to participate in this wonderful opportunity. My experiences at Gatton will benefit me for life.

Sincerely,
Sahil Chhabra

Sahil Chhabra

Home High School:
Bowling Green High School

Research Area:
Biology

Career Goal:
Physician-Scientist

Research Mentor:
Dr. Rodney King
WKU Department of Biology

Extracurricular Activities:
Biology Club and Science Bowl

"My favorite Gatton Academy memory is finally beating my friend and Gatton Academy comrade in chess. We went to the same sending school and whenever I played him before, I always lost."

"I am looking forward to discovering more about the mechanism of temperate bacteriophages by studying lysogeny. I also look forward to building a relationship with my mentor. The best piece of advice my mentor has given me so far is to document everything in a lab notebook. Documentation is key in research because it communicates your results to others."

"As a young person interested in STEM, research means studying an area that is not well-known and discovering something new. By completing research, I will be contributing to a scientific field in a meaningful way."

Hithan Garla
Frankfort, Kentucky (Franklin County)

Dear Mr. Gatton,

This summer opportunity meant a lot to me. It gave me a chance to go deep within my research, and it helped me to meet my academic goals. Here's a little bit about myself. My name is Hithan Garla, and I'm from Frankfort, Ky. I'm not the first to go to college in my family, as my parents attended college in India.

The Gatton Academy intrigued me, as I knew the opportunity to take college courses and live in a college environment was too good to pass up. The transition to Gatton has been easy, especially with all the friends you make and the staff who help you throughout.

The Gatton Academy has also really challenged me with some tough courses, as I've spent multiple late-nighters studying and working. This summer my research was a cross-study on mathematically modeling the wound-healing process of diabetic foot ulcers. This opportunity was truly amazing, and I am so grateful.

Sincerely,
Hithan Garla

"I am most looking forward to being able to focus on my research without worrying about my classes, and I am excited to put my full efforts towards my research. My biggest challenge will be creating models which are accurate to the data I come across. In addition, I will have to find a way to make the models easy to understand and easy to present."

"My mentor has given me great advice and great resources throughout our meetings. Introductory research with him has been beneficial to my understanding of the concepts surrounding my research."

"My favorite Gatton Academy memory has to be the experiences with my floor. My floormates are positive and humorous, which makes the Gatton experience even better."

Hithan Garla

Home High School:
Western Hills High School

Research Area:
Mathematics and Computer Science

Career Goal:
Engineer

Research Mentor:
Dr. Richard Schugart
WKU Department of Mathematics

Extracurricular Activities:
Computer Science Club and
Math Club

Barrett Gibbs
Corbin, Kentucky (Whitley County)

Dear Mr. Gatton,

We live in an age where the extreme human impact on the environment is common knowledge. Throughout my childhood, my father always encouraged me to work towards helping people and making the world a better place. His words stayed with me, and as I grew older, I fixated on this idea. Encouragement quickly turned into ambition, and I dreamed of doing something bigger than myself. I wanted to do everything in my power to help my generation preserve the planet so that humanity can flourish and enjoy its beauties for years to come. As my interests in mathematics and the sciences grew, so did my interest in attending The Gatton Academy to work towards my academic goal of fulfilling my dream through an environmental career.

Through your generosity, I got to spend the summer gaining my first hands-on research experience in environmental science by creating a website for some of south-central Kentucky's caves that regularly give tours and optimizing their impact using eye-tracking technology. I cannot thank you enough for this, as I got to start working toward my dream of preserving our planet like I always wanted to. Beyond a shadow of a doubt, this experience has made me confident that an environmental career is what I want. I have enjoyed this invaluable summer opportunity, The Gatton Academy, and the growth I experienced more than words can ever describe. Thank you so much for your generosity and the impact you have made on my life.

Sincerely,
Barrett Gibbs

Barrett Gibbs

Home High School:
Corbin High School

Research Area:
Earth, Environmental, and Atmospheric Sciences

Career Goal:
Environmental Law

Research Mentor:
Dr. Leslie North
WKU Department of Earth, Environmental, and Atmospheric Sciences

Extracurricular Activities:
Party Club

"My ultimate goal is to become an environmental lawyer and to be involved with the creation of environmental legislation. This project gives me the solid background in environmental science I need. In order for good environmental legislation to be passed, people need to be aware of the issues the natural world is facing, and one of the best ways to do this is through ecotourism. By promoting ecotourism, we can activate the domino effect that goes into establishing good environmental laws."

"I have learned to get back up after falling down. Gatton is a very difficult place academically and developing this skill has been very important."

"As a young person in STEM, research means exploration. I am getting to tread waters no one has ever treaded before, just as many scientists have previously done. As someone who grew up reading about great scientists doing research, it feels like a dream to finally do it myself."

Harrison Gover
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

I am a student from Bowling Green High, meaning that I am within biking distance of Western's campus. However, I have recently discovered that attending The Gatton Academy has been a change much larger than the distance from my house would have suggested. Here, I have had opportunities beyond what I had imagined, and, as a student at The Gatton Academy, have broadened my outlook on education as a whole.

My biggest interest since middle school has been to study math, and at Gatton, my math skills have blossomed. In addition to this, I am a part of the STEM+ program in Chinese and have explored more in language as well.

It was always a dream of mine to make discoveries in math, and through my RIG, I will be able to imitate great mathematicians on a smaller scale. I am in the middle of a research project in Knot Theory with Dr. Claus Ernst, working with spiral and curly knots. The goal of the project is to identify general groups of these knots and their qualities, and the journey has been wonderful so far.

With the RIG, I can go even further in my academic aspirations. I can do more with math and potentially propel myself toward bigger math projects throughout my career. Thank you for everything you have so generously provided!

Sincerely,
Harrison Gover

"The biggest challenge to overcome in my research is definitely the knowledge that I have no knowledge about what comes next. Mathematical research is a blind trek into a forest."

"I realized STEM was my passion upon joining my junior high school's Mathcounts team. It introduced me to a side of math I didn't know and made it fun for me. Research in STEM means I can do, on a smaller scale, what famous mathematicians have done for centuries."

"The best piece of advice my mentor has given me is to try everything once and then stick with what works. It works in both the context of my research and life as a whole."

Harrison Gover

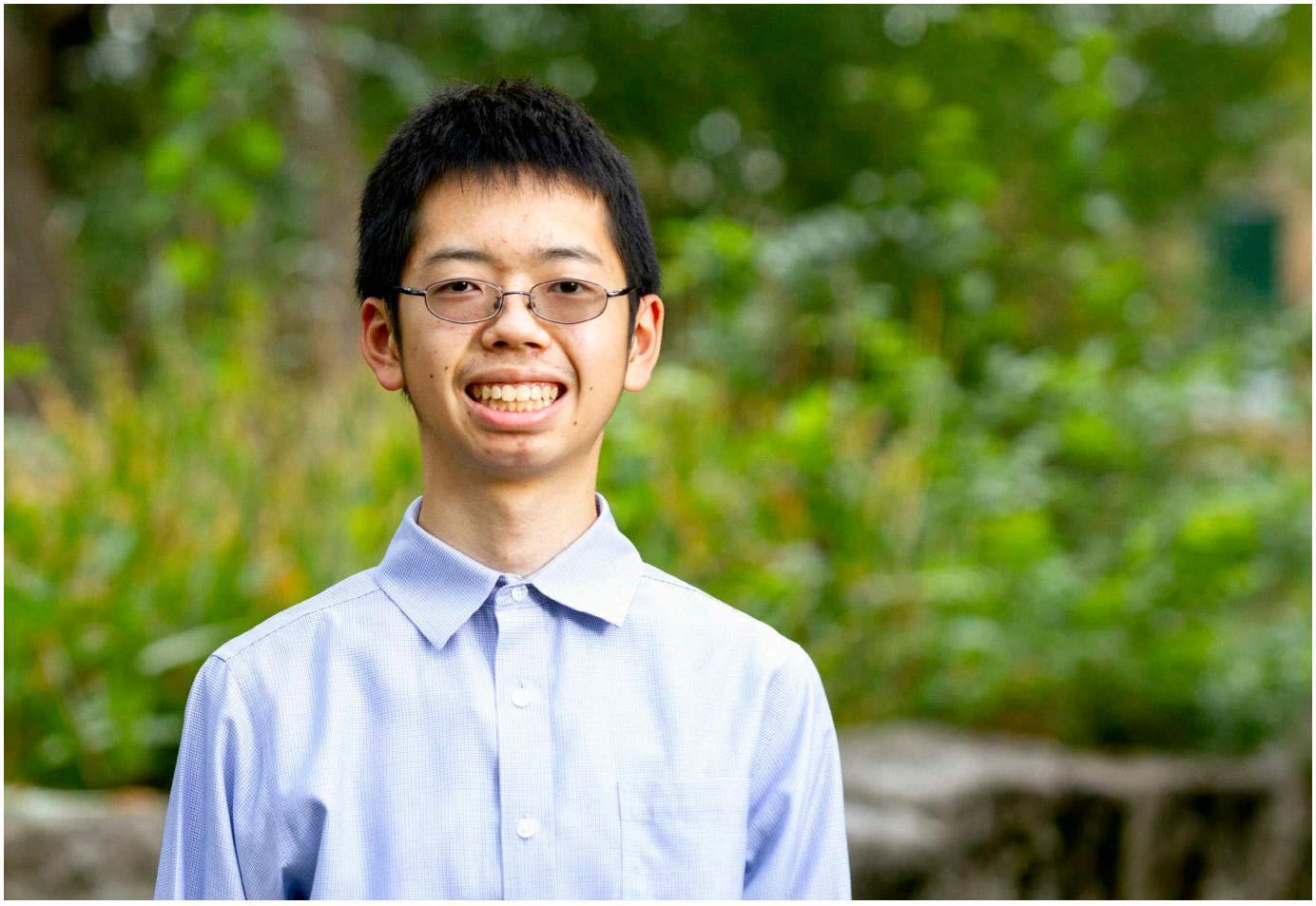
Home High School:
Bowling Green High School

Research Area:
Knot Theory

Career Goal:
Engineer

Research Mentor:
Dr. Claus Ernst
WKU Department of Mathematics

Extracurricular Activities:
Speech & Debate, Academic Team, Math Club, American Math Competition, American Invitational Mathematics Exam, and American Regions Math League



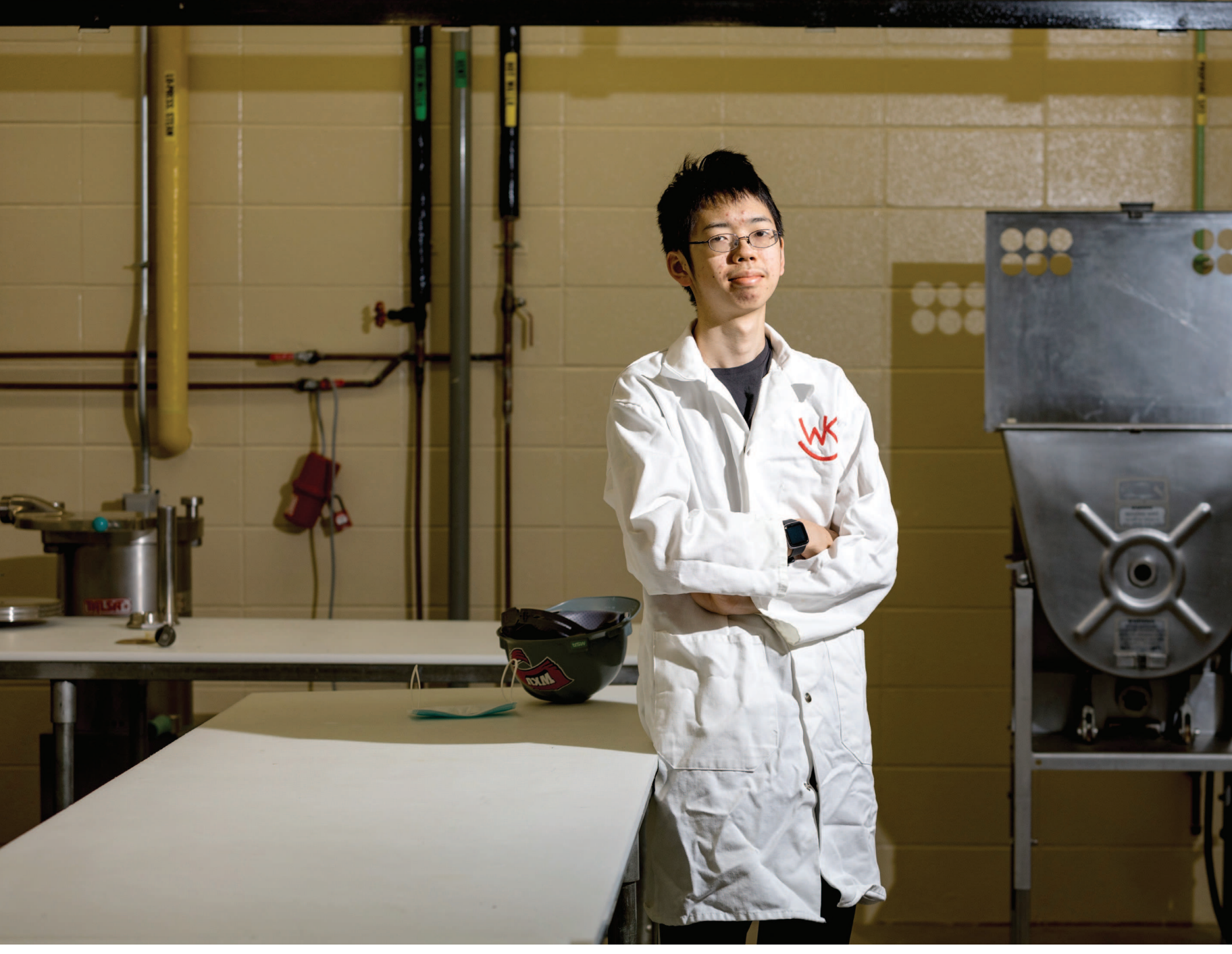
Kentaro Kawata
Union, Kentucky (Boone County)

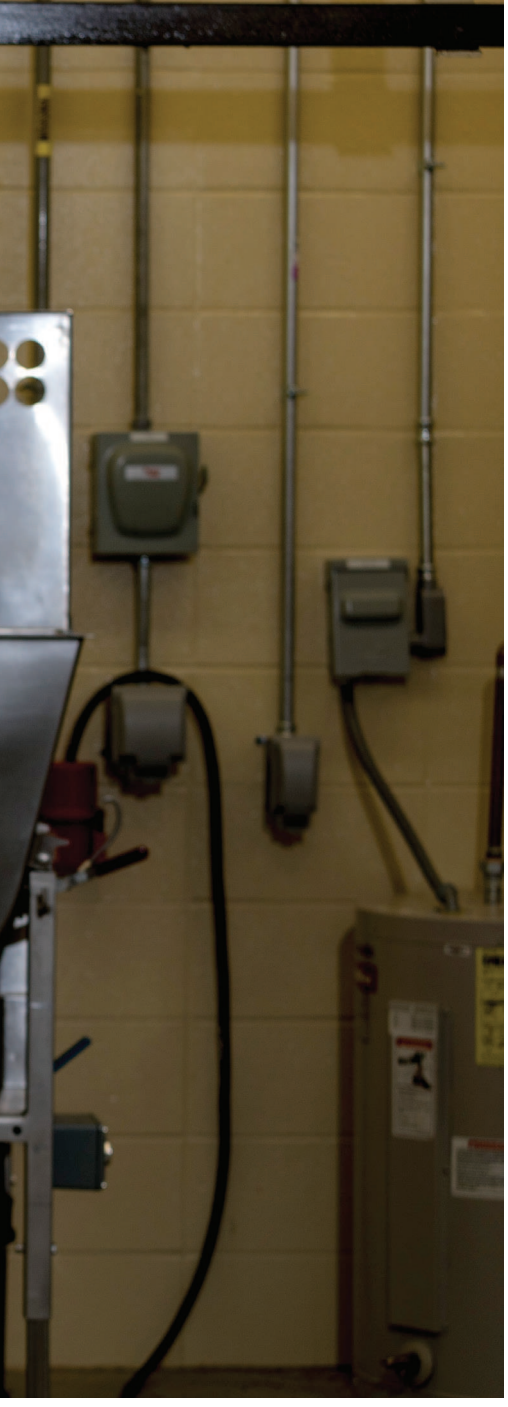
Dear Mr. Gatton,

I would like to thank you for giving me the opportunity to conduct the Gatton RIG research. I was initially interested in The Gatton Academy for a chance to do research. However, with the current situation, it was very hard for me to conduct research this past year. However, this opportunity gave me the chance to conduct research. It was a very fun summer, and it would be very different and unproductive if it wasn't for this opportunity. I learned a lot from this opportunity and am very grateful for that.

This opportunity changed my life. The research prepares me for competitions, publications, and conferences. Moreover, this research meant more to me as a person. I've only done a bit of experimenting in the past; this research showed how hard a study can be. From preliminary research, experimenting, and writing the report so that everyone can understand, this gave me the experience I need. This can prepare me for additional research I might be doing next year at WKU, at other universities, and as a career. My future has become brighter because of this experience. Again, I am grateful to have this opportunity. I look forward to applying my experience for the better in the future.

Sincerely,
Kentaro Kawata





"My best super-nerd moment was when I memorized the Periodic Table. When I was in middle school, I was staring at the periodic table and memorized the elements, symbols, and atomic numbers. In weeks, I had memorized it in its the entirety. It was at that moment I realized chemistry was my passion and favorite subject."

"I look forward to learning a lot more about the topic I am researching and the possibilities it can create for the future. Though it is in my strong suit (chemistry), food science is a fairly new subject, so I am hopeful I will learn a lot of things I can apply to my future research projects."

"As a young person interested in STEM, I've realized research is a prime opportunity to strengthen your skills, learn new things, and apply that knowledge in many forms. Research is a key piece of my foundation for success."

Kentaro Kawata

Home High School:
Ryle High School

Research Area:
Agriculture

Career Goal:
Food Chemist

Research Mentor:
Dr. Luiz Silva
WKU Department of Agriculture and Food Science

Extracurricular Activities:
Chemistry Club President

Allen Lin
Union, Kentucky (Boone County)

Dear Mr. Gatton,

Since the second grade, I have been captivated with mathematics. What initially started out as a competitive incentive quickly became a beautiful and fiery passion. I remember immediately pulling out a math book or watching math videos on the computer after I got home from school. Learning multiplication swiftly turned into learning the Pythagorean Theorem and the Fibonacci sequence. My self-exploration of mathematics expanded in the seventh grade, when my math teacher allowed me to spend class time learning on my own. During that time, I taught myself geometry, algebra, and calculus. I also became deeply fascinated with a field of mathematics known as number theory.

I chose The Gatton Academy because it is a place for me to grow my passion for math with advanced classes, work on number theory research, and show others the beauty of math. In fact, I credit The Gatton Academy for my acceptance to the Research Science Institute (RSI). At RSI, I am undertaking math research with a mentor from MIT this summer. Moreover, through my Research Internship Grant this summer, I am continuing number theory research with Dr. Dominic Lanphier of the WKU Department of Mathematics. Number theory is the study of prime numbers, whole numbers that are only divisible by 1 and itself. These numbers are crucial in our understanding of mathematics and have significant contributions in cryptography.

I am so grateful for The Gatton Academy because it has provided me with the resources and the potential to pursue my passion as a mathematician. Thank you for making all of this possible for me.

Respectfully,
Allen Lin

Allen Lin

Home High School:
Ryle High School

Research Area:
Mathematics (Number Theory)

Career Goal:
Mathematician and Computer Scientist

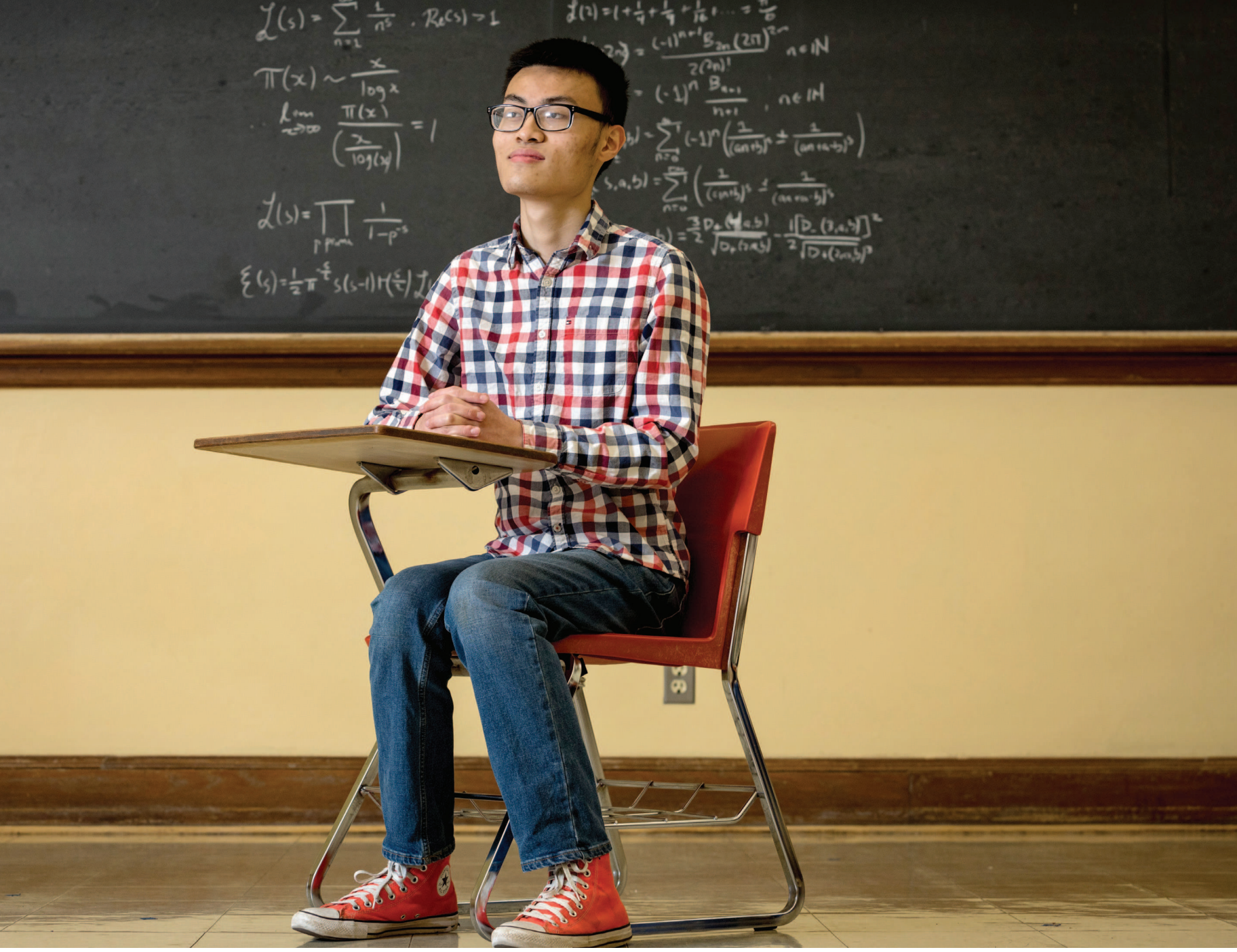
Research Mentor:
Dr. Dominic Lanphier
WKU Department of Mathematics

Extracurricular Activities:
Gatton Academy Math Club, Gatton Academy Computer Science Club, Gatton Academy Science Bowl, Gatton Academy Peer Tutor of Mathematics, Gatton Academy Chemistry Club, and WKU Chapter of the Society of Interdisciplinary Applied Mathematics

"Pursuing number theory research allows me to further my experience in research, as well as adding fuel to my passion for number theory. I plan to become a Ph.D. mathematician, and my current research will prepare me for that."

"In reference to getting stumped on a problem, my mentor said, 'If you ever run into a brick wall, take a break and run into it again at a different angle.' I always enjoy our conversations about history, math mentors, and doing math."

"Since my research is expanding on previous results, it will be difficult to come up with new ideas, but research is fun because it makes you think differently. It brings you into an unknown frontier, forcing you to think of new ideas and be creative."



Marcus Negron
Frankfort, Kentucky (Franklin County)

Dear Mr. Gatton,

I sincerely appreciate the opportunity you provided me through The Gatton Academy RIG program. Because of your support, I was able to spend a large portion of my summer working in the lab of Dr. Cristi Galindo in the Department of Biology. My project focused on studying the effects a certain gene mutation has on the heart through the use of a mouse model. This research has many practical applications that can be used in the medical field through further studies.

On a personal level, the research I was able to conduct relates to my future goals. I plan to pursue a career in medicine with a specialty in surgery. Biology research is often a part of that path, so being able to get this experience earlier than most will surely prove to be valuable in the future. Further, I was able to conduct many live mouse tissue collections, which is in many ways the most relevant practice for being a surgeon that I could have at this point in my life.

My sending school is Western Hills High School in Frankfort. I was a multi-sport athlete and was also involved in many other extracurricular activities, so the transition to The Gatton Academy was drastic. However, after my first year, I can clearly see that this is the place for me. The opportunities I have been given here are unmatched and will prove to be very beneficial for my future successes. Thank you for making this possible.

Best,
Marcus Negron

Marcus Negron

Home High School:
Western Hills High School

Research Area:
Biology

Career Goal:
Surgeon

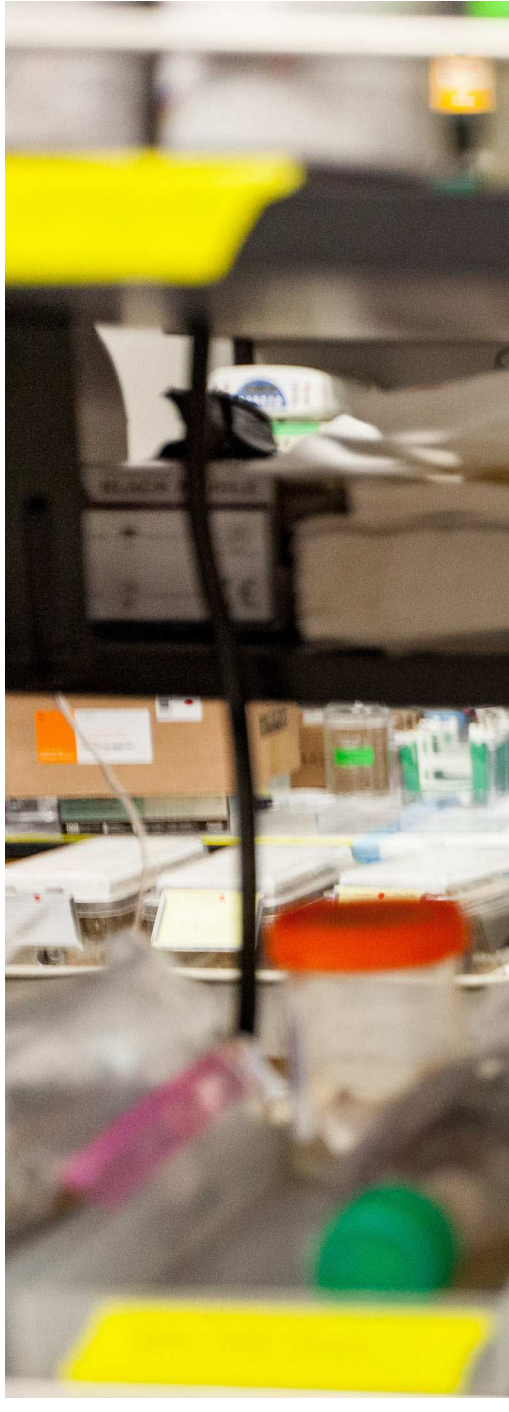
Research Mentor:
Dr. Cristi Galindo
WKU Department of Biology

Extracurricular Activities:
Mind Over Matter Club

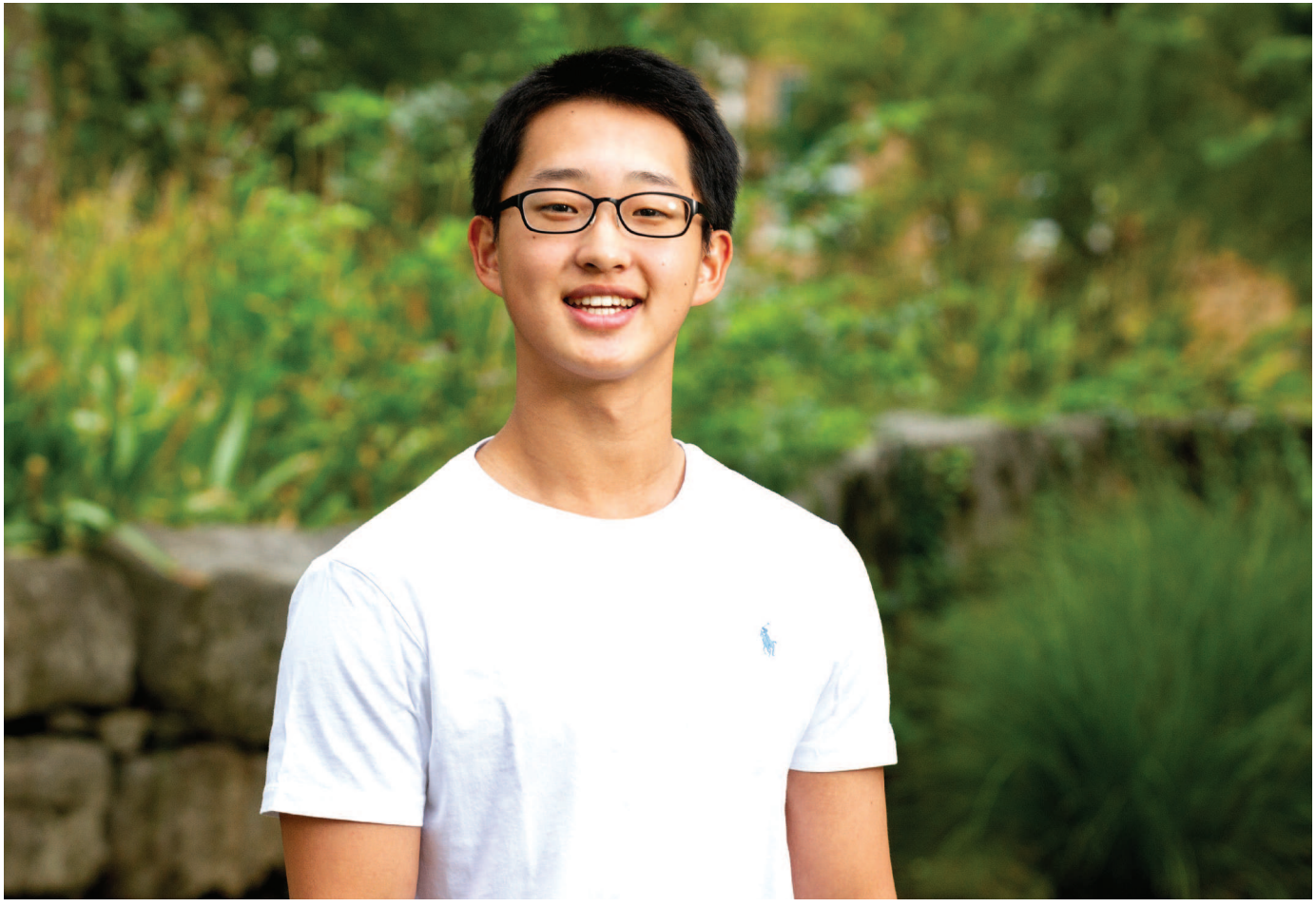
"The biggest challenge in my research will be analysis of our data. We have specific differences we are going to look in to, but we are going to have to analyze the data from multiple angles in order to get an overall picture. Doing this and being able to both fully understand the data and display it in a clear way is a confusing and difficult task."

"The best piece of advice my mentor has given me so far is to not be afraid of making mistakes. Mistakes are how we learn and grow and can even be used to make new discoveries."

"As a young person interested in STEM, research means I can get involved and learn about my future career field earlier than most. Getting connected with the STEM field early can be really hard. However, internships like this provide access to more STEM opportunities, which is very helpful and encouraging."




KIMTECH



Andrew Park
Crestwood, Kentucky (Oldham County)

Dear Mr. Gatton,

As a teenager from Oldham County, I was never exposed to the world of academia and the possibilities that come with it. The greatest challenge in my hometown was taking AP classes, but that was a trek I had already been taking for the past fifteen years of my life. After my older sister's experience at Gatton and hearing about the 'infinite possibilities' there, I knew that Gatton was the place for me. Even through a year at Gatton, with a multitude of peers asking me if I enjoyed this school, I never hesitate to answer that it has been the greatest choice I have made.

With experiences to look forward to every day and as an opportunity not many others have, Gatton has been invaluable, giving me an environment to ponder my future, debate with intellectual thinkers, and work to the point where I genuinely feel a sense of accomplishment. Gatton has never ceased to amaze me with the culture it cultivates. The shared goal of learning and success drives me to mold myself into the person I want to become. The people here make me view the world differently and constantly stimulate my brain, the same way my research in detecting the existence and functionality of circular RNAs does. This internship has given me experience in Linux commands, a basis for my future in computer science. Furthermore, research carves my personal pathway to discovering new ideas and concepts, making me question the validity and scope of current knowledge today. Knowing that we don't know stimulates the roots of curiosity and excitement, taking me along the path toward discovery. An intensive research experience like this is one I will never forget, and for that, I thank you.

Sincerely,
Andrew Park

Andrew Park

Home High School:
South Oldham High School

Research Area:
Bioinformatics and Computer Science

Career Goal:
Entrepreneur, Software Engineer and Product Manager

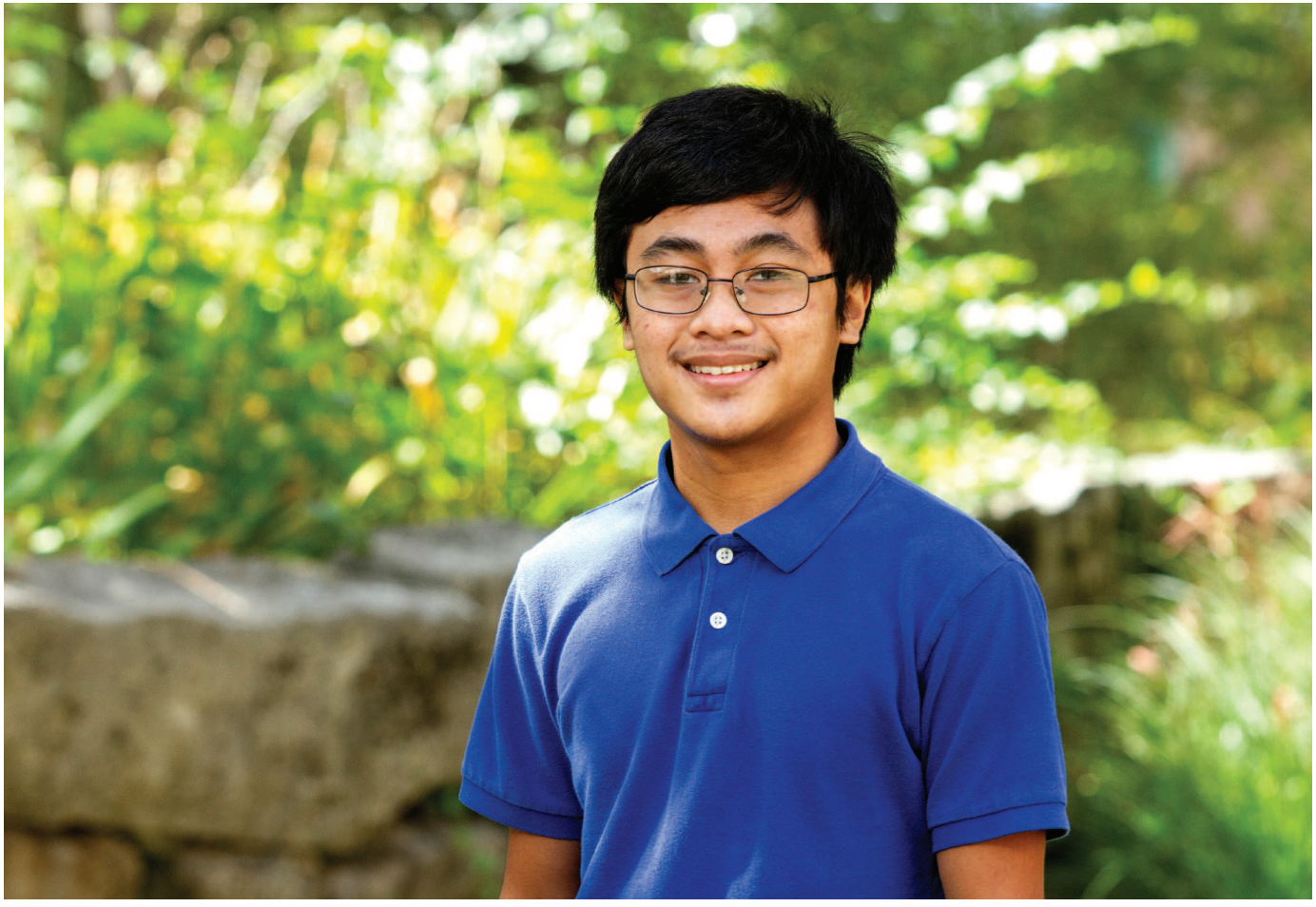
Research Mentor:
Dr. Juw Won Park
University of Louisville
Department of Computer Science and Engineering

Extracurricular Activities:
Computer Science Club, Student Media Organization, Norton Healthcare Volunteer, Beta Club, and Mu Alpha Theta

"The part of the summer experience I am most looking forward to is seeing the progress of my complex research project that will take weeks to develop. The results I will see and work towards on this large-scale project excite me."

"The best piece of advice my mentor has given me is to pave my own path. This means going out of my way to understand the concepts behind the questions I may have or asking about opportunities I want to participate in."

"I view research as a rare opportunity to explore a real-life academic application in-depth. Not pursued by many students, research is something I view as a privilege, motivating me to get more out of it by delving deep into the subject."



Matthew Pimienta
Prestonburg, Kentucky (Floyd County)

Dear Mr. Gatton,

Throughout middle school and the start of high school, my entire world of STEM was experienced mainly through competitions. At Auburn, I thought I had everything at a school with many resources, activities, and a Science Olympiad team, which competed nationally. Yet this "everything" quickly became "not enough." Classes labelled "honors" or "advanced" often didn't feel this way, and there wasn't enough focus on computer science, my favorite subject. When I started at The Gatton Academy over a year ago, I was overwhelmed by the potential research opportunities, classes, and other resources available.

However, I soon became indecisive. It was once easy to figure out which classes would most interest me, but at WKU this became difficult since many classes interest me. I was once certain I wanted to become a software engineer, but the research I've participated in while at the Academy made me rethink this for a more research-oriented career in CS. I became fascinated with biology, which is why I'm doing a research project in bioinformatics, identifying peptides. I'm grateful I can deeply explore my interests because of your contributions. In fact just over the past year, I've had to rethink several parts of my life and future I was always sure about.

Thank you for creating an environment which encourages this period of discovery and possibility.

Sincerely,
Matthew Pimienta

Matthew Pimienta

Home High School:
Pikeville High School

Research Area:
Mathematics

Career Goal:
Computer Science Researcher who works with Chemistry and Physics simulation software

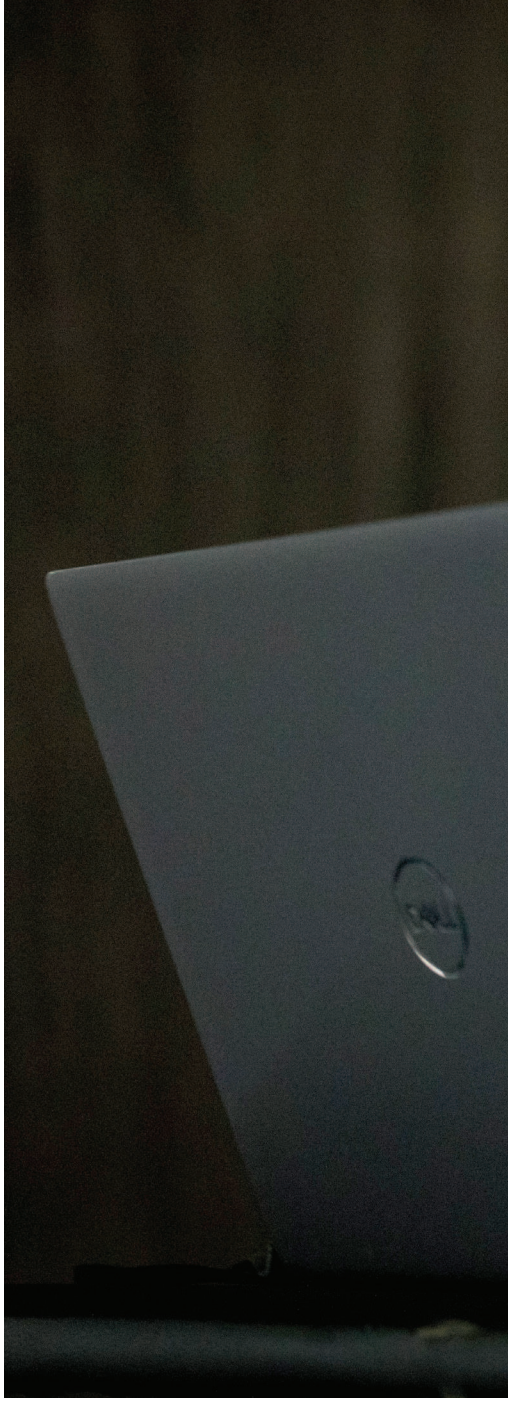
Research Mentor:
Dr. Zhonghang Xia
WKU Department of Computer Science

Extracurricular Activities:
Math Club and Chemistry Club

"My first super-nerd moment happened while playing ping pong. My father and I used to talk about random stuff while playing ping pong, then shift towards math and CS, and then it got to the point where we would stop the game entirely to talk about more advanced concepts. I realized then I was deep into CS."

"I'm most looking forward to being able to sit down for hours to learn and implement different algorithms. I've always wanted more time to sit down and solve problems in CS."

"The biggest way this experience fits into my educational goals is that I have a relatively new interest in machine learning. I'm used to deterministic algorithms, which are prevalent in competitive programming, so machine learning is new and exotic to me. I've also gained an interest in biology, so I can see if this is something I also want to pursue."



Arivumani Srivastava
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

My name is Arivumani Srivastava, and I'm currently a rising senior at The Gatton Academy from Greenwood High School in Bowling Green. I don't exactly remember when I found out about The Gatton Academy, but I remember I always had my heart set on attending. In my mind, Gatton represented a bastion of knowledge: a place where a realm of possibilities I never could imagine would be readily available to me. As I begin my senior year, Gatton has more than lived up to that expectation.

This summer through the Research Internship Grant, I was able to conduct research regarding road safety and healthcare infrastructure in The Gambia, a small country of about two million in West Africa. I have created a policy brief which I will present to members of the Gambian National Assembly, the University of The Gambia, and other organizations. I will also speak on a radio show regarding road safety, which will be aired in the capital city, Banjul. Most importantly, the award from the grant has allowed me to hone my skills as a speaker and writer of public policy, the career I hope to pursue. The experience has been transformational in my development as a student, presenter, and civic-minded citizen.

Without your generosity, I, like many of my peers, would never have had any of these opportunities present themselves, and for that I cannot thank you enough.

Sincerely,
Arivumani Srivastava

"I am most looking forward to traveling to Africa and being able to present my research to The Gambian government. Of course, the situation with COVID has put my travel in question. Regardless if it is in-person or Zoom, though, I look forward to presenting road safety recommendations to The Gambian government and hopefully saving lives."

"The biggest challenge I've had to overcome in my research is accessibility to data. The infrastructure for police and the bureau of statistics to collect data regarding road-traffic injuries and hospital patients is underdeveloped, so finding quality data for what we need has proven to be challenging at times. The best piece of advice I have received from my mentor is no matter what challenges or hurdles come in my way, just keep pushing, and I'll eventually reach my end goal."

"As a young person interested in public policy, my research is symbolic of the increasing influence youth are having on policy. My generation has shown that people of all ages deserve a seat at the table when making decisions, because ultimately, the long-term effects will rest on us. My research is emblematic of the fact that anyone with the will and knowledge, regardless of age, can meaningfully impact policy."

Arivumani Srivastava

Home High School:
Greenwood High School

Research Area:
Public Health

Career Goal:
Public Health Policy

Research Mentor:
Dr. Edrisa Sanyang
WKU Department of Public Health

Extracurricular Activities:
The Green, Kentucky Student Voice Team, and Academic Team

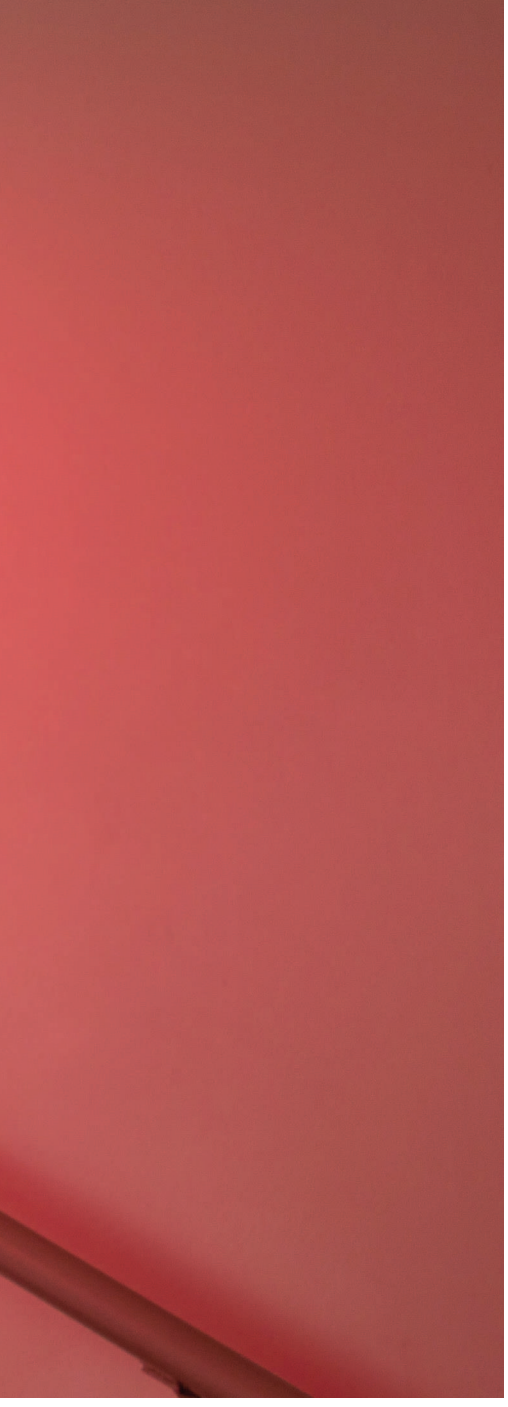
Nathan Turlington
Cecilia, Kentucky (Hardin County)

Dear Mr. Gatton,

At the end of my freshman year, my math teacher suggested I should consider applying to The Gatton Academy. She recognized that the class wasn't providing any sort of challenge and that it was not an effective use of time. While my old high school offered AP Calculus, it was not given much support, and I would still have been left without a math class my senior year. At The Gatton Academy, I was able to take both Calculus 1 and 2 my junior year. I plan on taking discrete, linear algebra, and potentially differential calculus in my final year. The rest of my classes have been significantly more interesting as well. One of my favorite classes is Russian, as we get to learn about Russian culture and history in addition to the language.

Before the end of last semester, I talked with Dr. Strode about internships and opportunities for the summer. He recommended I apply for the research internship grant, which would allow me to stay on campus over the summer and work on a project full time. I reached out to Dr. Galloway and found him more than happy to have the help. I have been developing a performance profiler for process execution in cloud environments, which will allow us to create a more effective job scheduler and load balancer in our computing cluster. It has been a great learning experience, and I would do it all over if I got the chance. Thank you for making this possible.

Sincerely,
Nathan Turlington



"The best advice given to me by my mentor so far is to always keep track of what you are doing and what you have done. He advised to write in a journal of what you do each day and how you solved problems that you encountered."

"The biggest challenge when coming to Gatton was the increased amount of freedom. I have to hold myself accountable to get everything done, and I have to be the one to reach out and take advantage of the resources presented to me."

"Research is a great way to be more involved in your course material. You can familiarize yourself with a working environment in that discipline, which will help you determine what you are going to do educationally and professionally later in life."

Nathan Turlington

Home High School:
Central Hardin High School

Research Area:
Computer Science

Career Goal:
Computer Science and Math

Research Mentor:
Dr. Jeffrey Galloway
WKU Department of Computer Science

Extracurricular Activities:
Math Club

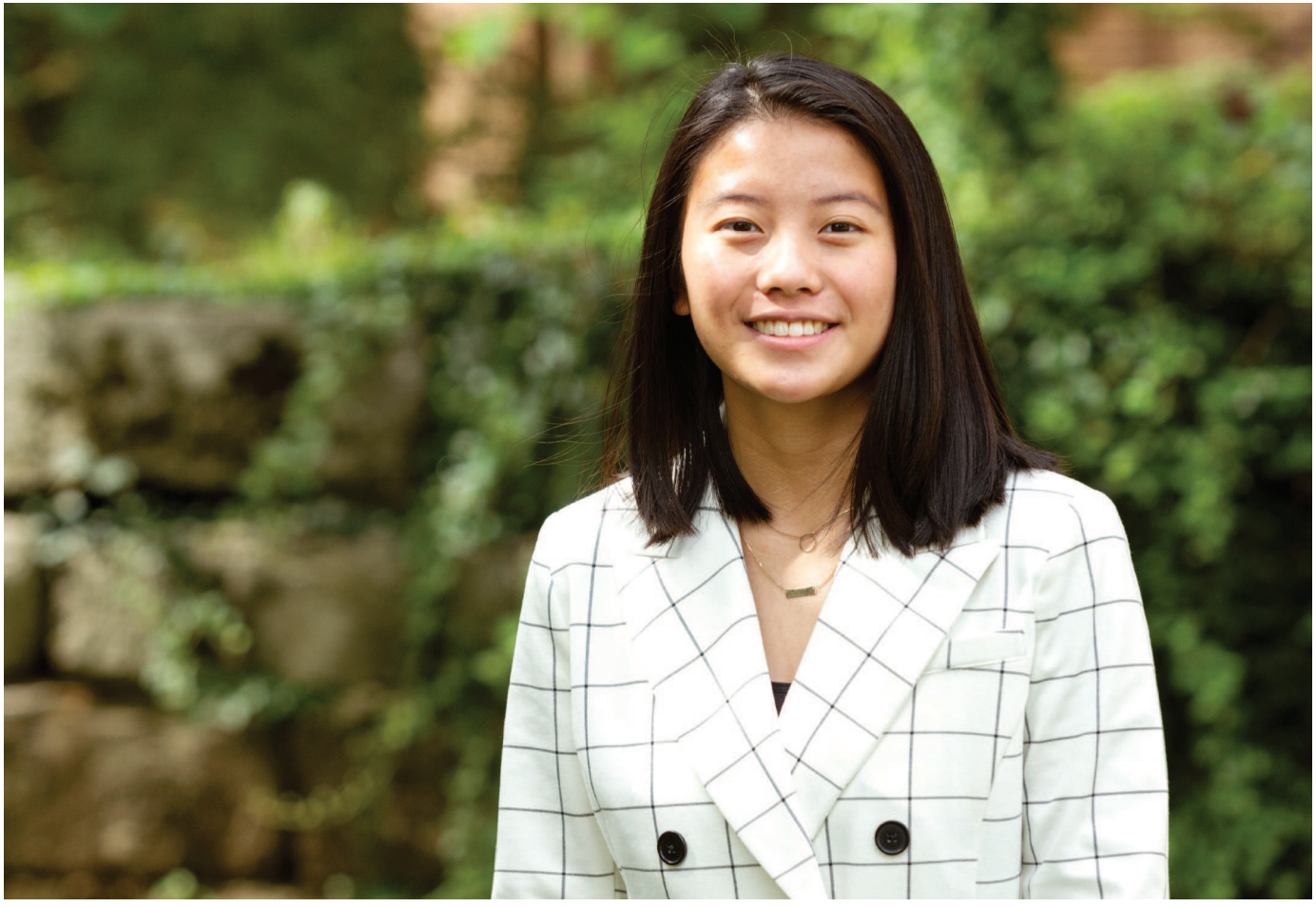
The WKU Sisterhood Research Internship Grant

Made possible by a gift from the WKU Sisterhood in the fall of 2016, the WKU Sisterhood Research Internship Grant program offers internships for young women between their junior and senior years from the following underrepresented backgrounds:

- Young women who come from a Kentucky county in the Appalachian Region
- Young women with minority status as an African American/Black; Hispanic/Latina; American Indian/Alaskan Native; Two or more races
- Young women who are first-generation college students
- Young women with a registered disability
- Young women who identify as LGBTQIA+

These internships are supporting summer research at WKU, across the Commonwealth, the USA, and the world.

The WKU Sisterhood is a group of women with shared values, who enjoy collaborating to advance the mission of WKU. Members pool their financial gifts and award funds to a limited number of university designations to maximize the impact of their philanthropy. Through their generous gift, the WKU Sisterhood has directly created research internships that otherwise would not have existed for this subset of young women. Recipients are using their internships as a springboard to later apply for prestigious awards such as the Regeneron Science Talent Search and the Goldwater Scholarship. Many recipients also submit their work for peer-reviewed publication and for conference presentations.



Apirada Chetawatee
Murray, Kentucky (Calloway County)

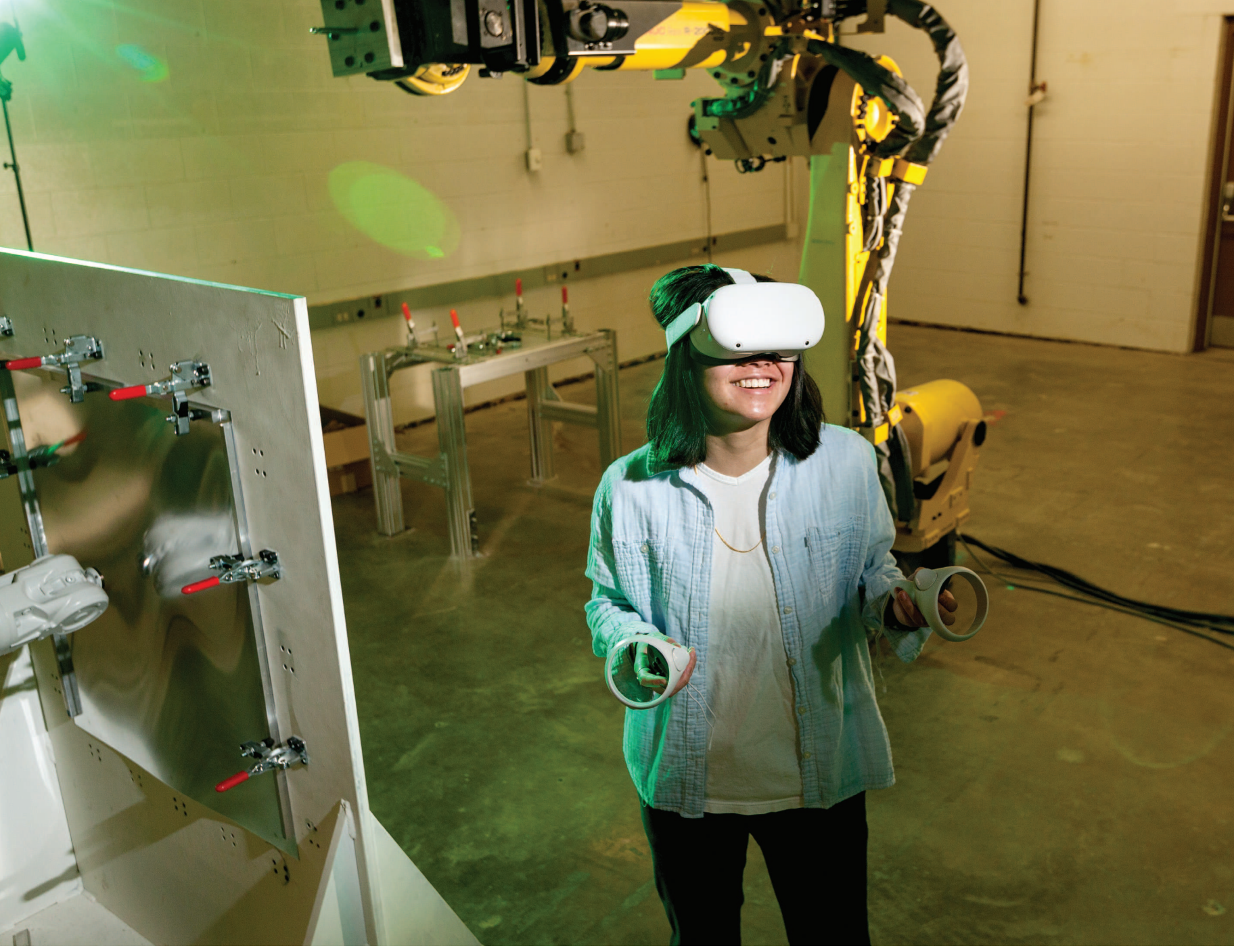
Dear WKU Sisterhood,

Growing up in the college town of Murray exposed me to many people and cultures from around the world. I met people from Nigeria, Japan, and South Korea. It left me wondering if these students would come all this way to pursue their interests, what would I be passionate enough about to travel halfway around the globe for? The Gatton Academy allowed me to find that. I was unsure what to expect when I first arrived in Bowling Green, but I knew it would be a challenge unlike any I had faced before. In the span of a year, I had learned so much and solidified my interests for a future career.

From a young age, I have loved the world of sports. I see sports as a way to connect with people and take a step back from all the craziness that is happening. When I would watch the pre-game show, I would hear the commentators talk about each athlete's outfit and what shoes they were wearing. From there, my interest in sneakers grew. With a push from Cheryl and Derick, I was able to turn my interest into a research opportunity. Under the mentorship of Dr. Michael Galloway, I combined sneaker development with virtual and augmented reality.

I want to thank you for not only believing in me, but investing in the growth of my knowledge. These past eight weeks have been invaluable as I have gotten to experience a collaborative learning environment.

With sincere gratitude,
Apirada Chetawatee



"This summer I am most excited to work on a project that is all my own. It is not for a class or to meet any curriculum standards, but for my own interests. This research experience will help me build a foundation to work on more advanced projects in the future. It is a great way to ease myself into working in a professional environment."

"I think the biggest challenge is this project being unprecedented. There is no blueprint to follow, and I have to figure out each step for myself. My mentor has said to me, 'I don't want you to be stressed if you don't know what's going on right now, because we don't know yet either.'"

"Research gives me the opportunity to explore a concentrated part of my interest without having to worry about tests or a grade. As a young person, it is great how my curiosity is what fuels my work."

Apirada Chetawatee

Home High School:
Murray High School

Research Area:
Computer Science and Virtual Reality

Career Goal:
Industrial Design

Research Mentor:
Dr. Jeffrey Galloway
WKU Department of Computer Science

Extracurricular Activities:
Mind Over Matter, Paint Club, Yearbook, Girls Who Code, and Gatton Academy Leaders in Education

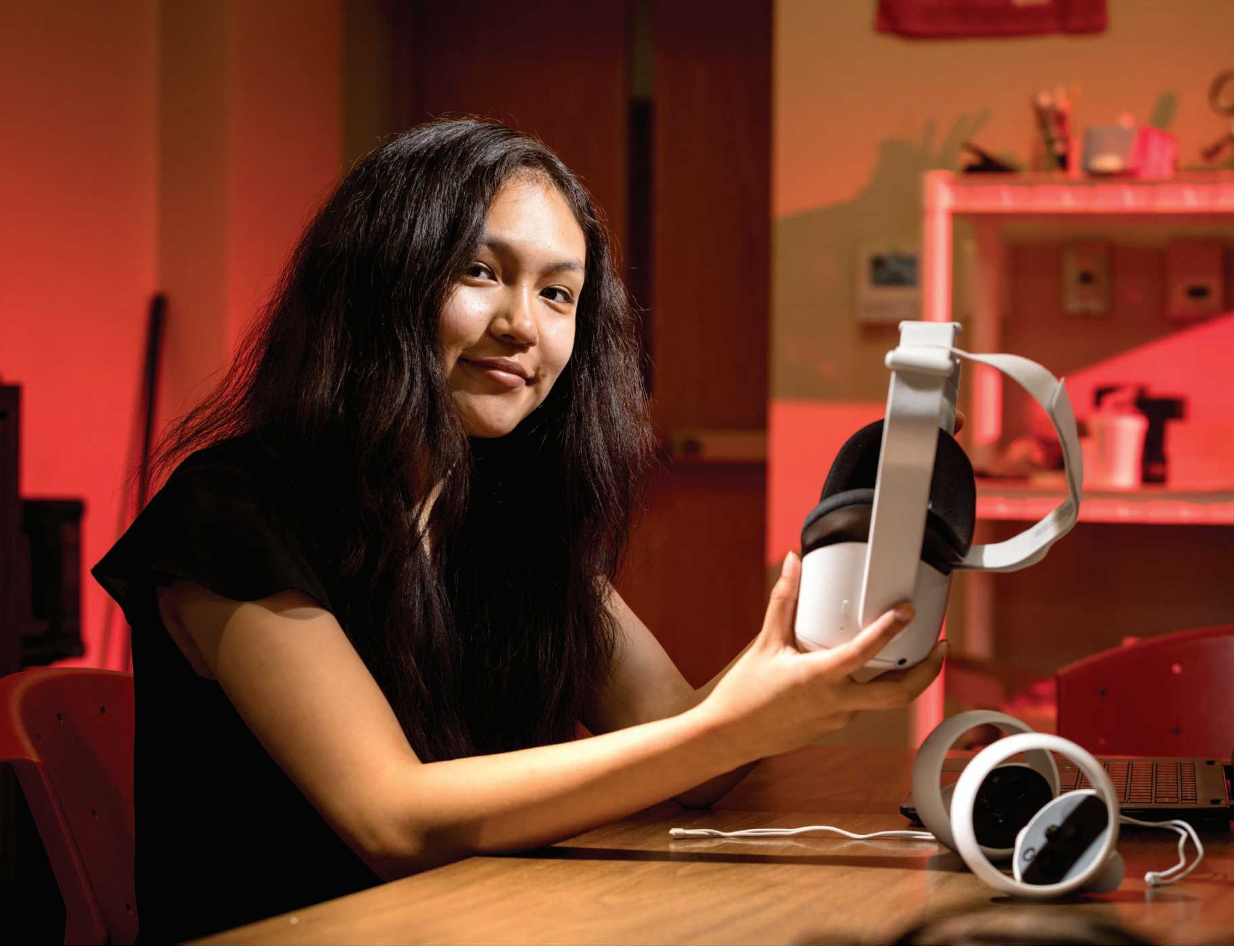
Isabel Ocegueda
Fort Knox, Kentucky (Hardin County)

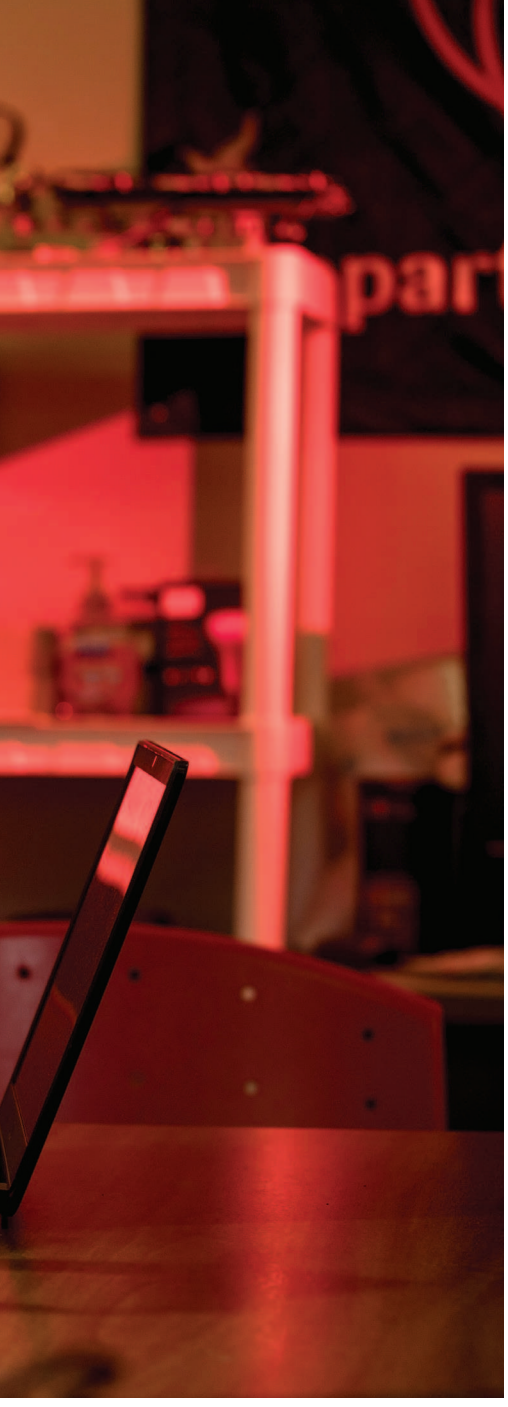
Dear WKU Sisterhood,

I moved to Kentucky during my freshman year of high school from upstate New York. As a military kid, I have moved around a few times, and I remember being devastated that this was where I would graduate from. The lack of opportunities in STEM at my school made me feel like I would never be able to explore computer science. Luckily, near the end of my freshman year, I found out about The Gatton Academy through a friend. I was hooked immediately and went home that day with the intent to discover everything I could about this school. I spent the next few days telling my parents about what Gatton offered and knew I'd apply the next fall.

Being at The Gatton Academy has allowed my passion for computer science to thrive, and I am now certain I will pursue a career in this subject. This summer, I was given the chance to participate in the WKU Sisterhood Research Internship Grant, where I took part in creating a robotic training program in virtual reality. As a high school student, I never would have dreamed I would learn how to use a game engine to simulate complicated scenarios. I have learned so much over these eight weeks, and for that, I am grateful for the opportunity you have given me. Thank you for making this summer possible.

Sincerely,
Isabel Ocegueda





"I realized STEM was my passion when I spent hours coding a project for fun instead of doing any of my actual schoolwork. I definitely stayed up late that night making up for that mistake."

"The biggest challenge in my research I will have to overcome is figuring out the layout of my research. Since the overall research project is only a month old, I'm excited to help with the set-up of it and be part of its formation."

"As a young person interested in STEM, research is a way to explore the subject area I am interested in via a hands-on approach. Research provides experiences and knowledge I can't read about in a class and lets me gain a deeper understanding of the subfield my research focuses on."

Isabel Ocegueda

Home High School:
Fort Knox Middle High School

Research Area:
Computer Science

Career Goal:
Computer Scientist

Research Mentor:
Dr. Jeffrey Galloway
WKU Department of Computer Science

Extracurricular Activities:
Gatton Academy Leaders in Education, Coding Club, Girls Who Code, and Catholic Women's Group

Samirah Salifu
Bowling Green, Kentucky (Warren County)

Dear WKU Sisterhood,

The Gatton Academy initially caught my interest because I knew it was a place to challenge myself in all aspects of STEM. I live in Bowling Green and have always thought I would go into the medical field like the rest of my family. The Gatton Academy, however, has helped me realize I want to forge my own path. I have always loved math, and chemistry is the perfect utilization of this subject. Initially, I was afraid to stray off my family's path and worried I wasn't creative enough, but now I know I want to become a biochemical engineer. I have always had a hard time choosing between all the STEM interests I like, and becoming an engineer solves this by combining all my interests. Through research at The Gatton Academy, I was able to work hands-on with the STEM areas I enjoy.

This summer I decided to focus on a different aspect of STEM: computer science. My research focuses on developing a job scheduler that sends jobs to multiple computers based on the resources available on each computer. I enjoy computer science and hope to be able to implement it into my career. With this opportunity, I hope to publish my research and present at many research conferences. I have also gained many skills and connections through my work in a computer lab. Thank you so much for giving me this opportunity. I know I will never forget the experiences I gained over the summer.

With gratitude,
Samirah Salifu

Samirah Salifu

Home High School:
Greenwood High School

Research Area:
Computer Engineering

Career Goal:
Biochemical Engineer

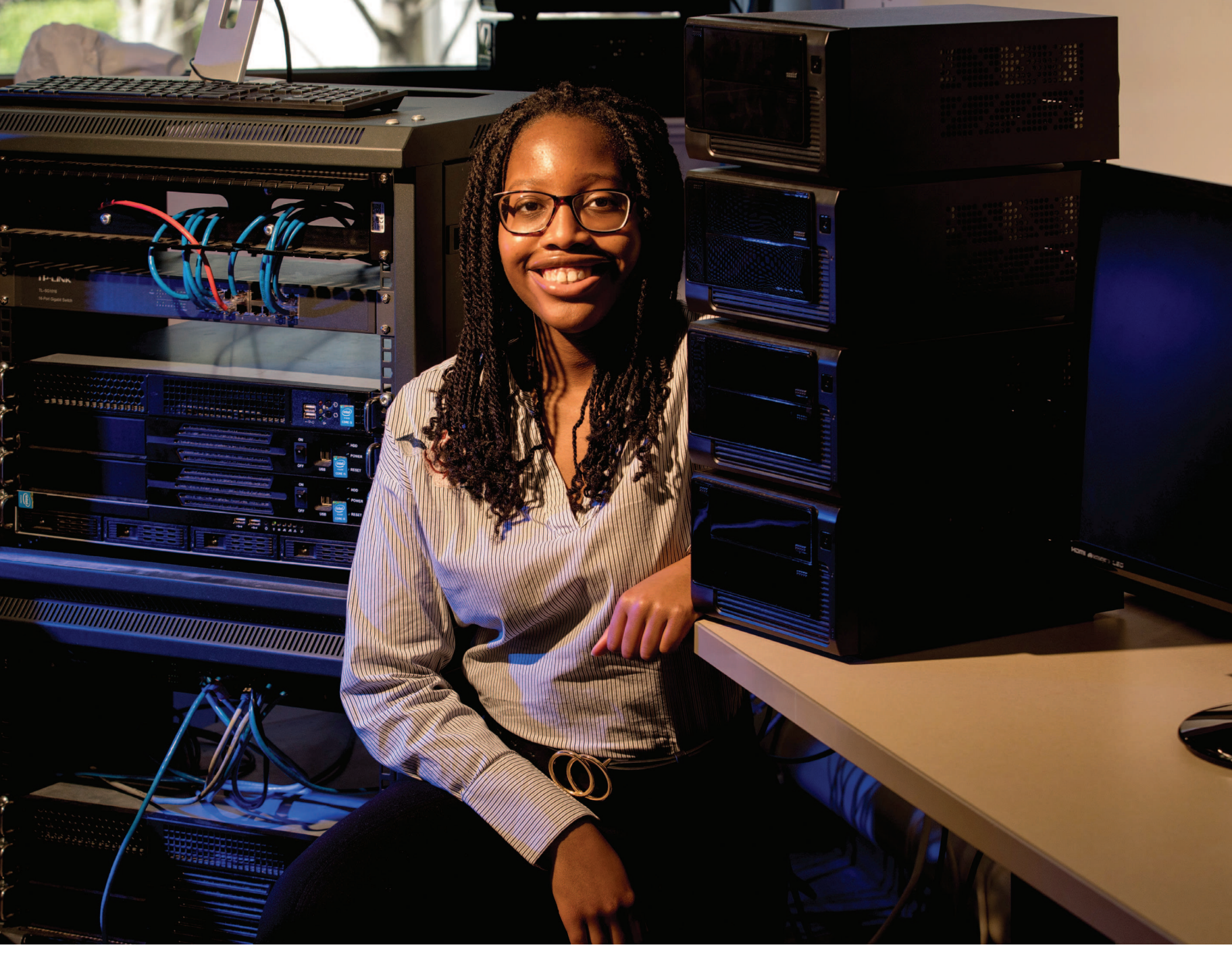
Research Mentor:
Dr. Jeffrey Galloway
WKU Department of Computer Science

Extracurricular Activities:
Project Unite, Women in STEM, FIRST Tech Challenge, Science Olympiad, Girl Up, and Gatton Academy Medical Association

"I realized STEM was my passion when I investigated CRISPR Cas 9 after learning about it in a science club. CRISPR Cas 9 is an endonuclease protein that can help with gene editing in human genomes. This experience is what made me want to pursue a bachelor's degree in Biochemical Engineering."

"The biggest change I experienced during my first year at The Gatton Academy was my mindset. When I was accepted into Gatton, I knew I would be surrounded by exceptional students. I had to adjust my mindset so that I was not constantly comparing myself to everyone. Gatton is a wonderful community that prioritizes happiness and encourages students to see each other as friends and not competition."

"As a young person interested in STEM, research is a way for me to gain a great deal of knowledge and be able to apply said knowledge in a way that is helpful to society. Research also allows me to explore different aspects of STEM I have not seen in my classes."




Thank you, Mr. Gatton!
THE GATTON ACADEMY
of Mathematics and Science

"As a young person in STEM, research means exploration. I am getting to tread waters no one has ever treaded before, just as many scientists have previously done. As someone who grew up reading about great scientists doing research, it feels like a dream to finally do it myself."

-Barrett Gibbs

"The biggest change I experienced during my first year at the Gatton Academy was my mindset. When I was accepted into Gatton, I knew I would be surrounded by exceptional students. I had to adjust my mindset so that I was not constantly comparing myself to everyone. Gatton is a wonderful community that prioritizes happiness and encourages students to see each other as friends and not competition."

-Samirah Salifu

"This research experience will help me build a foundation to work on more advanced projects in the future. It is a great way to ease myself into working in a professional environment."

-Apirada Chetawatee

"The best piece of advice my mentor has given me is to pave my own path. This means going out of my way to understand the concepts behind the questions I may have or asking about opportunities I want to participate in."

-Andrew Park


WKU