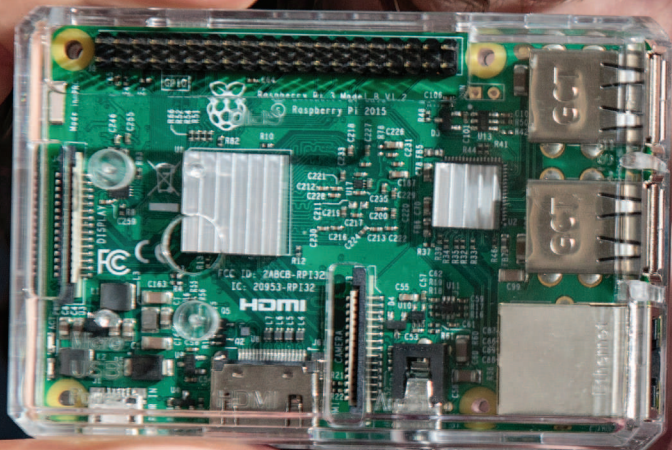


**Infinite Possibilities: Profiles of Summer Research from
The Gatton Academy of Mathematics and Science in Kentucky**

Volume Nine - Summer 2019





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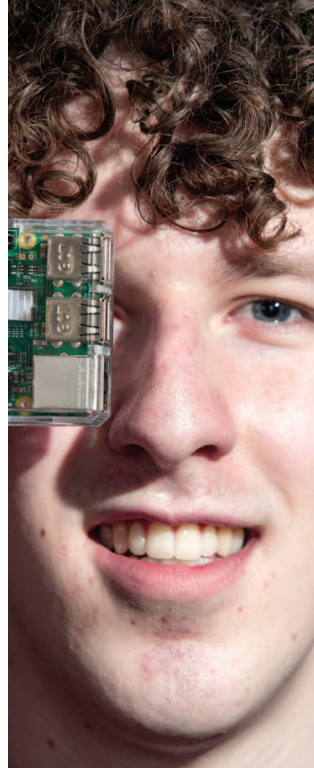
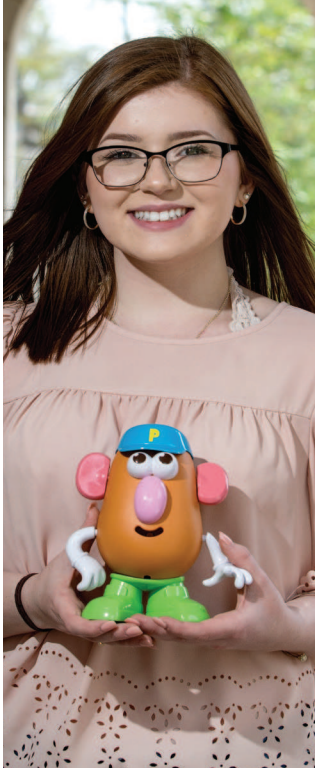
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of Mathematics and Science

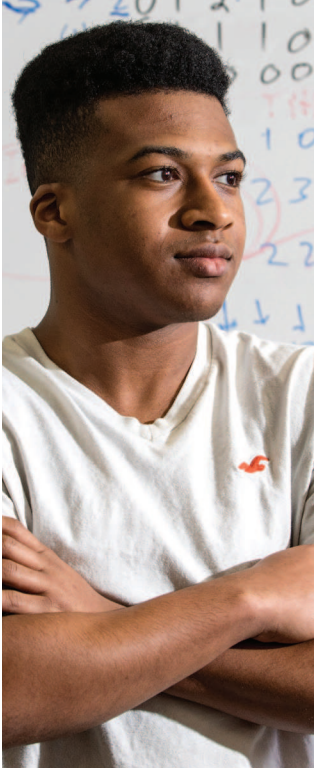
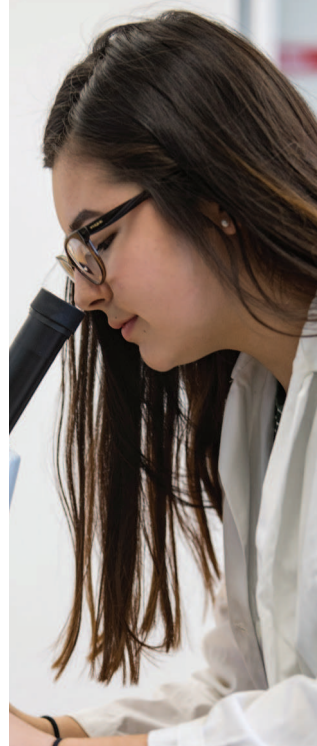
Infinite Possibilities:
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About the Gatton Research Internship Grant Program

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 ten years, the program has created 170 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. As examples, summer 2018 recipients of the Gatton Research Internship Grant were recognized in nationally prestigious competitions. Sydney Wheeler was a national semi-finalist in the Regeneron Science Talent Search, the nation’s premier competition for high school students who conduct research. Alexander Stewart and Sydney Wheeler both received the Barry M. Goldwater Scholarship—the top undergraduate scholarship for students in STEM research. Meanwhile, last summer’s Gatton Research Internship Grants resulted in 60 student-delivered presentations at conferences across the state and nation in the 2018-19 academic year. Two separate teams of students contributed 26 of these presentations: Elvin Irihamye and Satya Moolani’s work with the popular cancer-fighting drug Cisplatin resulted in 11 presentations, while Abdullah Ateyeh and Rithik Reddy’s work, looking at factors that contribute to healing diabetic foot ulcers, resulted in 15 presentations. Sydney Wheeler published the findings from her Gatton Research Internship Grant in the journal *Perception*, while Elizabeth Embry published her results in the *Beilstein Journal of Nanotechnology*.

The Gatton Research Internship Grant program funded 18 rising high school seniors during the summer 2019. In addition, the WKU Sisterhood funded an additional two female students from underrepresented populations from their own Research Internship Grant program. The following pages feature these students.



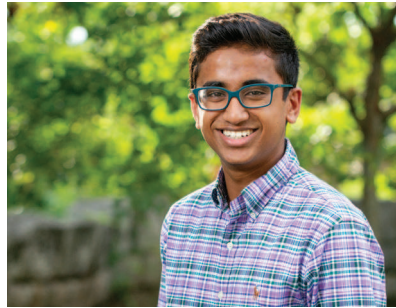
Abdullah Ateyeh



Elizabeth Embry



Elvin Irihamye



Satya Moolani



Rithik Reddy



Alexander Stewart



Sydney Wheeler



Dear Mr. Gatton,

Each year just before graduation we recognize Gatton Academy students for their accomplishments while in our program. As we recognize those who presented their research at professional conferences or were published, I am overwhelmed. These are high school-aged young adults becoming contributing experts in a discipline. Oh, the places they will go and how they will contribute!

Their opportunities to pursue their areas of interest and developing expertise is thanks to your generosity. The Gatton Research Internship Grant has allowed 18 students to dive into a wide range of disciplines, including Management, Mathematics, Psychology, Physics, Biology, Chemistry, Computer Science, Exercise Science, Geography/Geology, and Life Science. The Gatton grant also facilitated the awarding of the WKU Sisterhood Grant that is funding two additional students' summer research.

Thank you for building a bridge for our students, enabling them to pursue their infinite possibilities. We are grateful for your commitment to education and the legacy you have established through supporting students.

With deepest gratitude,
Lynette Breedlove, Ph.D.
Director





Mary “Belle” Begley
Springfield, Kentucky (Washington County)

Dear Mr. Gatton,

My name is Belle Begley, and I am currently a rising senior at The Gatton Academy. I am from the small town of Springfield in Washington County, and I grew up there with my four older siblings and my parents. Through my family, I found my passion for engineering, because three of my siblings are either currently pursuing or have graduated with a degree in civil engineering. When I was younger, I was always very curious. This curiosity drove my passion for educating myself all the way to The Gatton Academy. I am only the second student to ever attend the Academy from my county.

Through my junior year at Gatton, I found my passion for chemical engineering, which I am hoping to major in at the University of Louisville next year. My love of chemistry led me to the Research Internship Grant, or RIG, which I participated in this summer. Through my RIG, I received an eight-week internship in the WKU Department of Chemistry with Dr. Bangbo Yan. My research project focused on finding a crystal with the ability to capture excess carbon dioxide from the atmosphere. This crystal could be used in future renewable solar energy sources. This project has helped me confirm my desire to pursue a degree which involves chemistry and possibly research.

I would like to thank you for your generous contributions to Gatton over the years. The Gatton Academy has taught me so much about myself and my abilities. I can say with confidence that it has truly changed me into the person I am today. I have grown and matured into a responsible young woman, and I cannot wait to see where this next year of Gatton and the rest of my life takes me.

Sincerely yours,
Belle Begley

Mary “Belle” Begley

Home High School:

Washington County Senior High School

Research Area:

Chemistry

Career Goal:

Chemical Engineering

Research Mentor:

Dr. Bangbo Yan
WKU Department of Chemistry

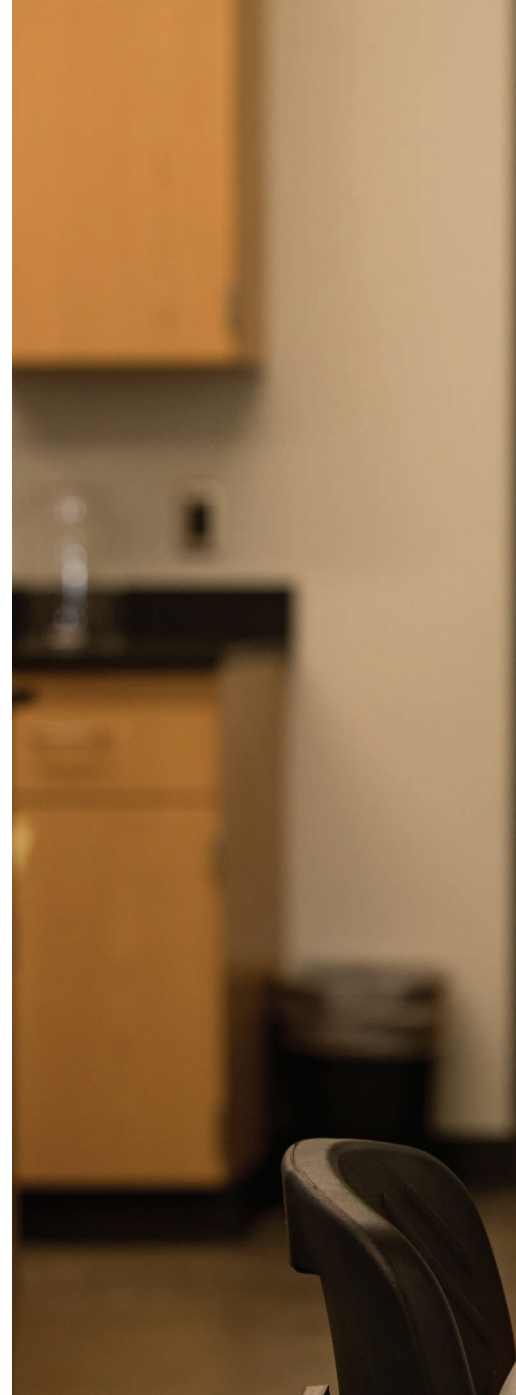
Extracurricular Activities:

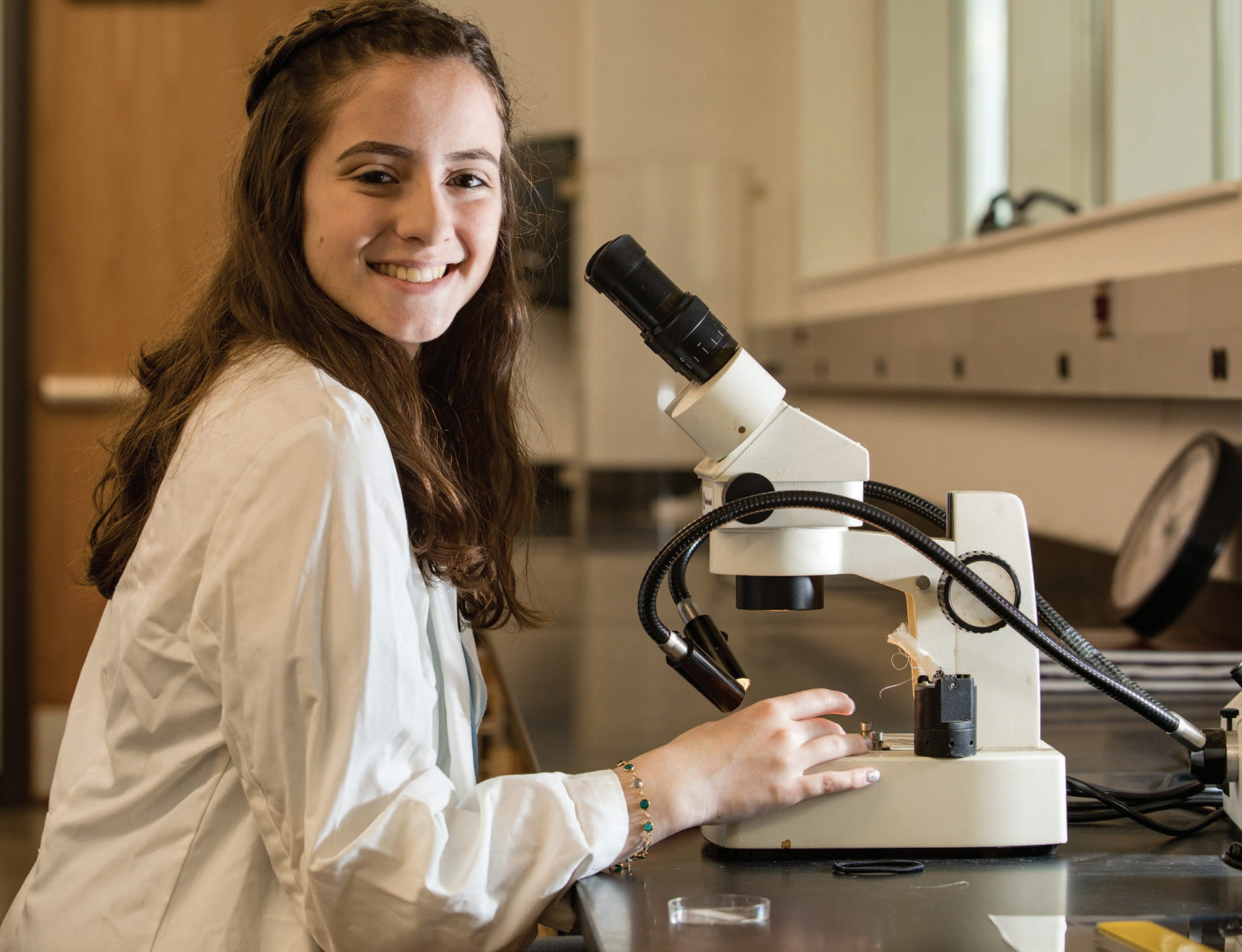
Gatton Academy Leaders in Education, Academic Team, 4-H, National Honor Society, Beta Club, and Family, Career, and Community Leaders of America

“I believe the biggest challenge to overcome in my research will be understanding complex chemistry concepts which I haven’t studied before. Another obstacle will be learning how to use advanced research equipment.”

“To me, research means studying topics which are imperative to the quality of life of future generations and the betterment of the world as a whole. I believe young people must understand the importance of research and attempt to aid this work in any way possible.”

“Through this experience, I hope to better understand the day-to-day life of a researcher. After years of watching fictional television shows such as ‘Bones,’ I am excited to see what a research career is truly like.”







Michael Givens
Greensburg, Kentucky (Green County)

Dear Mr. Gatton,

Whenever I tell people my hometown is Green County, I get some confused looks. I often refer to it as “45 minutes south of Elizabethtown” or “very south central Kentucky.” Green County is an extraordinary place to grow up. We have all of the homey, small county traditions, like hanging out in random parking lots or the whole town showing up for a football game. It taught me the values of family, hard work, and community.

Green County, albeit great, was limiting. I traveled plenty and saw multiple paths of life, but I was clueless as to how to get on any different path. The Gatton Academy opened those doors for me. Gatton gave me the opportunity to pursue whatever my heart desires. I have the chance to get into a great college instead of seeing them as a pipe dream. Thanks to this Research Internship Grant, I was even given the opportunity this summer to follow my passion for business and participate in business research, presenting my results in February at the Small Business Institute in New Orleans.

The Gatton Academy has given me the chance to not just dream of an amazing future, but to actually obtain one. It is truly “Infinite Possibilities.” For that, I will forever be grateful.

Sincerely,
Michael Givens

Michael Givens

Home High School:

Green County High School

Research Area:

Effect of Skill Congruence on Employee Job Satisfaction in Supply Chain Professionals Working in Small Businesses

Career Goal:

CEO of an International Corporation

Research Mentor:

Dr. LeAnne Coder
WKU Department of Management

Extracurricular Activities:

DECA, Boys and Girls Club, National Beta Club, Yearbook, Student Y, Science Club, Stock Market Club, and Business without Borders

“As I want to become a CEO in the future, this research has shown me the importance and implications of job satisfaction on my ability to manage many people in a large-scale company.”

“Research is a way to prove that I am not a person who just respects STEM, but one who can shape it and change it.”

“My favorite Gatton memories are the times I have sat at the Colonnade with friends and talked for hours.”







Maggie Gossage
Russell Springs, Kentucky (Russell County)

Dear Mr. Gatton,

To begin, I would like to introduce myself. My name is Maggie Gossage, and I am from Russell Springs, a small town nestled right on the bank of Lake Cumberland.

I do not really remember how I found out about The Gatton Academy, but I know that when I did, I was set on applying. Getting into Gatton was bittersweet; I was thrilled about the new opportunity, but I had to leave the best principal in the world behind, my Dad. I had been raised in the halls of Russell County High School, and I was leaving them after only two years.

My decision to apply and attend was the best decision of my life. I have learned about myself and the world through my experience here, and I have become more independent. Before coming to Gatton, I thought I wanted a career in psychology, but through class and research, I found a passion and love for neuroscience. Without the Academy, I would have never been able to pursue classes that interested me and find the field that I am passionate about.

This summer has been the best summer of my life. I never could have dreamed that I would be able to do undergraduate research as a 17-year-old. For my project I studied male body image and action figure physiques with Dr. Rick Grieve in the Department of Psychology. Through this experience, I gained hands-on skills in the lab and confidence in my writing ability. I plan to submit my findings to the Regeneron Science Talent Search this fall and present at upcoming psychology conferences.

Without your generous donation, I would not have had the experience of a lifetime this summer. I thank you from the bottom of my heart for giving teens like me these opportunities unlike any other: to grow and pursue their passions in STEM.

With gratitude,
Maggie Gossage

Maggie Gossage

Home High School:

Russell County High School

Research Area:

Psychology

Career Goal:

Neurology

Research Mentor:

Dr. Frederick Grieve
WKU Department of Psychology

Extracurricular Activities:

Gatton Academy Leaders in Education, Student Y, Yearbook Club, Tennis Club, Fellowship of Christian Athletes, Track & Field, Cheerleading, Russell County High School Class of 2020 President, National Honor Society, Kentucky Youth Assembly, and Kentucky United Nations Assembly

“My biggest challenge in my research is I will have to overcome the newness of the topic. In psychology, male body image is not a thoroughly-studied topic and has not been studied much until recent years. I hope that through this research we will be able to provide the realm of psychology and the world with new information about this topic and encourage others to research it more.”

“My favorite Gatton Academy memory to date was our pre-finals week ice skating trip. The afternoon was filled with attempts to skate, ultimate failure, and so much laughter in between. It was the best way to de-stress before our finals and make a memory that will last a lifetime.”

“The biggest challenge I experienced my first year at The Gatton Academy was computer science. Before Gatton, I had never been exposed to the thought processes that came with coding and computer science in general. I am thankful Gatton offers this course because it has taught me how to approach problems in different ways and has given me a newfound appreciation for this discipline.”







Matthew Johnson
La Grange, Kentucky (Oldham County)

Dear Mr. Gatton,

As you know, Gatton is about to begin its 12th year as being a place where STEM-oriented juniors and seniors pursue their future career. However, 12 years ago, I was starting kindergarten in southern California in Riverside County, completely unaware of the pivotal role The Gatton Academy and the Commonwealth of Kentucky would play in my life. Fast forward to the beginning of my teen years, when my father told me our family was relocating to Oldham County, Kentucky. When I entered 8th grade, I heard about Gatton from a sibling of an alumni, and the rest is history! I have loved my time at Gatton, and I have got to do so many things I never would have, such as international travel, research, and making connections with people I would not have had a chance of meeting otherwise.

Thank you so much for the gift you have given that made the Research Internship Grant possible as well. I had a great summer researching with Dr. Rachel Tinius of the WKU Department of Exercise Science, and I learned so much about what research really is. Most research I had done before my RIG had been completely focused on lab work. However, this summer I became experienced with all new facets of research. I went to the Medical Center to do real-time measurements on newborn babies, went to the houses of pregnant women to equip them with fitness trackers, and did study visits with babies at the WKU Exercise Science Research Lab. It opened my eyes to how research is little pieces that go together to make a whole. It was interesting to learn what it is like to be completely focused on research and not balancing it with schoolwork.

Thank you once again for the opportunity you gave me this summer.

Sincerely,
Matthew Johnson





“The summer experience I am most looking forward to is working at The Medical Center. I will be able to work closely with newborns and infants, which is an exciting opportunity for me.”

“The most challenging part of the research is that we are working with umbilical cord blood, since we obviously would not take blood from a newborn, and the umbilical cord blood is collected after it has been separated from the baby. However, the concentrations of the umbilical cord blood will most likely be less compared to regular blood, meaning we will have to adjust for certain protocols.”

“Research is going into something, having no idea what the results are going to be, and PRAYING that some sort of correlation occurs. It is academic guesswork.”

Matthew Johnson

Home High School:

Oldham County High School

Research Area:

Exercise Science

Career Goal:

Obstetrician/Gynecologist

Research Mentor:

Dr. Rachel Tinius
WKU Department of Exercise
Science

Extracurricular Activities:

Gatton Academy Medical
Association, Future Healthcare
Professionals, Boy Scouts of America
Eagle Scout, Gatton Academy
Leaders in Education, Gatton
Academy Yearbook, Y-Club, Student
Government, Beta Club, and National
Honors Society



Stuart Kernohan
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

I offer you my sincerest thanks for the opportunity you have provided me through The Gatton Academy and through the RIG program. One of the biggest factors that attracted me to the Academy was that it offered opportunities in undergraduate research. Through the coursework and research I have conducted at the Academy, I have solidified my plans to pursue a career in chemical engineering. My research is in organic chemistry and focuses on creating more effective catalysts for the synthesis of an important compound called sulfoxides.

I am extremely thankful for the challenges that attending The Gatton Academy has offered me. At my previous high school I had few challenges academically: school was a breeze, and I was tired of it. Going to Gatton has made me learn to study and work hard, as well as given me a much broader base knowledge in all different STEM fields. Thank you for everything you have done for me as well as hundreds of other students.

Sincerely,

Stuart Kernohan

Stuart Kernohan

Home High School:

Bowling Green High School

Research Area:

Organic Chemistry

Career Goal:

Chemical Engineering with a focus in Renewable Energy

Research Mentor:

Dr. Rui Zhang

WKU Department of Chemistry

Extracurricular Activities:

Student Y, Political Party Club, Tennis Club, Boys and Girls Club, Beta Club, and Choir

“My research is focused on creating new catalysts that are more efficient than ones currently used when making sulfoxides, substances that are useful in pharmaceutical and other industries. It matters a lot to me that I’m conducting research that could mean large improvements to our world.”

“The best advice my mentor has given me is to be persistent in learning new topics.”

“This summer I’m most looking forward to digging deeper into my research. The biggest challenge I expect to face is the fact that my research is organic chemistry, and I haven’t taken organic chemistry yet.”





Ashbey Manning
Ashland, Kentucky (Boyd County)

Dear Mr. Gatton,

When I came to The Gatton Academy, I had no idea what was in store for me. I knew I would be able to pursue my STEM passions, but I never knew just how much more there was to explore. Coming to The Gatton Academy has been one of the greatest challenges I have ever faced. I had to truly teach myself how to learn, how to succeed, and how to fight for my education. During my second semester, I realized the incredible opportunities at my feet as a high schooler living on a college campus, and that is when I found my research mentor in psychology.

The opportunity I received this summer to conduct research became an incredibly influential period in my life. While being able to solely focus on my research, I realized how much I truly loved the work I was doing in psychology. Under my research mentor, I was able to look into the effect that parental behavior health characteristics had on children's behavior and attempted to find a point of intervention in decreasing child behavior problems. Conducting this work on a community sample of children meant getting the opportunity to help everyday families, something that means the world to me. The ability to get to work with families in the community is also aiding me in the formation of numerous life skills bound to be important no matter what career path I choose. So, from the bottom of my heart, thank you. Thank you for giving me the opportunity to branch out. Thank you for letting me make my mark on the world.

Best,
Ashbey Manning





“My research helps me to be a more well-rounded student and future employee. While I do not study much psychology, the research I do in the department helps me to broaden my knowledge of more disciplines.”

“The biggest change I have experienced in my first year here at the Academy has been a change in interests. As a student who was once interested purely in math and engineering, I have picked up psychology research and even become a STEM + Arabic student.”

“To me, research means being able to see science in action. Reading about studies as opposed to conducting them are two completely different territories. Being a student in psychology research, I have gained a deeper appreciation for the field of psychology.”

Ashbey Manning

Home High School:

Boyd County High School

Research Area:

Psychology

Career Goal:

Unknown

Research Mentor:

Dr. Timothy Thornberry

WKU Department of Psychology

Extracurricular Activities:

Gatton Academy Leaders in

Education and Political Party Club



Lukas Negrón
Frankfort, Kentucky (Franklin County)

Dear Mr. Gatton,

I would like to say thank you for allowing me to participate in this opportunity. I am originally from Frankfort, where I lived with my parents, my brother, my cousin, and a few pets. I first learned about The Gatton Academy at the beginning of middle school at a math competition, and since then I made it my goal to attend. It would be no exaggeration to call it my dream, and now that I am here, I have had a better experience than I expected. My transition was a relatively peaceful one. I have never been homesick, and I am good at adapting to new routines. I also joined a very positive group of like-minded friends, which has made my free time enjoyable.

Over the summer, I worked on developing code to perform a specific operation on mathematical knots and links. In the future, I plan to become an engineer and work with renewable energy. I also hope to improve my coding skills while in school, whether as a hobby or in classes. Overall, this summer has been great in that it has allowed me to experience both what a work environment would be like and what it would be like to live away from home without the resources that The Gatton Academy provides readily available.

Thank you,
Lukas Negrón



“I’ve always been interested in pure math. I find the combination of abstract concepts and computer science to be what I like to learn about, and I think that an extended study into this field will help me in my future professional pursuits.”

“My favorite Gatton Academy memory so far has been studying abroad in Costa Rica. Not only was this a great educational and cultural experience, I was able to go to Costa Rica with my friends.”

“I’ve always wanted to help the world as much as possible, but I have never been able. Research means that I am finally able to add to the human knowledge base and contribute in my own way.”

Lucas Negron

Home High School:

Western Hills High School

Research Area:

Knot Theory

Career Goal:

Engineer

Research Mentor:

Dr. Claus Ernst

WKU Department of Mathematics

Extracurricular Activities:

Science Bowl, Math Team, Computer Science Club, American Regional Mathematics League, Gatton Student Alliance, and Tennis Club



Ngoc Nguyen
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

I want to start by thanking you for one of the most enlightening and challenging experiences of my life. I am a refugee from Vietnam who was settled into a government-subsidized neighborhood less than 10 minutes from the Academy in 2008 during its opening year. If you had told me then that I would be there one day—well, I would not have even been able to understand what you were saying. Neither of my parents completed high school back in Vietnam, so growing up I was driven only by my passion for learning as I pursued whatever happened to pique my interest. Somehow, I was able to “slip through the cracks” (as Derick Strode, a staff member at the Academy, would say) and gratefully ended up at my second home.

Attending the Academy has opened up many opportunities that I did not think were possible for someone of my background. Currently, I am interested in chemistry and am participating in a Gatton Research Internship Grant to study degradable polymers. This experience has enriched me so much, and you do not know how much it means for me to have such a knowledgeable and caring mentor.

One of the most important realizations I have had after a year at the Academy is that I am more than just my background; even though it is still an important part of me, my present and future are in my hands. For the first time in my life, I was not lying to my friends about my home life. For the first time in my life, I truly felt like I was controlling my academic and professional future rather than just “slipping through the cracks.” My growth and realization would not have been possible without the helpful and compassionate staff, supportive environment, and you at the Academy.

Thank you again,
Ngoc Nguyen

Ngoc Nguyen

Home High School:

South Warren High School

Research Area:

Organic Chemistry

Career Goal:

Chemist

Research Mentor:

Dr. Lawrence Hill
WKU Department of Chemistry

Extracurricular Activities:

Department of Energy Science Bowl,
Women in Science and Engineering,
Science Dance, and Academic Team

“I am most looking forward to immersing myself in my research this summer. I love the topic I am researching, so during the summer I will have a lot of time to dedicate to exploring and progressing through our research goals. It will be a time where I can focus solely on my research and not have to worry about other obligations.”

“I would like to be a synthetic chemist, and the research internship really aligns with my goal. In my lab, I am constantly creating novel substances and characterizing them. It’s really exciting for me to create something brand new, and I also believe my research will allow me to learn and experience more of the field of synthetic chemistry.”

“The biggest change I have experienced in my first year at The Gatton Academy is being more independent and getting to know myself better. At Gatton, I am encouraged to follow my true passions, and I am given limitless opportunities.”







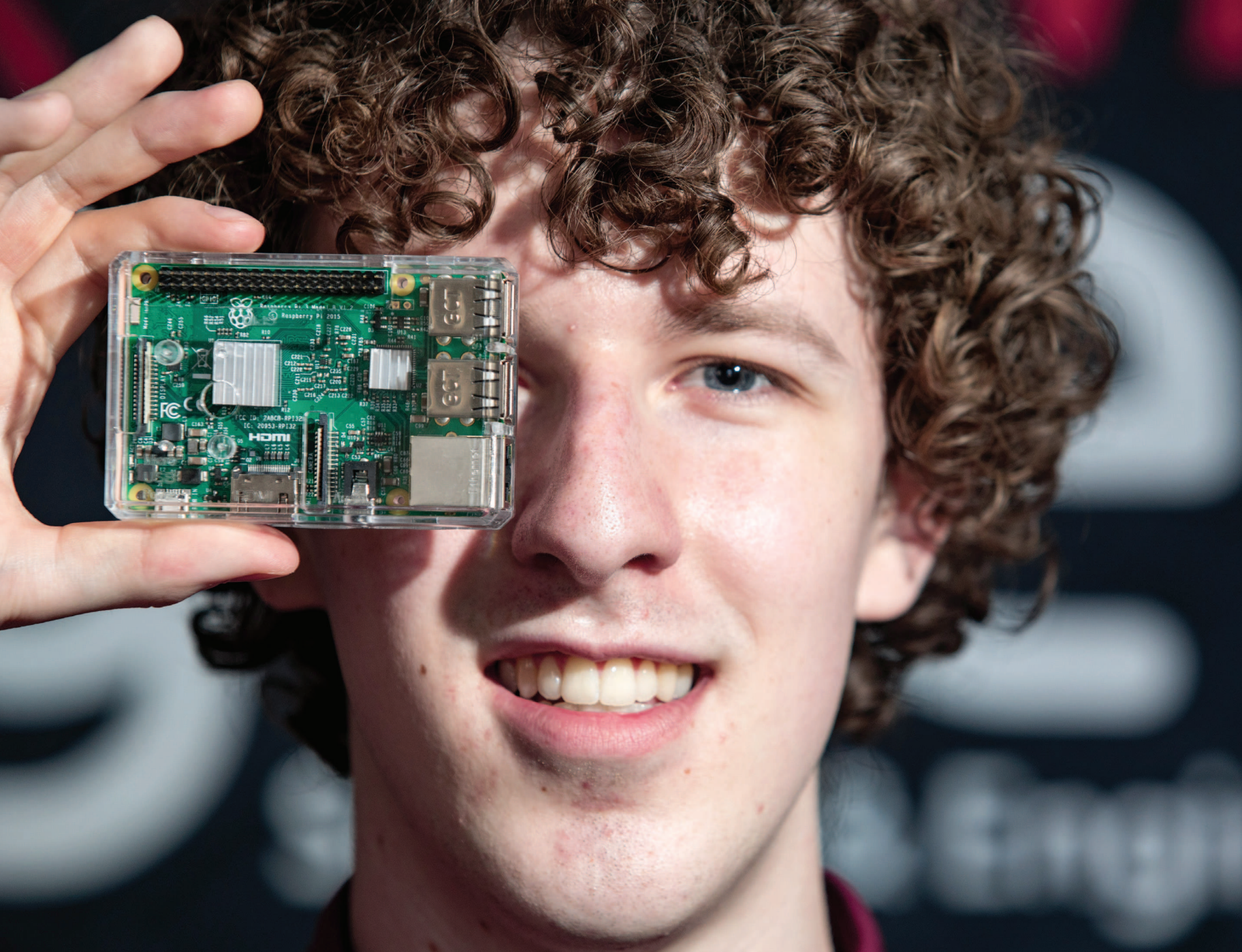
Patrick O'Boyle
Elizabethtown, Kentucky (Hardin County)

Dear Mr. Gatton,

My name is Patrick, and I am a rising senior from Elizabethtown. When I was in 6th grade, I went to my first Gatton Academy information session. There, I listened to Gatton alums talk about their experiences. The students' sense of community and passion for STEM drew me towards Gatton— I knew it was the place where I belonged. It sounds cliché, but Gatton has truly expanded my horizon. I have learned how to make my own opportunities, and I have explored new interests that have opened me up to the “infinite possibilities” ahead. The RIG, for example, has helped me find new interests within the broad domain of computer science. Even though open-source, Linux, and security were not in the scope of my project, I was still exposed to them because of the nature of research. It was great because I was able to learn about a field both in breadth and depth.

I spent eight weeks in Dr. Galloway's cloud computing lab working on a smart parking application. The software uses computer vision to detect cars in order to monitor parking availability. I have learned about everything from documentation methods to new languages to development tools. None of this would have been possible without you. I am grateful for the opportunities you have helped provide for me and many others throughout the state.

Sincerely,
Patrick O'Boyle



“One of my best nerd moments happened while I was learning Java. I was amazed by the power of the binary search algorithm. It represented two of my interests, math and computers, fusing together into something beautiful.”

“My research will prepare me for my future in computer science. I’ll be coding, running experiments, and documenting my process while learning how to use new tools and algorithms. The experiences will translate to new skills I can hone later.”

“My favorite Gatton memory is when I went to Film Club for the first time. It brought back my passion not only for film, but for art in general.”

Patrick O’Boyle

Home High School:
John Hardin High School

Research Area:
Computer Vision

Career Goal:
Information Security/Privacy

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

Extracurricular Activities:
Computer Science Club, Film Club,
and Story Club



Uria Park
Crestwood, Kentucky (Oldham County)

Dear Mr. Gatton,

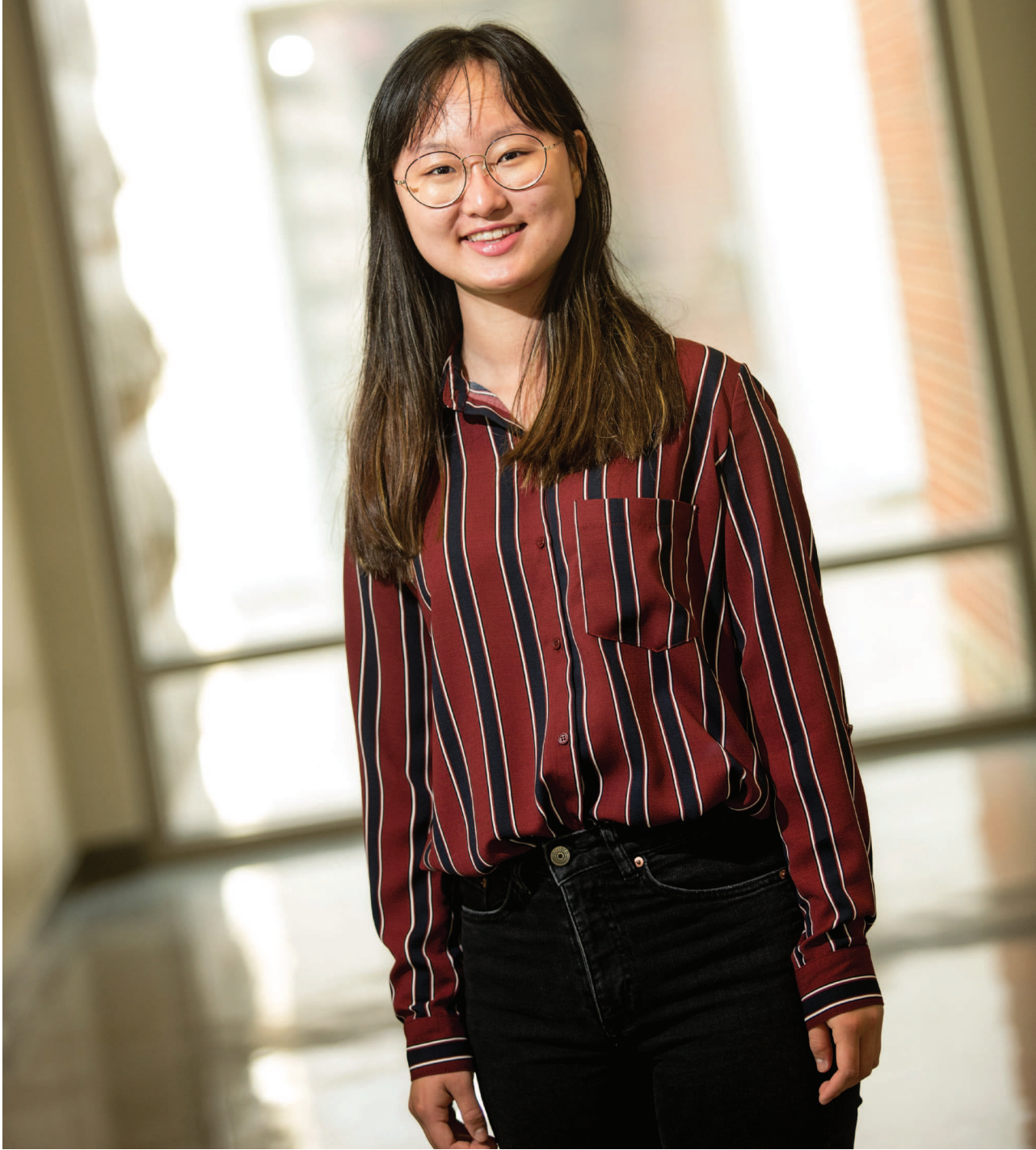
I am Uria Park from Oldham County, and I wanted you to know how Gatton has grown to become a community I am proud and honored to be a part of! Coming here has provided me with so many opportunities like the RIG, new academic skills like coding, and most importantly, the strong community.

I remember how at South High, I did not need to pay attention in class half of the time to be successful. That all changed when I came to Gatton. I thought, 'How hard could it be?' By the end of the first semester, I had gotten three B's out of the six courses I took. When I got my grades back, I was ready to cry. I was overjoyed when the semester had ended, but I was frustrated at myself for not being able to reach my usual level of academic excellence. Nevertheless, I can confidently say that I have been able to survive a semester of college while learning how to code Java, how to maintain a work-life balance, and all while building strong relationships. I have been academically challenged by my research this summer, gaining valuable experience by working nearly independently in a lab, an experience that will prepare me well for medical school.

I have grown so much in such a short time and expect there will only be more growth in the future. I look forward to building my relationships with my amazing peers and mentors, who I have only had the chance to meet because of incredible supporters like you.

I sincerely thank you for your contributions and your interest in assisting the academic endeavors of countless students.

Thank you,
Uria Park



“I knew STEM was my passion when I realized I had spent five hours on a Saturday watching videos of the biology and anatomy of chickens and other various farm animals.”

“In order to attend medical school, I will have to gain clinical and laboratory experience, and this summer research helps me attain that goal. I am also an avid advocate for protecting the environment, and this project is a way that I can start to combine my efforts with my educational goals.”

“I am looking forward to developing my leadership and communication skills while learning about microbiology. I was intrigued by Dr. Himes’ (my mentor) research project, which involves identifying a strain of bacteria that is able to identify an optimal bacteria that is able to fix nitrogen. I am particularly excited to help with his project, as the goal is to reduce the amount of soil that has been mixed with toxic human chemicals.”

Uria Park

Home High School:

South Oldham High School

Research Area:

Microbiology

Career Goal:

General Physician

Research Mentor:

Dr. Paul Himes
University of Louisville,
Department of Life Sciences

Extracurricular Activities:

Gatton Academy Medical Club,
Future Healthcare Professionals,
Science Dance, and Women in
Science and Engineering



Usman Salim
London, Kentucky (Laurel County)

Dear Mr. Gatton,

My name is Usman Salim, and I am a member of The Gatton Academy's class of 2020. I am a first-generation Pakistani-American, meaning that my parents immigrated to this country from Pakistan many years ago. In doing so, my parents faced many hardships, such as assimilation and racism, but they endured all of this willingly with the hopes that my brothers and I could have a life and education better than what they had back in Pakistan. I have found such an education here at The Gatton Academy, and I am thankful for my parents for allowing me to come all this way to receive it, even if it means going away from home.

Coming in to the Academy last fall, I already knew that I was interested in medicine and its related biological fields, so I immediately set out to find research in the fascinating world of biology. I have been able to join Dr. Ajay Srivastava's lab in WKU's Department of Biology, where I am studying genetics research. For my research I have been working with *Drosophila melanogaster*, more commonly known as the fruit fly. Thanks to your generous contributions, I was able to extend my research through summer, where I dived even deeper into my project of identifying a cause of potential tumor metastasis-inducing genes in fruit flies that are related to those in humans. Without your gift, I would not have been able to explore this field that I have come to love.

The Gatton Academy has solidified my future career goals and provided me with many other opportunities, such as my summer RIG and study abroad in England. These are experiences I would never have gotten to take part in without this school that I call home. Thank you.

Sincerely,
Usman Salim





“Part of my research involves dissecting fruit fly larvae and isolating their Air Sac Primordia. This can be difficult, as I will be dissecting such small samples while looking at them through the microscope. However, I have no doubt I can get better since I will be performing many dissections over the summer.”

“One of the best pieces of advice that my mentor has given me is, ‘Don’t worry if you mess up a bit at first. Part of practice is learning and getting better, which will happen with time.’”

“My goal is to go to medical school and eventually become a doctor, and my research this summer has potential medical applications.”

Usman Salim

Home High School:
North Laurel High School

Research Area:
Biology

Career Goal:
Cardiologist

Research Mentor:
Dr. Ajay Srivastava
WKU Department of Biology

Extracurricular Activities:
Boys and Girls Club, Y Club, Tennis Club, Bollywood Movie Club, Beta Club, and National Honor Society



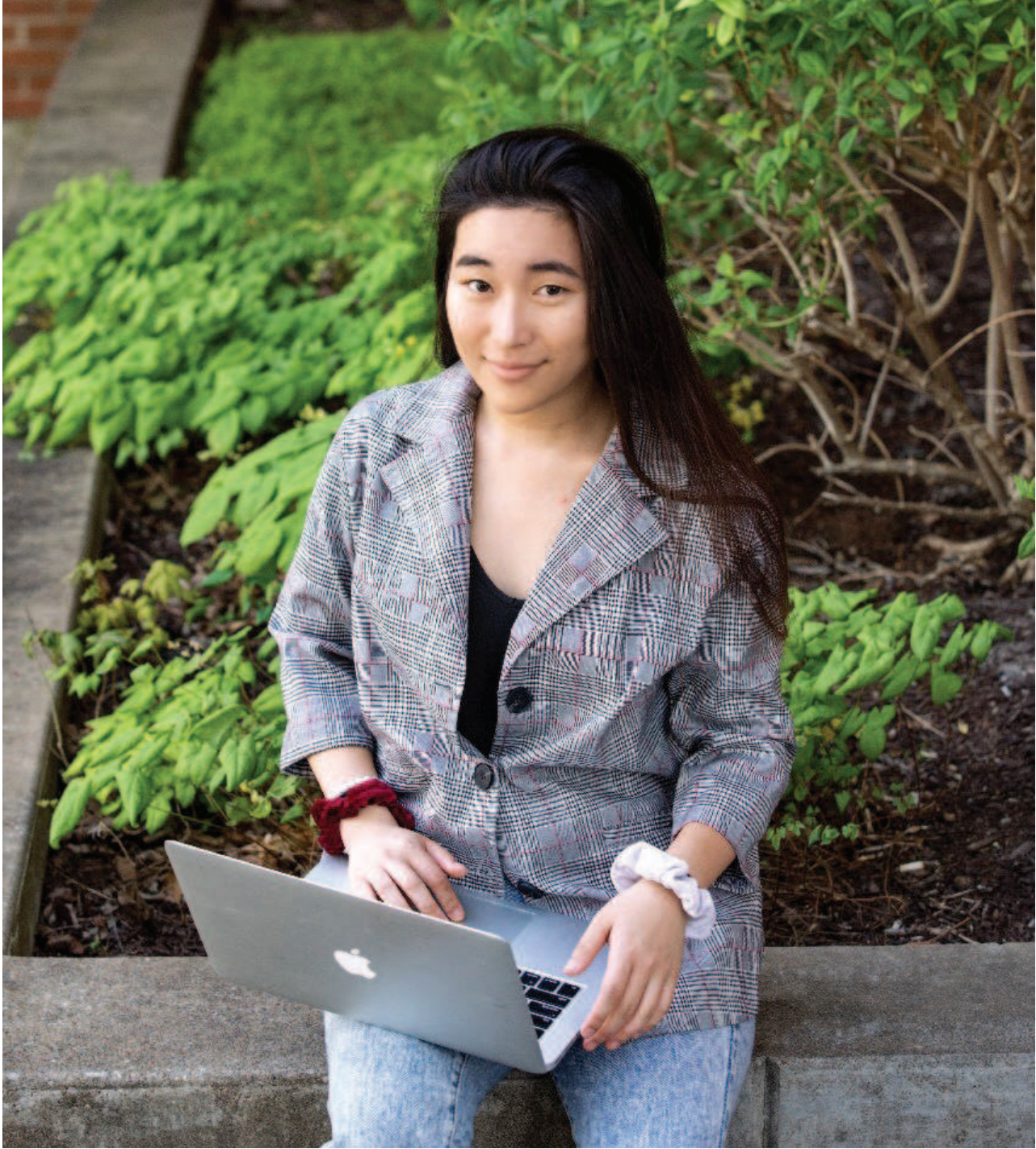
Eumin Shin
Morehead, Kentucky (Rowan County)

Dear Mr. Gatton,

Renowned innovator and intellectual figure Henry Ford once stated, “Quality means doing it right when no one is looking.” Growing up amid Appalachian culture, it was difficult for me to clearly articulate my goals and interests to other individuals. Many of the people in Eastern Kentucky looked ahead and never upwards. Due to this, I always felt as if opportunity was the barrier holding me back from the goals I had. This is what ultimately brought me to The Gatton Academy, where barriers were no longer present and instead replaced by guiding steps by those who sought more. Although the change from my home school to The Gatton Academy was incredibly different, I could not be more thankful for the opportunities it has presented. From the struggles of learning computer science, along with the knowledge of the perfect amount of time to microwave a bowl of Ramen noodles in the microwave, Gatton has changed my perspective in more ways than one. Without the Academy, I would have never been able to experience the impact that STEM education could truly have on not only individuals such as myself, but ultimately the future of innovation.

With the opportunities granted to me, I have been given the chance to expand my knowledge with the Research Internship Grant this summer. This grant allowed me to work within the areas of geology and climatology this summer, where I correlated several different variables into a comprehensive diagram. With the skills I acquired over the summer, I hope to pursue a double major in business and medicine, hopefully combining both skills to become a businessperson as successful as you. This summer has broadened my academic goals, allowed me to experience real-world work, and given me unforgettable memories that I will carry throughout the progression of my academic future.

Thank you for not only the opportunity, but also the experience, Mr. Gatton,
Eumin Shin



“I feel that this internship will allow me to develop a better work ethic and give me a form of real-world work experience that I wouldn’t have been able to acquire otherwise. One of my favorite quotes states, ‘Wealth is in the mind and not the pocket.’ What good is a quote if it is not able to be applied to my experiences?”

“Prior to attending Gatton, I never encountered any form of coding. After being at the Academy for merely a month, I realized computer science was not only a valuable skill to have, but also one that was a baseline for most STEM research. The biggest challenge was acquiring a new way of thinking needed for computer science.”

“As a young person interested in STEM, research is the logical progression from thought to product. I think research is important in the establishment and future of any field, specifically in STEM areas.”

Eumin Shin

Home High School:

Rowan County Senior High School

Research Area:

Meteorology and Geology

Career Goal:

Financial Analyst

Research Mentor:

Dr. Xingang Fan
WKU Department of Geography and
Geology

Extracurricular Activities:

Kentucky Youth Assembly, National
Forensics League, Congressional
Debate, Academic Team, Future
Problem Solving, Piano, and Violin



David Suarez
Somerset, Kentucky (Pulaski County)

Dear Mr. Gatton,

I am David Suarez, a rising Academy senior from Southwestern High School in Somerset. I have grown up in eastern Kentucky for most of my life, and when I first learned about the Academy, I was initially only interested in attending due to the fact that I ran out of mathematics courses to take at my home high school. There was not much more to it at the time, but I eventually began to realize that my rationale for attending the Academy was completely flawed. There is much more to Gatton than meets the eye. I began to realize this at the beginning of my first semester.

I have met an incredible, empowering community that continues to inspire me to further pursue my dreams in physics and mathematics. I have been able to join extracurricular activities such as the Gatton Academy Leaders in Education (GALE) organization, where we trained a low-income elementary school academic team to advance to their regional competition over the course of just a few months. I have joined the Society for Physics Students, where I volunteer for a high school Physics Olympiad hosted by Western Kentucky University.

I have been able to make lasting connections with physics and mathematics faculty and students at WKU, which has allowed me to pursue summer research in the study of quark stars. I find it hard to believe that I would have ever conducted such research in Somerset. This invaluable research experience will only serve to further my career aspirations as I continue my study of physics.

None of this would have been possible without the Academy, and I would like to sincerely thank you for your generous donation to the program.

Sincerely,
David Suarez

David Suarez

Home High School:

Southwestern High School

Research Area:

Quantum Quark Star Formation

Career Goal:

Physicist

Research Mentor:

Dr. Keith Andrew

WKU Department of Physics and
Astronomy

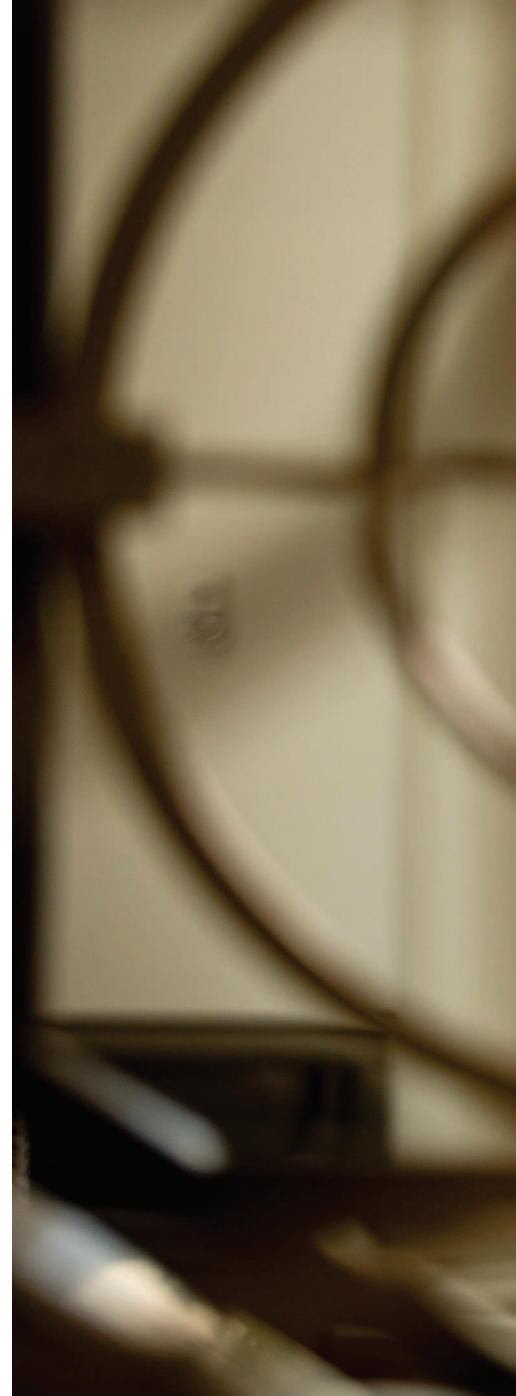
Extracurricular Activities:

Gatton Academy Leaders in
Education, Science Bowl, Math Club,
and Society for Physics Students

“I’m looking forward to delving into the different fields of physics I’ll need to understand as a part of my research and overall summer experience. Being able to be a part of the Gatton Research Internship Grant has opened up possibilities for me to work in a field I truly enjoy, and for that, I am incredibly grateful.”

“Through my experiences doing research at Gatton, I hope to make a more thorough and conclusive decision on the type of physics research I’d like to pursue as an undergraduate, whether it involves theoretical, computational, or experimental aspects of physics. This research experience will help me make that decision earlier in my career.”

“As a young person interested in STEM, research allows me to fully apply my understanding of a general concept to today’s most challenging problems in science. Through the entire process of research, there are elements common to every field of science: from observations, to experimentation, analysis of data, and communication of results, research provides a rigorous framework forming the foundation of modern science. Once I came to this realization, I knew I wanted to be a part of the research experience.”







Elisha VanZant
Lexington, Kentucky (Fayette County)

Dear Mr. Gatton,

Ever since I was young, I knew I wanted a career in math or science, but being from Lexington, I was simply part of the crowd. My home high school had around 2,400 students, with more than 600 of them in my class. I was always just an ordinary student. I wanted to stand out; I wanted to be more. This led to my decision to apply for The Gatton Academy, where I could focus more on what I wanted and become an outstanding student.

Coming to The Gatton Academy last year, I did not know what I wanted to pursue as far as a career. It was between biology, chemistry, or maybe even mathematics. Through the targeted coursework, I have confirmed my love for the biological sciences. The classes introduced me to my research, which I have continued throughout this summer and plan to continue until I graduate from Gatton. Although I have decided to go into a healthcare field such as dentistry, my research in genetics allows me to pursue another interest of mine while making an impact on *Drosophila melanogaster*, or fruit fly, research.

Without The Gatton Academy, I would never have had the chance to explore the cloudforests of Costa Rica, participate in a research internship over the summer, or learn about British literature in England. I am and will be forever grateful for the amazing opportunities I have gotten at this school.

Thank you,
Elisha VanZant

Elisha VanZant

Home High School:

Henry Clay High School

Research Area:

Biology

Career Goal:

Medicine/Dentistry

Research Mentor:

Dr. Ajay Srivastava
WKU Department of Biology

Extracurricular Activities:

Band, Gay-Straight Alliance, Gatton Academy Medical Association, Animal Shelter Club, Beta Club, and Academic Team

“My research focuses on comparing the genetics of Drosophila melanogaster, the common fruit fly, to human genetics to learn more about the development of cancer in humans. Since I want to go into medicine or dentistry, the genetics and cancer research is good experience since it falls within the healthcare fields.”

“I think one of the biggest challenges this summer will be finding uniqueness in my project. Previous and current students have worked on the same project, so I want to be able to add a unique characteristic to make my research stand out.”

“As a young woman pursuing a career in the STEM field, independent research is crucial. It is a unique opportunity for someone my age, and it creates a foundation for future goals. I am grateful I am able to do something productive that I enjoy.”





Sarah Vickers
Winchester, Kentucky (Clark County)

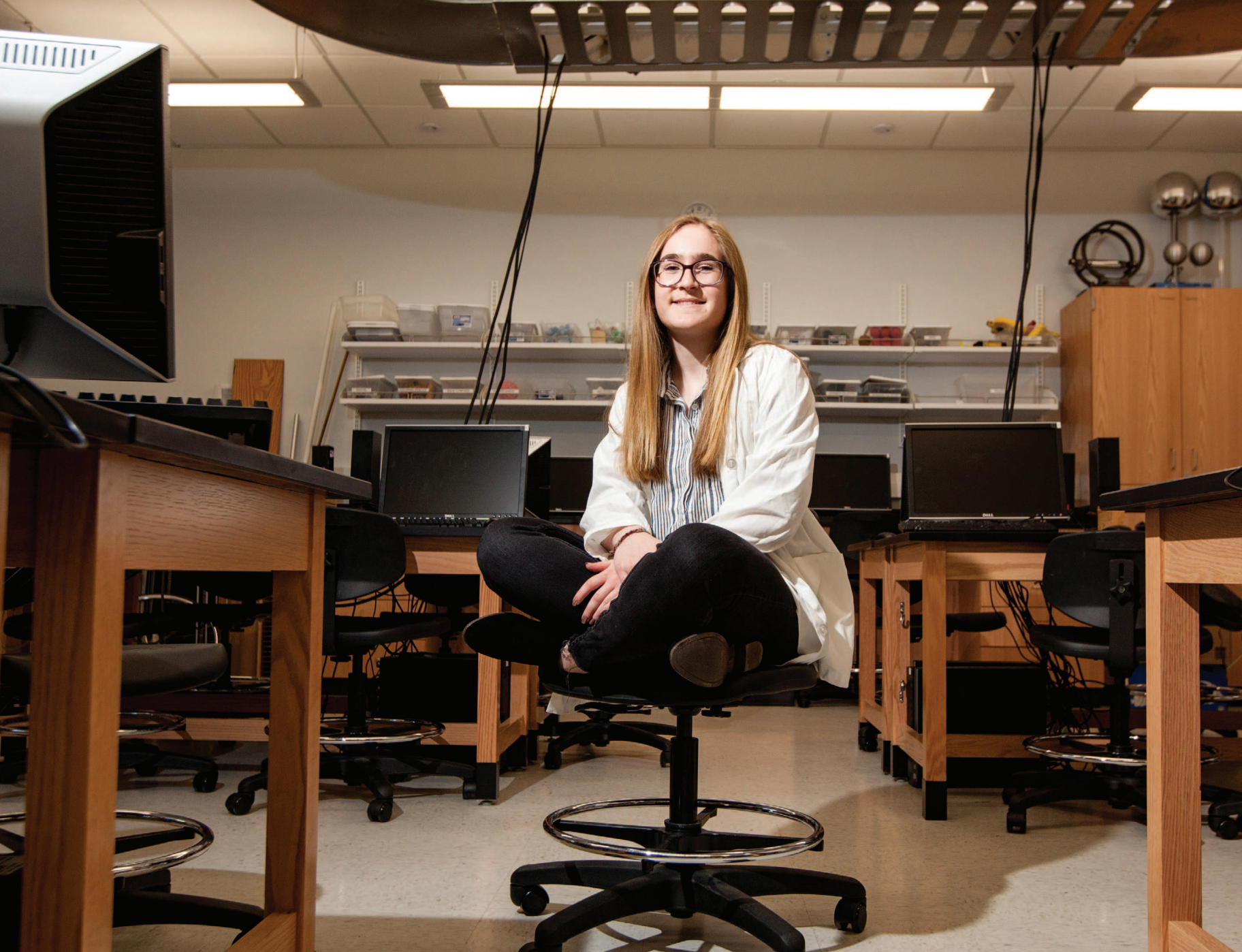
Dear Mr. Gatton,

I grew up as an only child in rural central-eastern Kentucky, where my whole world was as big as my town and there seemed to be few options in life. When I came to Gatton, everything seemed to get bigger. My perspective, my personal goals, my dreams, they all expanded as I learned about all of the possibilities I had here and beyond. With this I have grown to become a much more outgoing and caring person than I was at my home high school. None of this would have occurred without you and your generosity, so please know that it really is having an impact.

Physics is a subject that I truly have a passion for and get excited about, so getting the chance to explore it in-depth through my research project is amazing. Working on my project at the University of Kentucky and being able to connect with other people in the world of physics has been a wonderful experience that will continue as I keep in touch with my mentor and work on presenting in the fall. I am so happy with all of the skills I have gained and everything I have been able to contribute this summer.

I could not be more grateful for all of the experiences I have had so far while at Gatton and during my RIG, and I cannot wait to see what is in store for the next year. Thank you for making it all possible.

Sincerely,
Sarah Vickers





“As someone who’s planning on pursuing an education up to the Ph.D. level in physics or a related field, research is going to be a huge part of my journey in higher education and, hopefully, a huge part of my career. Being able to start now and work closely with experienced physicists will provide me with knowledge and experience that will be helpful to me in the future as I continue doing research.”

“Being at Gatton has made me much more of a social person than I was at my old school. I used to be introverted and only talked to a select handful of people, but now I do my best to talk to as many people as I can and make sure no one gets left out of conversations.”

“Research to me means the opportunity to discover, create, and innovate, making contributions to the scientific community and the general population. It means finding something you are passionate about and learning as much about it as you can, hopefully drawing new conclusions and finding new information along the way.”

Sarah Vickers

Home High School:

George Rogers Clark High School

Research Area:

Neutron Decay Lifetime and Detector Geometry

Career Goal:

Astrophysicist

Research Mentor:

Dr. Christopher Crawford
University of Kentucky,
Department of Chemistry and
Physics

Extracurricular Activities:

Boys and Girls Club,
Film Club, Gay-Straight Alliance,
Speech & Debate, Girl Scouts, Beta
Club, and Track & Field



Austin White
Owensboro, Kentucky (Daviness County)

Dear Mr. Gatton,

At my home high school in Owensboro there were more than 2,000 students, most of whom were determined to join the working class right out of high school. Niche programs for those interested in STEM fields were scarce. After finishing my first year there, I began to feel listless from the paths offered to me. Even when I tried, they did not suit my interests. I began to wonder if opportunities for high school students that could excite me existed. For me, discovering The Gatton Academy felt as if I had just pulled out an oddly shiny piece of hay from the same old haystack I was familiar with. After looking a little closer, I quickly realized it was the needle I had been longing for all along.

Once I arrived at Gatton, I felt completely liberated from the dull feeling I had before. At first, all of my energy and enthusiasm was directed towards my new STEM courses. Ultimately, one of them allowed me to find a true passion that I could pursue. In my computer science class, I really understood and enjoyed the content, so some of my peers began to ask me questions after class. During those discussions, I realized that my perspective on how to solve a problem was only one of thousands. As the conversations continued, I developed a respect for the discipline unlike anything I had felt before. My appreciation for its complexity filled me with the desire to examine everything about computer science.

I found my means of investigating the field through research. Currently, I am researching the resilience of virtual computing environments running on computers to malicious attacks. I could never have discovered my true passion at my home high school. The Gatton Academy has opened doors for me that, before, did not even have a handle. Thank you for helping create a cornucopia of opportunities for those searching for a fascination that moves them at their very core.

Sincerely,
Austin White

Austin White

Home High School:

Daviess County High School

Research Area:

Cloud Computing

Career Goal:

Private Software Development Firm

Research Mentor:

Dr. Michael Galloway
WKU Department of Computer
Science

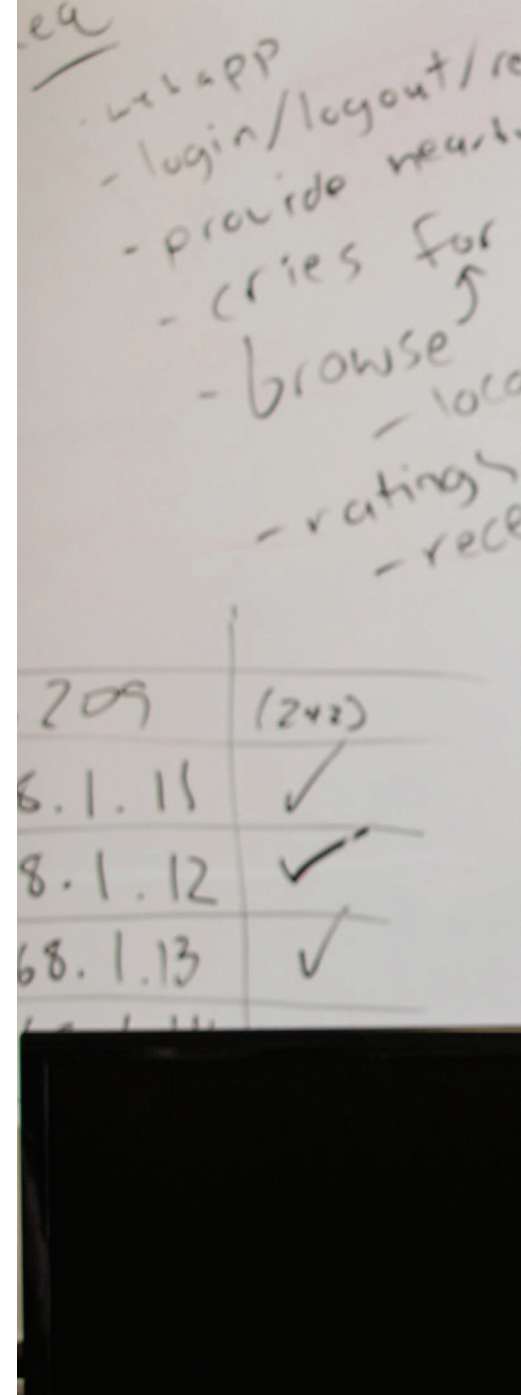
Extracurricular Activities:

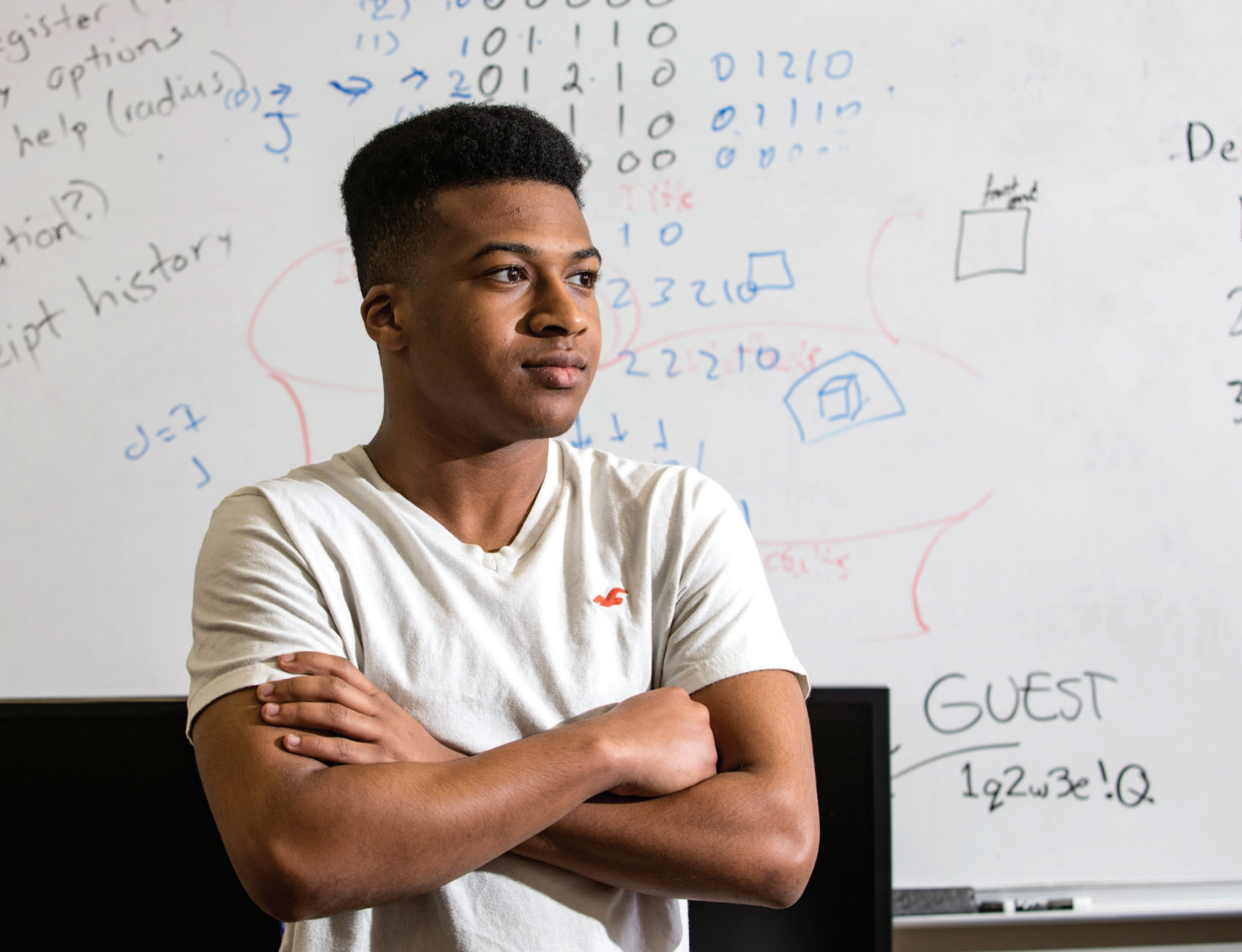
Intramural Soccer and
Computational Olympiads

“I first had an inkling that I was destined for a career in STEM when I was younger. Sometimes instead of playing one of the various video games I installed on my grandma’s laptop, I’d spend hours looking through a game’s resource files instead of actually playing it. I had no clue what each file did, but I was determined to figure it out on my own.”

“Participating in research as a fledgling in the fields of STEM feels like I’ve been given a one-in-a-million opportunity to work on the same things as the experienced and talented experts that I’ve always envisioned myself becoming. Every day, I think back to the days when I daydreamed about working and accomplishing exactly what I’m doing now.”

“The biggest challenge in my research will be familiarizing myself with the software and architectures I will have to work with and develop. There will be a large learning curve, but I know I will enjoy the challenge.”







Rocco Wrentmore
Lexington, Kentucky (Fayette County)

Dear Mr. Gatton,

For me, growing up in Lexington meant that opportunities already existed. The program I was part of at my home high school called itself the best high school program in the state and allowed students to do research at the University of Kentucky during junior and senior years. Halfway through my sophomore year, however, I discovered that those offerings were not enough for me, and I wanted my junior and senior years to look a lot different. The classes were not as hard as people said they were. I knew immediately that I needed more.

More is exactly what I got when I was accepted into The Gatton Academy. I finally feel challenged in school, and the phenomenal experiences I have had in a professor's office hours and studying with other students have made it all worth it. This past semester, I began cyber security research on the types of attacks that hackers deploy to bring down big websites like Facebook and YouTube. I hope to work in the field of cyber security one day, and being able to work on my research at WKU this summer will give me the experience I need to make my dreams come true. I am incredibly grateful for this opportunity you have provided for me, and I hope that my contributions to computer science can one day be as great as your contributions to education. Thank you for creating a high school that deserves to call itself the best in the state and for continuing to support the success of its students.

Sincerely,
Rocco Wrentmore





“My professional goals are to work in the field of cybersecurity. Distributed Denial of Service (DDoS) attacks are real threats that occur pretty often. Facebook and Instagram have been targets of a DDoS attack that brought both sites down for several hours. DDoS attacks are an incredibly important part of cybersecurity, and I’m excited to learn more about them.”

“The part of the summer experience I’m most looking forward to is working on my project with no other work to do. So far, I haven’t been able to work on my project as much as I’ve wanted because of demands in other classes. I can’t wait to see how much I can get done when research is my only priority.”

“My favorite Gatton memory to date would have to be leading the physics review sessions. I really enjoy helping people and seeing them learn. A lot of students struggle with physics, and it feels really good to be able to help them out.”

Rocco Wrentmore

Home High School:

Paul Laurence Dunbar High School

Research Area:

Computer Science

Career Goal:

Cybersecurity Software Engineer

Research Mentor:

Dr. Michael Galloway
WKU Department of Computer
Science

Extracurricular Activities:

Gatton Math Club, Gatton Computer
Science Club, Society of Physics
Students, and Association of
Computing Machinery



Sierra Wyllie
Lexington, Kentucky (Fayette County)

Dear Mr. Gatton,

My name is Sierra Wyllie, and I want to thank you for everything you have done for The Gatton Academy. I come from a long line of Canadian engineers, spanning careers from cars to dams to computer programming. Unlike my ancestors, I grew up in Lexington, and I was honestly worried I would not be able to achieve the level of education I wished. When I heard about The Gatton Academy, I was hooked and started the application immediately.

When I first came here, I thought everything would be smooth sailing, just like high school. That was quickly debunked. I remember I failed my first assignment for CS 180. It turns out Gatton is a challenge, but it is one my peers and I never fail to meet. I re-did that assignment and was so hooked on programming that I have decided to pursue it for the rest of my life. This summer I will be working to make drones more secure to protect any important information they may hold. This is an opportunity I never thought I would have, but now it is here, and I simply cannot wait to get started.

Thank you,
Sierra Wyllie

Sierra Wyllie

Home High School:

Henry Clay High School

Research Area:

Computer Science: Drone
Communication Security

Career Goal:

Software Developer in Artificial
Intelligence

Research Mentor:

Dr. Ismail Abumuhfouz
WKU Department of Computer
Science

Extracurricular Activities:

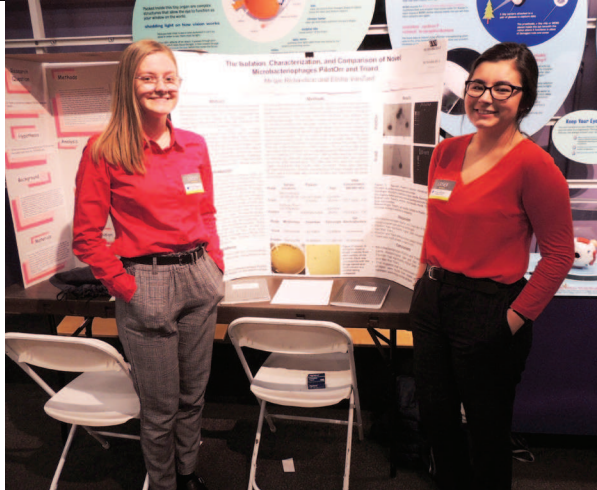
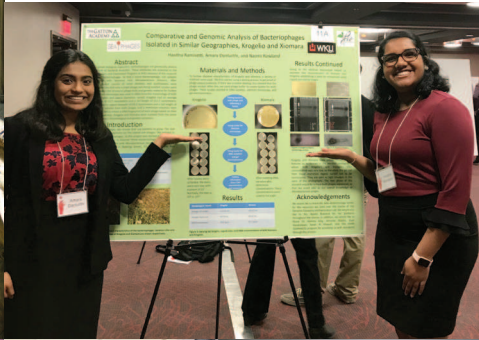
Science Dance

“Much of this project is based around artificial intelligence, which is the field I hope to go into. Getting a head start in such a specific area is vital to becoming an incredible software developer, and getting a head start in such a cool project is simply a dream.”

“Artificial intelligence is fickle. Between collecting data and accuracy, there’s a lot of risk in undertaking it. Connecting an AI to the drone itself will be a huge challenge, as there are so many parameters to consider.”

“Especially in the tech fields, research sets me apart from the crowd, allowing me to pursue my passions before I even graduate high school. Women are still a huge minority in tech, but I hope my experience can help me even the score some day.”





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.



Camila Lozano
Bardstown, Kentucky (Nelson County)

Dear WKU Sisterhood,

I was initially interested in The Gatton Academy because I felt like it was a place where I would be challenged academically and be allowed to explore my interests. Both of these have definitely proven to be true. I am challenged every day in so many ways, and, throughout my Gatton Academy experience, I have found what truly interests me. I am now certain I want to pursue a career in biology and/or engineering.

Furthermore, the ability to get involved in research at The Gatton Academy has provided a way for me to take part in a project that stems from my interests. This summer I participated in research that studied the mis-expression of a gene present in the wing imaginal disks of fruit flies, all of which is tied to learning how the protein encoded by this gene contributes to the growth and movement of cancer cells. I would never have imagined that I would be taking part in something like cancer-related research as a high school student. I am especially grateful and want to thank you for giving me the opportunity to do research over the summer. I will definitely be making the most out of my experience!

Thanks again,
Camila Lozano

Camila Lozano

Home High School:

Thomas Nelson High School

Research Area:

Biology

Career Goal:

Biomedical Engineer

Research Mentor:

Dr. Ajay Srivastava

WKU Department of Biology

Extracurricular Activities:

Gatton Academy Leaders in
Education

“I realized STEM was my passion when I was about 12 years old. In science class we were learning about basic circuits, and I just loved learning about how they worked and building the circuits themselves.”

“This research experience fits into my educational and professional goals because I will be conducting research in the biology field, and biology is one of my biggest academic interests. More specifically, I will be doing research that involves genetics which, in the future, is what I hope to be able to work on through a career in biomedical engineering.”

“The biggest change that I have experienced in my first year at The Gatton Academy has been having to live away from home. This experience has definitely helped me become a more independent and responsible person.”





Jocelyn Martin
Russell, Kentucky (Greenup County)

Dear WKU Sisterhood,

To start, I want to tell you a bit about myself. I am an African-American girl from Eastern Kentucky, which is an oddity in itself, but on top of that, I was kind of nerdy. It was very hard to be who I wanted to be in a predominantly Caucasian neighborhood, because the other kids expected me to be the stereotypical black girl. I had such a passion to learn, but no one around me would let me express that side of myself. The outside pressure put me into a very tight box, and I did not know how to get out of it.

Luckily, the summer of my freshman year, during VAMPY (a three-week summer camp held on WKU's campus), we had an information session about Gatton. I learned about the rigorous curriculum and the welcoming social setting and knew that it was my ticket out. As soon as I got home from the camp, I raved about it to my mom and started the journey that would lead me to this wonderful academy.

Since being here, my passion for learning has flourished more than I ever thought it would. Right now, I am absolutely in love with psychology and chemistry. The plethora of opportunities at the Academy allowed me to discover my interest in neuropsychology, a subject I plan to study further in college. I was also able to participate in the WKU Sisterhood Research Internship Grant, where I studied developmental changes in emotional processing. My mentor, Dr. Mienaltowski, was amazing and taught me so much about the field I now love so dearly.

Thank you for giving me the opportunity to continue my research into the summer. It means the world to know someone believes in my talent and intelligence so much they would give me the money and means to accomplish some really great things. Over the course of this summer, I have learned amazing things as well as made some wonderful friends. This was a once-in-a-lifetime opportunity, and I am so glad I got to experience it. Once again, thank you so very much.

Sincerely,
Jocelyn Martin

friendly

politeness
excellence

dreadful

enjoyment

guilty

disappoint

soothe

ashamed

pain

Sadness

worried

enjoyment



“I realized STEM was my passion when my friends first told me to stop psychoanalyzing them.”

“This internship fits into my professional goals by showing me how proper psychology research is done and allowing me to be a part of that. I am most looking forward to getting closer to my peers and getting the work experience necessary to gauge whether this specific path is the right fit for me.”

“As a young person in STEM, research to me means a potential foot in the door in a field that I am strongly interested in.”

Jocelyn Martin

Home High School:
Russell High School

Research Area:
Psychological Sciences

Career Goal:
Biopsychology

Research Mentor:
Dr. Andrew Mienaltowski
WKU Department of Psychological
Sciences


Extracurricular Activities:
Beta Club, Academic Team,
Science Olympiad, Orchestra, and
Cheerleading

CAROL MARTIN GATTON
ACADEMY OF
MATHEMATICS AND SCIENCE



Alvin Park
Simon Shaw
Jonathan
Clayton White
Nora Nora

Thank you, Mr. Gatton!

David Suarez *Luke Neeson* *Maggie*
Belle Begley *Message*
Stewart *Kermond*
Judyn Martin
Patricia *Ally* *Camila Lozano* *Ashley Manning* *Wendy*
THE GATTON
ACADEMY 
Elizabeth
of Mathematics and Science
Michael *James* *Matt*

“As a young person in STEM, research means getting to dive deeper into my passions than I could have in a traditional classroom setting. Through research I get to be the one to find the breakthroughs and new ideas that one reads about in textbooks. I’m proud to be able to conduct research that could aid and help people one day and provide new information about these topics to other people with similar passions.”

-Maggie Gossage

“I’ve always wanted to help the world as much as possible, but I have never been able to. Research means that I am finally able to add to the human knowledge base and contribute in my own way.”

-Lukas Negron



“The main difference between high school and Gatton is the possibilities. Gatton does more than just show you hundreds of amazing opportunities; it helps you make your own.”

-Patrick O’Boyle

“Research means everything. I am truly excited to be given the privilege and opportunity to conduct research through the Gatton Research Internship Grant.”

-Uria Park





