




INFINITE POSSIBILITIES
Profiles of Summer Research

THE GATTON 
ACADEMY
of Mathematics and Science

Volume Fourteen
Summer 2025



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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

Volume Fourteen – Summer 2025

ABOUT THE GATTON RESEARCH INTERNSHIP GRANT PROGRAM

The Gatton Academy of Mathematics and Science in Kentucky created the Gatton Research Internship Grant (RIG) 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 Kentucky, 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 16-year history, the program has created 250 research internships for students to study STEM problems in their areas of interest in devoted, full-time research settings. Each year, the research funded by the RIG program yields significant outcomes for recipients. Our 2025 recipients successfully completed their RIGs in various locations: WKU; University of Pennsylvania in Philadelphia, PA; University of Louisville; and the University of Kentucky. Each has plans for submitting their research to competitions, conferences, and/or academic journals for publications, just as 2024’s recipients did. A sampling of their achievements includes:



Aanyaa Arora, who presented her research, “Investigating the regulation of cell cycle and shape by the polarity proteins and the mitotic exit network in yeast” at the Yale Undergraduate Research Conference in New Haven, CT.



Luna Asbell, who presented her research, “Applying Gaussian tools for the study of physical and organic chemistry” at the WKU Student Scholar Showcase in Bowling Green, KY.



Mahmood Ateyeh, who presented his research, “Improving photodeactivation rate of pathogens using nanoparticles and efflux pump inhibitors” at the Kentucky Academy of Science Annual Meeting in Frankfort, KY.



Ava Blackledge, who presented her research, “Functional characterization of a bacteriophage gene product that is toxic to *Mycobacterium smegmatis*” for Kentucky legislators at Posters at the Capitol in Frankfort, KY.



Katie Isaacs, who presented her research, “Enhancing photon detection for deeply virtual Compton scattering at the Electron-Ion Collider” at the American Junior Academy of Science Annual Meeting in Boston, MA.



Varshith Kotagiri, who presented his research, “Developing a novel phenanthroimidazole-based fluorescent sensor for detecting analytes in an aqueous medium” at the International Science and Engineering Fair in Columbus, OH.



Ethan Papp, who presented his research, “Heteronuclear metal-organic framework of Cobalt (II) and Ruthenium (II)” at the Spring 2025 American Chemical Society National Meeting in San Diego, CA.



Jill Patel, who presented her research, “Up-regulation of VCAM1 on ECs and down-regulation of KLF-4 by Fibronectin can be attenuated by FUD: Implications for Atherosclerosis progression” at the Kentucky Junior Science and Humanities Symposium in Louisville, KY.



Sydney Putnam, who presented her research, “V-type ATPase’s role in *Drosophila melanogaster* air sac primordium development” at the National Consortium of Secondary STEM Schools Student Research Conference in Huntsville, AL.



Daniel Thelen, who presented his research, “Quantitative analysis of geochemistry and flow dynamics in the Great Onyx groundwater basin, Mammoth Cave National Park, Kentucky” at the WKU Applied Research & Technology Program (ARTP) Day of Celebration of Student Research in Bowling Green, KY.



Eldon Williams, who presented his research, “GRADE: Grading and Assessment of Database ER Diagrams” at the 56th Association for Computing Machinery Technical Symposium on Computer Science Education in Pittsburgh, PA.



This year the Gatton Research Internship Grant program funded 11 rising high school seniors during the summer of 2025. The following pages feature these students.

The Gatton Academy's Research Internship Grant provides students with key opportunities to explore their STEM interests in depth. These experiences help solidify students' career interests and build their confidence for majoring in STEM fields. Students learn many life skills as well as academic skills. They learn networking and communication skills as they reach out to university faculty inquiring about positions on research teams. Students problem-solve as they figure out the logistics of housing, meals, and transportation near the research facilities, or how they will manage their time if commuting from home. Most students live away from home and further develop the independent living skills they started in Gatton's residence hall.

The Gatton Academy is able to provide students with these summer grants thanks to the generosity of Mr. Bill Gatton whose initial investment in The Gatton Academy established an endowment for research. The contributions of additional donors and

the operational investment from the Kentucky General Assembly have enabled the Research Internship Grant program to thrive. In the summer of 2025, fewer RIG awards were made because each award was significantly

increased to cover tuition, housing, and a living stipend. Instead of 20 or more awards, only 11 were granted. We are excited to return to our usual award numbers in 2026 due to a generous gift from the Bill Gatton Foundation.

Summer research experiences are key to students exploring career options, developing core workforce skills, and honing their interests in STEM fields. We are grateful to Mr. Gatton and all our donors and partners who have made these experiences possible.



LETTER FROM THE DIRECTOR

With gratitude,

A handwritten signature in black ink that reads "L. Breedlove". The signature is written in a cursive, flowing style.

Lynette Breedlove, Ph.D.

Director

2025
RESEARCH
INTERNSHIP
GRANT
RECIPIENTS

INFINITE POSSIBILITIES



THE GATTON
ACADEMY 
of Mathematics and Science





Hosamulhaq Brula

*Bowling Green, KY
(Warren County)*



Dear Gatton Supporter,

I want to sincerely thank you for supporting my summer research through The Gatton Academy Research Internship Grant. When I first applied to Gatton, I was looking for an environment that could challenge me beyond the limits of a traditional high school. I wanted to be surrounded by students and mentors who shared a deep curiosity for science and innovation. For me, the biggest challenge yet has been trying to explain to my grandparents how I'm in college but also not at the same time!

This summer, I've been working at the University of Pennsylvania with a biotech startup called Chloropept. Our project focuses on using machine learning to design new antimicrobial peptides that can help reduce antibiotic resistance in livestock. We are trying to find safer, more sustainable ways to prevent infections in animals without relying on overused antibiotics. The experience has given me a first-hand look at how ideas move from the research lab to real-world application, something I hope to continue doing in my future career.

My goal is to work in translational medicine, creating biotechnology innovations that directly improve patient care. Your generosity has made this research internship opportunity a crucial stepping stone in this direction, and I'm forever grateful for it. Thank you for investing in students like me and helping us turn our ambitions into action.

With gratitude,

Hosamulhaq Brula

HOSAMULHAQ BRULA

HOMETOWN

Bowling Green, KY

HOME COUNTY

Warren County

HOME HIGH SCHOOL

South Warren High School

RESEARCH AREA

Microbiology

RESEARCH TITLE

AI-driven “Molecular De-Extinction”:
Engineering of Algae-Delivered
Antimicrobials to Prevent
Bacterial Resistance in Livestock

CAREER GOAL

I would like to create my own
biotech startup aimed at developing
more cost-effective tools and
treatments in fields such as
infectious diseases and oncology.

EXTRACURRICULAR ACTIVITIES

Tutoring Overtime, FBLA, Rubik’s Cube
Club, Muslim Student Association,
Varsity Soccer, Norton Children’s
Hospital Campaign Leader, Blood
Drive Organizer & Youth Action
Campaign Leader (Red Cross), Med
Center Health Volunteer, Refugee
Support Volunteer, Student Ambassador,
MIT Science Bowl, Academic Team

This research experience aligns perfectly with my goal of launching a biotech startup focused on developing affordable tools and treatments for infectious diseases and cancer. By engineering cost-effective antimicrobials at Chlorocept, I’m gaining hands-on experience at the intersection of synthetic biology and translational medicine—exactly the space where I hope to bring cutting-edge science to solve real-world health applications in the future.

My favorite Gatton Academy memory is probably watching my friends get drenched during the USC SpeakYourMind Ice Bucket Challenges. This was especially amusing given the fact that I never had to face the pain of it myself.

Research, to me, is about that feeling of actually contributing to meaningful change. In a traditional school setting, you spend most of your time absorbing knowledge and ideas. But research allows me to shift from just taking in information to actively giving back and making a difference in the world. It’s about taking the concepts I learn and applying them to real-world problems, creating change myself rather than just observing it.





A portrait of a young man with curly brown hair and a beard, wearing a dark suit, white shirt, and dark tie. He is smiling slightly and looking towards the camera. The background is a blurred outdoor setting with green and brown foliage and a stone wall. A green curved graphic element is in the top right corner, and a white curved graphic element is in the bottom left corner.

Isiah Byrd

*Taylorsville, KY
(Spencer County)*



GATTON
ACADEMY

Dear Gatton Supporter,

Before being told about Gatton, I realized that my opportunities to grow further at my school were quickly running out. I had already taken the most intense courses offered with little issue. I knew I needed to push myself by taking the opportunity to receive a rigorous, college-level education while still in high school. Since arriving, I have taken the most challenging courses I can, made more friends than I ever expected, and grown tremendously as a person.

The environment at Gatton constantly inspires me to improve. Everyone here motivates one another to excel — whether through academics, research, or even physical fitness — in a way that is both friendly and competitive. Through the Research Internship Grant offered by Gatton, I began my first research experience studying catalytic epoxidation with Dr. Rui Zhang. This opportunity taught me about the importance of biomimetic metal complexes in green chemistry and allowed me to explore experimentation firsthand and draw conclusions from data I gathered myself under Dr. Zhang's guidance. The experience has overall strengthened my confidence as a scientist. Since my long-term goal is to pursue biochemistry, the skills I've developed in this organic chemistry lab will be invaluable for my future studies and career.

I am incredibly grateful for your support of The Gatton Academy and the opportunities it provides students such as myself. Your generosity gives us the opportunity to challenge ourselves, discover our passions, and reach our full potential both inside and outside the classroom.

Sincerely,

Isiah Byrd

I realized STEM was my passion when I decided to memorize the entire periodic table (to a degree). This was because I was lazy and getting tired of flipping the page with the periodic table on the front of the test back and forth.

The best advice my mentor has given to me is the idea that out in the real world, nothing will just come to you. In order to really make it, you must be curious; you must ask questions and actively search out answers, or you will never find a true solution.

Research, to me, means learning, developing, and executing skills that I may use to further advance my future in a career that will benefit society. It means not only developing a product but developing myself as well.

ISIAH BYRD

HOMETOWN

Taylorsville, KY

HOME COUNTY

Spencer County

HOME HIGH SCHOOL

Spencer County
High School

RESEARCH AREA

Organic Chemistry

RESEARCH TITLE

Catalytic Oxidation Studies
of Biomimetic Compounds

CAREER GOAL

Virologist/Immunologist

EXTRACURRICULAR ACTIVITIES

Chemistry Club





A portrait of a young man with dark hair and glasses, wearing a dark blue button-down shirt. He is standing outdoors in front of a stone wall and trees with autumn foliage. A green curved graphic element is in the top right corner, and a white curved graphic element is in the bottom left corner.

Krish Dukka

*Prospect, KY
(Jefferson County)*



Dear Gatton Supporter,

I come from a long line of college-educated family members, so attending The Gatton Academy was something my parents encouraged from the start. I wasn't very interested at first and didn't fully understand what Gatton could offer. Once I arrived, the transition was difficult. I was surrounded by new people who all seemed more confident and experienced. At first, I stayed in my room most of the time, but slowly I began joining activities and talking to classmates. Over time, I learned to be more independent, manage my time better, and become comfortable in new environments.

Gatton has challenged me both academically and personally. The coursework has taught me to think critically and approach problems with precision, while living with other motivated students has taught me discipline and collaboration. These challenges have pushed me to grow in ways that traditional high school could not. I have learned that progress often starts with small steps, like showing up, asking questions, and taking chances even when I feel unsure.

I plan to pursue medicine, specifically neurology. My interest in science began long before Gatton, but my experiences here have given me direction. I previously worked in microbiology using qPCR techniques, and this summer I am studying how to optimize a catalyzed chemical reaction to maximize product yield. This opportunity allows me to apply scientific concepts in a real research setting while developing practical lab skills that will help me in my future studies.

This experience connects directly to my academic goals and my plan to enter medical research. I am grateful that Gatton provides these opportunities and for the support that makes them possible.

Sincerely,

Krish Dukka





KRISH DUKKA

HOMETOWN

Prospect, KY

HOME COUNTY

Jefferson County

HOME HIGH SCHOOL

DuPont Manual
High School

RESEARCH AREA

Organic Chemistry

RESEARCH TITLE

Catalytic Oxidation
Screening Studies

CAREER GOAL

Cardiologist

EXTRACURRICULAR ACTIVITIES

Biology Club,
Gatton Academy
Medical Association

This lab fits my educational and professional goals because it helps me understand biological reactions, which will greatly prepare me to enter the pre-medical field and eventually become a doctor.

The biggest challenge I have had to overcome in research is coming out of my shell and asking questions. If I don't ask questions, I will be left behind while my research moves ahead.

To me, research is a great way to learn more about a subject that classes could never teach you. It is the perfect complement to the Gatton STEM curriculum.

A portrait of a young man with dark hair, wearing a blue and yellow striped polo shirt, standing outdoors in front of a stone wall and trees. A green curved graphic element is in the top right corner, and a white curved graphic element is in the bottom left corner.

Vedant Garg

*Louisville, KY
(Jefferson County)*



GATTON
ACADEMY

Dear Gatton Supporter,

I was initially interested in The Gatton Academy due to the vast amount of coursework available. Wanting to major in computer science, my sending school did not have an adequate selection of classes, which included very rudimentary education that I had mastered in middle school. Gatton provided a challenge that I strived for. In my first semester alone, I had learned more than in the two years I spent at my sending school, and it motivated me to explore more in the world of computer science. I was also encouraged to do research, which was something I had not even begun to think about doing in high school. Exploring something new and untouched seemed like work that could only be done by those who had achieved a degree. However, working with Western Kentucky University faculty opened my eyes to this new world where I could dive deep into my passion while also making a difference in the world, all the while starting while only in high school.

Another aspect of The Gatton Academy was its community building. Gatton fosters a welcoming community that encourages students to go above and beyond without promoting unhealthy competition. Gatton students help each other through gaps in knowledge and drive one another to keep pushing through obstacles, regardless of difficulty. They do not put each other down; instead, they lift each other, nurturing growth and success. Gatton's community helped me become a better student by assisting me in my journey and teaching me to assist others, too. Thank you for supporting The Gatton Academy. Without this program, I would not be studying to my fullest potential.

Thank you,

Vedant Garg

The most humorous super-nerd moment that made me realize STEM was my passion was when my parents found me with the home computer completely taken apart. They were split between complete anger of the now-apart computer, and unmistakable awe of how their son was able to figure out this complicated piece of technology.

My favorite Gatton Academy memory to date is the days off we had due to inclement weather during February. I was able to spend time with friends while catching up on work—and enjoy a nice meal off campus.

Research to me, as a young person interested in STEM means that I can explore and make discoveries into a field that I want to pursue. It allows me as a young person to start early so that I can quickly establish my foundation—to ensure that I will be able to start earlier and maximize my impact on this world.

VEDANT GARG

HOMETOWN

Louisville, KY

HOME COUNTY

Jefferson County

HOME HIGH SCHOOL

DuPont Manual
High School

RESEARCH AREA

Machine Learning
and Biomedical
Sciences

RESEARCH TITLE

Machine Learning
Analysis of Patient
Glioblastoma Data

CAREER GOAL

Artificial Intelligence
Engineer/Data Scientist

EXTRACURRICULAR ACTIVITIES

Soccer Club, Volleyball Club,
Computer Science Club,
Student Development Committee,
Food Club







Keaton Garrison

*Bowling Green, KY
(Warren County)*



Dear Gatton Supporter,

I have the utmost gratitude for your support, which has allowed me to partake in incredible experiences at Gatton. Before Gatton, I performed very well in school with minimal effort. However, this all changed once I got to Gatton. Classes were more information-dense, homework was harder and longer, and exams seemed like impossible tasks. Instead of sticking to my old ways, I rose to the occasion and worked harder than ever.

Having battled and conquered my first year of classes, I was ready for something harder: research. Through my classes, I discovered my immense passion for chemistry. This led me to pursue research in chemistry the following summer, working to develop silica nanoparticles that can mimic the functionality of antibodies. While working on this project, I had to take pictures of them with a very specialized machine. The first time I wasn't even sure I took a picture of what I was supposed to. My mentor told me to try again. For weeks, I troubleshooted different ways to prep the sample, background mediums, and machine settings. After hours upon hours of work, I was finally able to see some pretty good images of my particles.

The joy that this success brought me and the grit I gained along the way have led me to love research. With this love, I want to pursue a career as a physician who conducts research. I hope to apply my chemical knowledge to another field I am passionate about: neuroscience. Overall, my opportunity to attend Gatton and complete research through the RIG program has been massively rewarding, even shaping my life's goals. I thank you for both of these opportunities.

With gratitude,

Keaton Garrison



KEATON GARRISON

HOMETOWN

Bowling Green, KY

HOME COUNTY

Warren County

HOME HIGH SCHOOL

South Warren
High School

RESEARCH AREA

Chemistry

RESEARCH TITLE

Improving the selectivity
of artificial antibodies
developed using molecularly
imprinted polymers

CAREER GOAL

Ophthalmologist

EXTRACURRICULAR ACTIVITIES

Chemistry Club, Soccer Club,
HOSA - Future Health
Professionals Club

I became aware of my passion for STEM during my freshman year chemistry class. I remember entering class every day looking forward to the new topics I would learn that day or the lab experiment we would be doing. That was the first time I truly loved a class, and it catalyzed my current pursuit of chemistry.

The biggest change I have gone through at Gatton is having more freedom. I have the freedom to do things like plan when I will have classes, when I will eat, when I will study, and much more. This is difficult as you don't typically do this in high school, but I love being able to decide when I will be doing things.

To me as a young chemist, research means advancing the world for the better. Research is how medicines are developed, how industrial processes are made more efficient and environmentally friendly, and how we develop new, innovative technologies.

A portrait of a young man with dark hair, wearing a dark blue polo shirt, standing outdoors in front of a stone wall and trees. The image is framed by a green curved shape in the top right and a white curved shape in the bottom left.

Youngwoo Kim

*Richmond, KY
(Madison County)*



GATTON
ACADEMY

Dear Gatton Supporter,

I am honored to be a part of The Gatton Academy and grateful for the opportunity it provides. I come from Richmond, Kentucky, in Madison County. My passion for STEM—particularly math and physics—sparked my interest in Gatton, but it was the strong emphasis on research that truly drew me in. The transition has been both exciting and challenging, especially with the rigorous STEM coursework that constantly pushes me to grow academically and personally.

This summer, I'm engaged in a research opportunity that allows me to apply what I've learned in a real-world setting. Gaining hands-on experience in a research environment is helping me refine my academic interests and better prepare for a future career in STEM. Opportunities like this not only strengthen my skills but also give me the confidence to pursue ambitious goals. Thank you for supporting students like me and making experiences like this possible.

Sincerely,

Youngwoo Kim

While it may not directly impact my professional career, this research internship will be an invaluable experience for me as I will learn essential skills (e.g. critical thinking, analytical skills, communication, etc.) that will undoubtedly assist me in reaching my goals.

The greatest change I experienced coming to Gatton was living without my parents. I no longer had them to rely on. Every time something was not going well, or I needed desperate help, I had to figure out a way to resolve the issue on my own without depending on an adult.

I personally believe that research just means asking bold questions. Research is basically just a way to express your curiosity. It's how you connect your imaginations with impact. As a young person interested in STEM, research gives me the opportunity to explore unexplored ideas and contribute to a field that could one day change someone's life.

YOUNGWOON KIM

HOMETOWN

Richmond, KY

HOME COUNTY

Madison County

HOME HIGH SCHOOL

Model Laboratory
High School

RESEARCH AREA

Neurophysiology

RESEARCH TITLE

Dynamic Interplay between
Lipopolysaccharides and
K⁺ Channels in Modulating
Membrane Potential

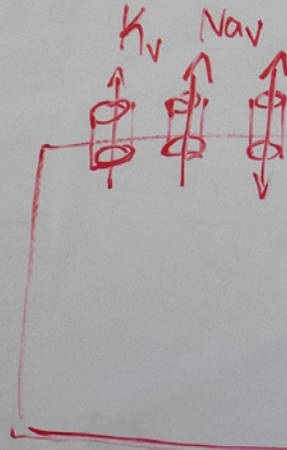
CAREER GOAL

Quantitative Analyst

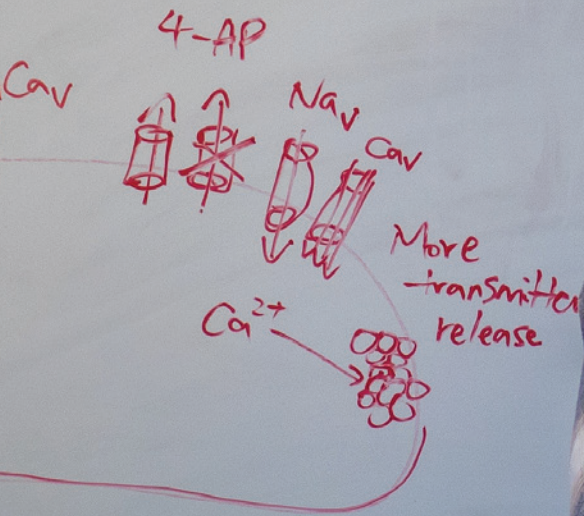
EXTRACURRICULAR ACTIVITIES

Math Club

$$V_m = \frac{RT}{F} \ln$$



$$\frac{P_K [K^+]_o + P_{Na} [Na^+]_o + P_H_2O}{P_K [K^+]_i + P_{Na} [Na^+]_i + P_H_2O}$$





Prthu Naik

*Louisville, KY
(Jefferson County)*



Dear Gatton Supporter,

As a student from Louisville, I've been given countless opportunities for my personal advancement in STEM. However, Gatton has been the best opportunity I've ever experienced. The Gatton Academy has pushed my academic skills further and has allowed me to pursue my interest in physics. I've been able to take harder classes and experience research. Most of all, I've had the pleasure of interacting with the great staff at Gatton and making friends with some of the brightest minds in Kentucky.

The Gatton Research Internship Grant has exemplified the opportunities present at Gatton. I've been able to expand my physics knowledge over this summer. I've gotten to know my project like the back of my hand. My project used a cloud chamber to visualize particles passing through the chamber, and I recorded the chamber and used an algorithm to track those particles. During this research opportunity, I've begun to learn what a future in physics will be like for me. The Research Internship Grant has been a great opportunity, and I'm so glad that the students who come after me will be able to experience this opportunity, too.

Sincerely,

Prthu Naik

My research aligns with my goals as a nuclear physicist. I will be working with radioactive materials and detection, which helps expand my skills.

The biggest challenge in my research is integrating software and hardware. We are currently using a Raspberry Pi computer, but it's difficult to connect properly, and many things have to be downloaded to make it function as it's supposed to.

Research is the pursuit of something new. This often leads to many complex topics that are hard but not impossible to learn and understand.

PRTHU NAIK

HOMETOWN

Louisville, KY

HOME COUNTY

Jefferson County

HOME HIGH SCHOOL

DuPont Manual
High School

RESEARCH AREA

Physics

RESEARCH TITLE

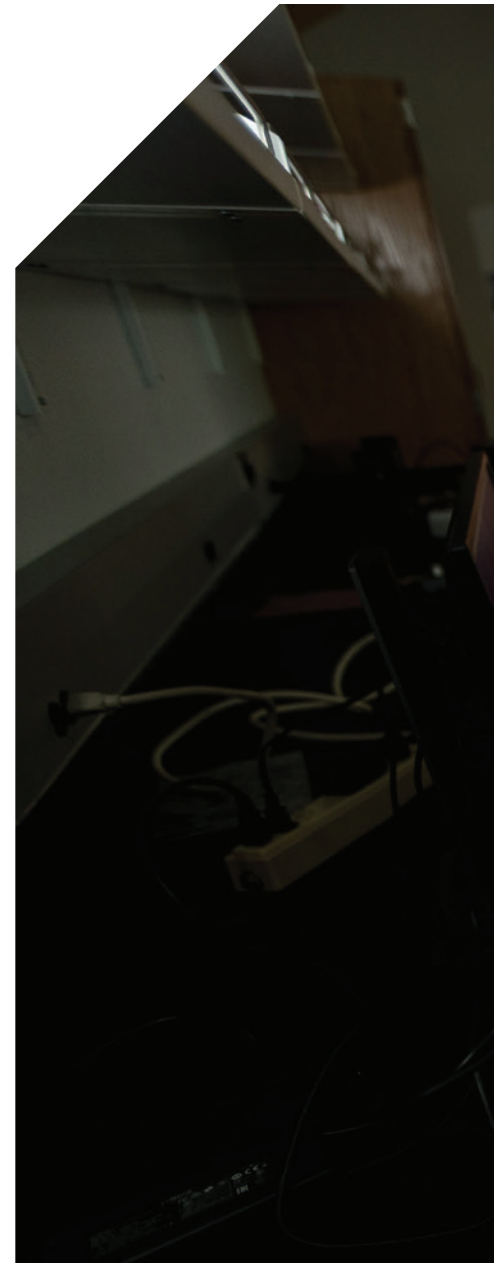
Particle Track Classification
using a Raspberry Pi 5 and
a Stereo Camera Setup

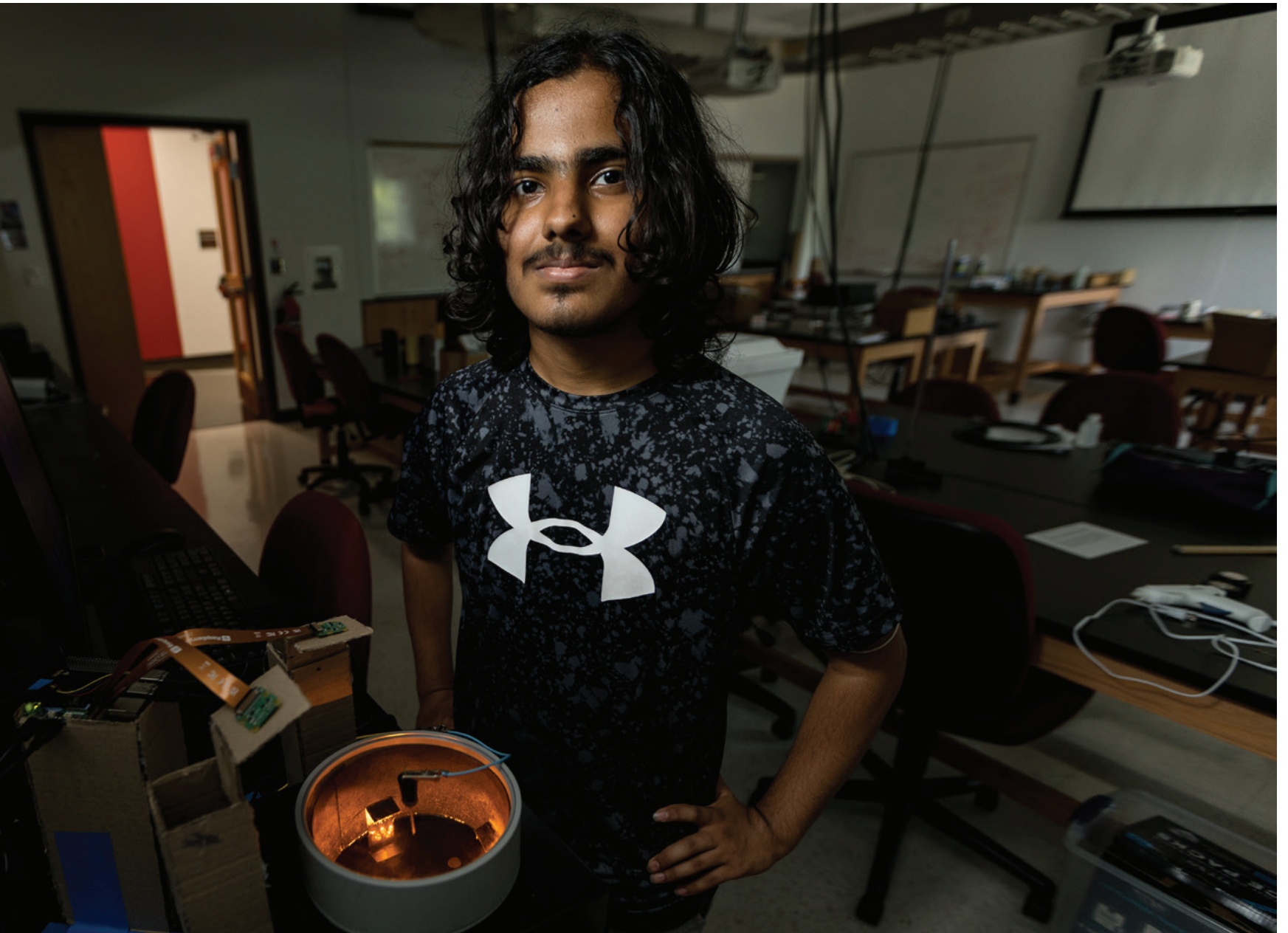
CAREER GOAL

Nuclear Physicist

EXTRACURRICULAR ACTIVITIES

Math Club







Logan Robinson

*Owensboro, KY
(Davies County)*



GATTON
ACADEMY

Dear Gatton Supporter,

I am immensely grateful for the opportunities that Gatton has provided for me. I come from south-central Kentucky, near Owensboro. The home I grew up in was very oriented around fostering growth and the pursuit of knowledge, so while the transition to Gatton was not necessarily difficult for me, it did challenge my work ethic and mindset towards academia. It pushed me to become both a better student and a better member of my community, and for that, I am extremely grateful. Gatton has led me to pursue being a neuroradiologist, a profession that will push towards my goals to give back to my community, and to work on the forefront of medical technology. It was this choice of profession that led me to choose a research experience that revolved around experimental disease treatments that utilize cutting edge medical technologies.

Through The Gatton Academy, I was given the means to conduct research this summer in a microbiology lab. The project that I spearheaded revolved around researching an experimental treatment for Legionnaire's disease, a rare form of pneumonia that is particularly dangerous for elderly patients that have compromised immune systems. The research, while being instructive from a scientific standpoint, has also allowed me to improve my acute problem-solving skills in the field of experimental medicine. This experience would not have been possible without Gatton's generous grant, allowing me to finance my housing and food for the time I was working in the lab, garnering understanding of what it means to work in the medical research industry.

Sincerely,

Logan Robinson

In elementary school, my grandmother gave me a chemistry book that was basically a full compendium of materials, methods, and tips for her occupation. It was thousands of pages long, and I didn't understand an inkling of it, but I brought it to 4th grade every day and read it with the hopes of learning something new. I think it was then that I realized how much I enjoyed the acquisition of new knowledge, especially in STEM.

I am most looking forward to being on the forefront of research this summer, pursuing a project that I have creative liberty over, and experiencing scientific research through the lens of a lab employee rather than just a student researcher.

The biggest change The Gatton Academy has brought about in me is a strengthened ability to face challenges with purpose and resilience. I've learned to take both personal and academic hardships and turn them into opportunities for growth, using them to improve myself and approach future challenges more effectively.

LOGAN ROBINSON

HOMETOWN

Owensboro, KY

HOME COUNTY

Daviess County

HOME HIGH SCHOOL

Daviess County
High School

RESEARCH AREA

Microbiology / Virology

RESEARCH TITLE

Isolation and Characterization
of Legionella Pneumophila
Bacteriophages

CAREER GOAL

Neuroradiologist
Specializing in Oncology

EXTRACURRICULAR ACTIVITIES

National Honors Society,
Student Y Association, Gatton
Academy Medical Association, Club
Soccer, First Baptist Foundations,
Owensboro Symphony—Orchestra Track,
Undergraduate Research, Genome
Discovery and Exploration Program







Helen Rose

*Lexington, KY
(Fayette County)*



Dear Gatton Supporter,

Since I was little, I have wanted to work in an environmental field, working with animals, plants, the sky, and the soil. In my sophomore year of high school, I took my first computer science course. I fell in love with the subject unlike any subject I'd studied before. This left me at a confusing point: the intersection of computer science and environmental science was difficult for me to find. Then, Gatton entered the equation. In my computer science courses at Gatton, I came to understand a sub-genre of computer science: data science. It resonated deeply with me, a student who had always excelled in mathematics and was seeking a field that could make a global impact. I gained a clearer vision of my future self: combining data science with environmental science to create models that predict climate changes and natural disasters, informing policy to protect vulnerable communities.

The research I have been involved in during the school year and continued during the summer RIG program, with your support, has been pivotal in recentering my academic career and entering the research world. I study how tropical systems impact Kentucky's climate (precipitation, drought, flooding, extreme weather), and how those impacts are affected by the year, time of year, location of the storm, location that is being impacted, and the strength of the storm. It is a perfect project, combining environmental sciences with statistics and analysis. I have also been able to experience the full scope of a research project, from the conception of an idea to the writing and submission to journals. This experience has been invaluable in shaping me as an academic, a researcher, and a person operating in a changing world. Thank you for your support of Gatton and opportunities like this one.

Sincerely,

Helen Rose



U.S. Drought Monitor

Current Maps Data Summary About Conditions & Outlooks **Ag in Drought** En Español NADM

Date: October 10, 2017 Area type: State

Area: Kentucky Map type: Cumulative Statistics

U.S. Drought Monitor Kentucky

October 10, 2017
(Released Thursday, Oct. 12, 2017)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0 | D1 | D2 | D3 | D4 |
|--------------------------------------|-------|-------|------|------|------|------|
| Current | 95.89 | 4.54 | 0.00 | 0.00 | 0.00 | 0.00 |
| Last Week 10-03-2017 | 93.58 | 6.42 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 Month Ago 07-10-2017 | 93.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Calendar Year 01-01-2017 | 93.54 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Water Year 09-30-2016 | 90.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| One Year Ago 10-10-2016 | 38.18 | 61.82 | 0.00 | 0.00 | 0.00 | 0.00 |

Legend:
 None (white)
 D0 Abnormally Dry (yellow)
 D1 Moderate Drought (orange)
 D2 Severe Drought (red)
 D3 Extreme Drought (dark red)
 D4 Exceptional Drought (black)

The Drought Monitor focuses on broad scale conditions. Local conditions may vary. For more information on the Drought Monitor, see the [Frequently Asked Questions](#) and [About the Drought Monitor](#).

HISTORICAL HURRICANE TRACKS

NATE 2017
Oct 02 2017 to Oct 11 2017

OVERVIEW DETAILS

LIFETIME STATISTICS

- HI1 Maximum Category
- DB1 Maximum Pressure (mb)
- BO Maximum Wind Speed (kt)

WIND AND PRESSURE

Map of the United States showing hurricane tracks with markers for various cities like Denver, Kansas City, St. Louis, Indianapolis, Cincinnati, Louisville, Nashville, Memphis, Atlanta, Dallas, Houston, New Orleans, San Antonio, Austin, Phoenix, Tucson, Salt Lake City, Albuquerque, Denver, and Chicago.



HELEN ROSE

HOMETOWN
Lexington, KY

HOME COUNTY
Fayette County

HOME HIGH SCHOOL
Henry Clay
High School

RESEARCH AREA
Meteorology and
Data Science

RESEARCH TITLE
Evolving Impacts of Tropical
Systems on Kentucky's Climate:
A Historical and Statistical
Analysis of Climate Trends

CAREER GOAL
Data Science / Data Analytics

EXTRACURRICULAR ACTIVITIES
Russian Culture Club, Envirothon,
Student Development Committee

I never truly realized that STEM was my passion; it is simply something that has always been a part of my life. A story that my family likes to tell is that when my older brother was in kindergarten and first grade, I would correct his math homework because I was doing it over his shoulder. I have always sought out and enjoyed math and other STEM subjects.

The biggest change I experienced in my first year at The Gatton Academy was in my personal motivation. Being able to take classes that I genuinely look forward to, work on an amazing research project, and be surrounded by people who are just as in love with these subjects has made me so much more excited to dive into any work that I have. The opportunities and environment mean that I do not burn out easily and happily anticipate any academic and professional possibilities.

As a young person interested in STEM, research offers me a way to positively impact the world as soon as possible. To me, pursuing my career interests has always stemmed from a desire to improve the world around me. Being able to do this research so early in my academic and professional career means that I have the potential to start influencing the health, safety, and happiness of others.



Ava Smith

*Aurora, KY
(Marshall County)*



Dear Gatton Supporter,

I come from a family who believes strongly in the power of education. I fell in love with learning when I started school at Mayfield. My mother also taught there, so school felt like a second home. I'm thankful for the foundation it provided, but I wasn't adequately challenged, so I couldn't reach my full potential. When a teacher told me about Gatton, I knew I had to go. Now, I'm the first person from my school to attend, and thanks to you, my wildest dreams are coming true.

Because of your generosity, I have the opportunity to further my research this summer. My research focuses on the protease V-type ATPase and how it affects the development of a structure in fruit fly larvae called the ASP. First, I cross flies to downregulate the V-type ATPase. Then, I collect the larvae, stain the larval tissue, and analyze the ASP using a fluorescence microscope. The ASP is an excellent model for invasive behavior, so our findings are largely relevant to tumor metastasis.

I'm thrilled to conduct such impactful research. I love every aspect of my lab work, especially the challenging ones. Without this project, I might not have discovered my passion for original research, which has greatly influenced my career goals. Your support has allowed me to discover and fulfill my true passion. For that, I cannot thank you enough.

With gratitude,

Ava Smith

Asking for an MCAT-Prep Biology book for my 14th birthday is my most humorous super-nerd moment that proved STEM was my passion. I read the whole thing, cover to cover! My friends thought I was really weird!

The biggest change I've experienced at Gatton has been coping with imperfection. When I got my first "bad" grade, I felt discouraged until an acquaintance of mine gave me a valuable piece of advice. 'You'll never find your passion in a number.' -Rianna Peng

As a young person interested in STEM, my research means more to me than I can say. The opportunity to contribute to our understanding of cancer and invasive behavior is an invaluable opportunity that I will cherish forever. I'm so grateful to be making an impact!

AVA SMITH

HOMETOWN

Aurora, KY

HOME COUNTY

Marshall County

HOME HIGH SCHOOL

Mayfield High School

RESEARCH AREA

Biology

RESEARCH TITLE

Isolating the Role of
V-ATPase in Metastasis
of the Air Sac Primordium
in *Drosophila Melanogaster*

CAREER GOAL

Molecular Oncologist

EXTRACURRICULAR ACTIVITIES

Gatton ASL Club,
Student Development Committee,
Gender-Sexuality Alliance,
Humane Society Club





Sophia Thomas

*Louisville, KY
(Henry County)*



GATTON
ACADEMY

Dear Gatton Supporter,

Thank you so much for your generous donation to The Gatton Academy and for helping fund my summer research experience. Before coming to Gatton, I was never able to participate in research due to funding limitations, lack of opportunities, or timing conflicts. Through this grant, I was able to confidently reach out to professors and learn more about the research opportunities WKU has to offer. This summer, I am conducting research with Dr. Joseph Marquardt in the field of molecular biology. My research investigates the cell cycle control mechanisms of polarity proteins Boi1/Boi2 and the Mitotic Exit Network (MEN). This topic interests me because I am fascinated by molecular biology and the intracellular processes that occur within our bodies. I have known my entire life that I want to pursue a career in the medical field. I am open to different paths and have shadowed a variety of physicians but the field that intrigues me most is oncology—specifically pediatric oncology.

My experience at The Gatton Academy so far has been amazing. I love getting to live with my best friends and take higher-level classes, all while enjoying the perks of both high school and college life. I have lived in Louisville, Kentucky, my entire life so when I got accepted to Gatton, I was nervous to leave my hometown. However, my time in Bowling Green so far has been nothing short of fantastic! There's always something exciting happening or a new spot to check out, whether on or off campus. The constant energy and opportunities have made my experience here incredibly fulfilling. Thank you so much for your continued support and for believing in my and my peers' potential to grow.

Thank you,

Sophia Thomas

The moment I realized STEM was my passion was in 3rd grade when I went to visit my mom in the hospital. I was fascinated by the tubes, machines, and the role the doctors played in my mom's recovery. From that moment on, I knew I wanted to make the same impact on others while saving lives.

The best piece of advice Dr. Marquardt has given me is not to limit my creativity when making observations. By staying open-minded and allowing yourself to think creatively, you notice patterns and ideas that might otherwise be overlooked. This is especially true when doing independent research, as the answers will not always be given to you.

For me, research is the key to bridging the gap between curiosity and real discovery. As someone who is passionate about oncology, I'm constantly seeking to understand the unknowns of cancer—questions that can't be fully answered by a Google search. Participating in this research will not only deepen my understanding of cellular biology but also help me academically by strengthening my critical thinking skills.

SOPHIA THOMAS

HOMETOWN

Louisville, KY

HOME COUNTY

Henry County

HOME HIGH SCHOOL

Sacred Heart Academy

RESEARCH AREA

Molecular Biology

RESEARCH TITLE

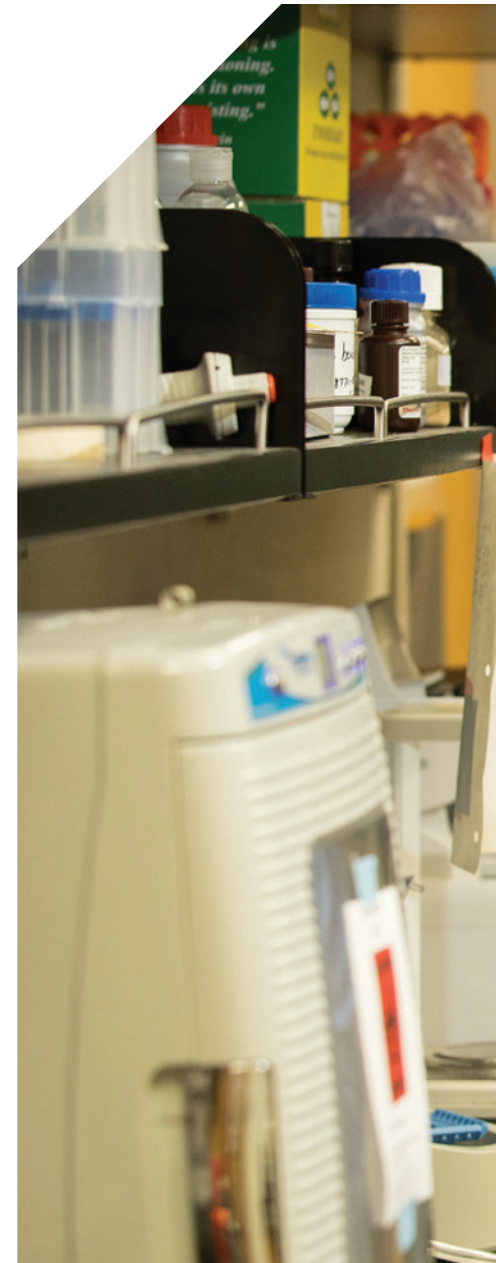
The Connection of Yeast
to Tumors: Exploring
Boi1/Boi2's Role in Cell
Cycle Control and Cancer

CAREER GOAL

Oncologist

EXTRACURRICULAR ACTIVITIES

Gatton Academy Medical Association,
Gatton Academy Leaders in Education,
Gatton Media Team, Gatton Activities
Board, Health Occupations Students
of America, Biology Club, Gatton
Yearbook, Humane Society Club





*Thank You,
Gatton RIG Supporters!*

THE GATTON
ACADEMY 
of Mathematics and Science



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