

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

Volume Two - Summer 2012



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WKU[®]



CAROL MARTIN GATTON
ACADEMY OF
MATHEMATICS
AND SCIENCE
IN KENTUCKY

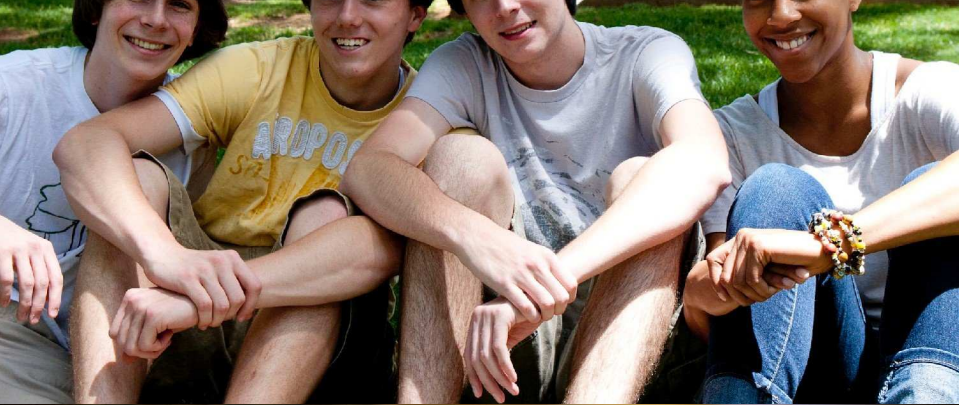
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Dear Mr. Gatton,

Early on, the Gatton Academy leadership made an important strategic move in the program's foundational design. As a high school for Kentucky's brightest and most motivated STEM 11th and 12th graders, we decided to promote summer research and internships as a central pillar of our model.

The Gatton Research Internship Grant has become a major conduit to making such summer opportunities possible. Unlike any other program I am aware of at the high school level, our program invites proposals each spring from the junior class. Selected students are then funded to carry out research in the summer between their Gatton Academy years in a mentored, structured environment.

The yield has been remarkable. Though the program is only three years old, it has funded 35 internships that otherwise would never have been possible.

Since the Gatton Academy has just completed its fifth year, the exceedingly rare nature of our program can start to seem routine. Sometimes, I have to remind myself that the students I work with are only 16 and 17 years old. And here they are, absolutely changing the world we live in.

Take this year's class of grant recipients for example. They are researching geothermal energy at Fort Knox, coding nanosatellites at the Kentucky Space Center, studying spinal cord injuries at the University of Kentucky and knot theory at WKU. It's remarkable what motivated young minds are capable of when entrusted with a truly coveted opportunity.

I won't give away all of this summer's excellent stories. In the following pages, you will come to know the 12 recipients of this year's Gatton Research Internship Grant.

Thanks to your gift, these students are out there at this very moment having the opportunity of their young lives—an opportunity unmatched by any other high school. For that, we are grateful!
Sincerely,

Derick B. Strode

Assistant Director, Academic Services

About the Gatton Research Internship Grant Program

The Gatton Academy of Mathematics and Science in Kentucky created the Gatton Research Internship Grant program 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 and the world. By providing a funding mechanism, the program directly creates research internships that otherwise would not have existed for Gatton Academy students. In its first three years, the program has already made possible 35 research internships for Gatton Academy students to study STEM problems in their area of interest in a devoted, full-time research setting.

In the summer of 2012, the program funded 12 rising high school seniors who attend the Gatton Academy. Performing research in medical advancement, pharmaceutical chemistry, knot theory, and satellite coding, just to name a few, these students’ work will shed positive effects in the not-so-distant future. The following pages feature the summer of 2012 Gatton Research Internships Grant recipients.





David Brown
Central City, KY (Muhlenberg County)

Dear Mr. Gatton,

I just want to thank you for your tremendous support of the Academy and all of the opportunities it has provided for me and my fellow classmates. More specifically, I want to thank you for your support of the research we undertake while students here.

This summer I am working with a professor of chemistry at Western Kentucky University in the field of organic chemistry. I am synthesizing various molecules which have uses in electronic devices. The major application of the material is for organic solar cells: an inexpensive, reliable alternative to silicon-based solar cells. Through your generosity I have the extraordinary opportunity to directly assist in the push for green energy and, hopefully to, make a real difference in the world.

I had never had any real laboratory experience until I began working here, and I believe it will be invaluable as I continue my education and look towards my future. I have found something that I truly enjoy doing and am learning so much, not only about chemistry, but also about myself as a person. It has been a fantastic experience that I will carry with me wherever I go. Again, thank you so much, Mr. Gatton, for being such an ardent supporter of education, the sciences, and youth. I will be forever grateful for all you have done for me.

Sincerely,

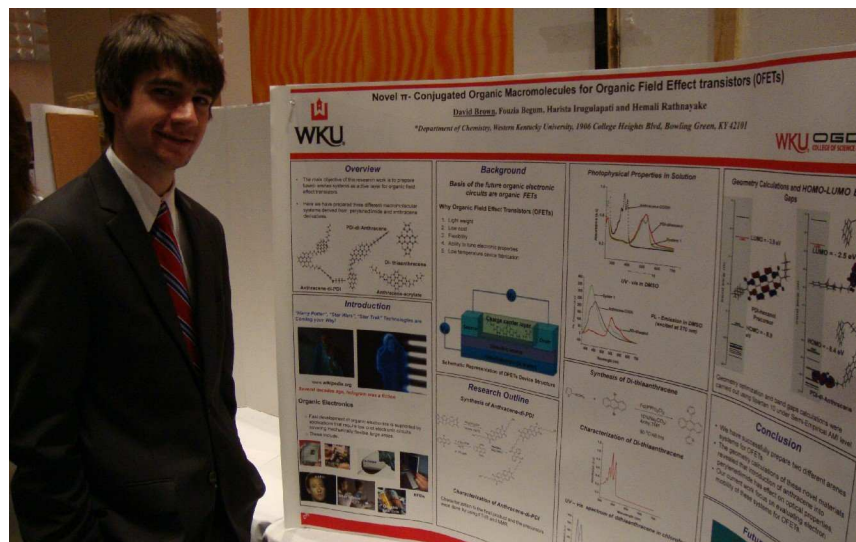
David Brown

Getting to Know David



"Research means that I get to do what no one has ever done before and to improve upon the enormous accomplishments of those who have gone before me. It is the chance to gain new knowledge, ideas, and to hopefully make a positive contribution to the world. As a senior in high school, that is certainly an exciting way to spend my summer."

"I felt somewhat overwhelmed my first day at the Academy. I wasn't sure what to expect and was a little scared of the idea of attending college two years early, leaving friends, and sacrificing many opportunities at home. I still miss my friends very much and I am frightened when test day rolls around, but I know what to expect and feel even more determined to show the world what I can do."



Home High School: Muhlenberg County High School

Research Area of Interest: Chemical Synthesis of Charge Carrier Layers for Organic Solar Cells

Career Goal: Chemist/ Chemical Engineer

Extracurricular Activities: Beta Club, Y-Club, Boy Scouts

"I plan to use my research to compete in the Intel Science Talent Search as well as the Siemens Competition. However, I am particularly interested in pursuing the Goldwater Scholarship. My current research should go a long way in helping me to be competitive in these contests."



"Honestly, I am not sure what I want to do in the next ten years. Depending on what field I end up pursuing, I may still be in school or I could, hopefully, be gainfully employed as, perhaps, a chemical engineer. What I do know is that the Academy has and will help me to narrow down my interests and find my true niche."



Leah Cannady
Brandenburg, KY (Meade County)

Dear Mr. Gatton,

I am a 16 year old high school senior from Brandenburg, Kentucky and am one of the few Kentucky students that have been blessed with reaping the benefits of your generosity. I want to take this opportunity to thank you so much for giving me the chance to create and implement a research project this summer. Not only that, I but thank you for making it possible for me, along with 120 other high school students in Kentucky, to have the privilege of attending the number one high school in the nation. Because of you I have had the experience of a lifetime—studying and living on a college campus and completing college courses as a high school student. The Academy has given me such a unique experience and a new perspective. Through it, I have learned the value of determination and hard work as well as perseverance.

I spent this summer researching and comparing various techniques of energy conservation with the Corp of Engineers in Fort Knox, Kentucky. It has been such a great opportunity, through which I have received job-like experience as well as research experience in creating my own project. I am learning about various forms of energy conservation and have had the privilege of meeting accomplished engineers who have helped me along the way. None of this would have been possible without your generosity, and I would like to express my immense gratitude for giving me this opportunity. Thank you so much for everything you have done. I plan to continue doing the best I can to take advantage of this experience to its fullest.

Thank you,

Leah Cannady

Getting to Know Leah



"Spending my summer at the Corp of Engineers in Fort Knox, Kentucky has opened my eyes to a new field of study and expanded my interest in engineering as a career. Prior to this experience, I hadn't seen engineering as a career prospect but this summer has changed my mind."

"The Gatton Academy gives us as students the privilege of studying such a rigorous curriculum at such a young age at no cost, therefore making students want to give back—whether it's financially or through service, thus benefitting Kentucky in the long run."



Home High School: Meade County High School

Research Area of Interest: Energy Conservation

Career Goal: Engineering

Extracurricular Activities: Y-club, 2nd floor
Community Developer

"On my first day at the Academy, I was terrified and knew no one. Now, I consider it my home and have met so many great people that I know will be life long friends."

"The most enjoyable aspect of my research experience this summer has been meeting so many new people and making new connections with important people in the engineering field who can help me down the road. With jobs becoming so competitive, it's important to have useful contacts in the field and I have made many of those this summer."





Nicholas Fedorka
Danville, KY (Boyle County)

Dear Mr. Gatton,

The summer of 2012 I enjoyed the benefits of the Gatton Academy Research Internship Grant. I chose to continue my ongoing research with Dr. Bangbo Yan on Metal-Organic Frameworks in the WKU Department of Chemistry. It was a wonderful experience, as I got to live, work, and eat on my own, and not be dependent upon anyone else.

I know the value of a good education. Both of my parents came from very little by way of capital. They worked hard, found what they wanted to do, and got degrees pertinent to that interest, and with the work they found and got with those degrees raised a very successful family. I have long felt that through education I will be successful-not just financially, but a successful human being. And so I came to the Academy, and I applied for the Research Internship Grant, for what is better than starting an education early when I'm ready for it to start, and what is better than getting actual experience doing science, what I'm looking to do for the rest of my working years?

While I don't quite yet know what I wish to do with my life, I have a couple of ideas. By exploring each of these fields, I will be able to make an educated decision about what I want to do, be it Chemistry, Psychology, creative writing, or any number of other things that fascinate me. Through this grant I can do just, and for that, I thank you.

Thank you,

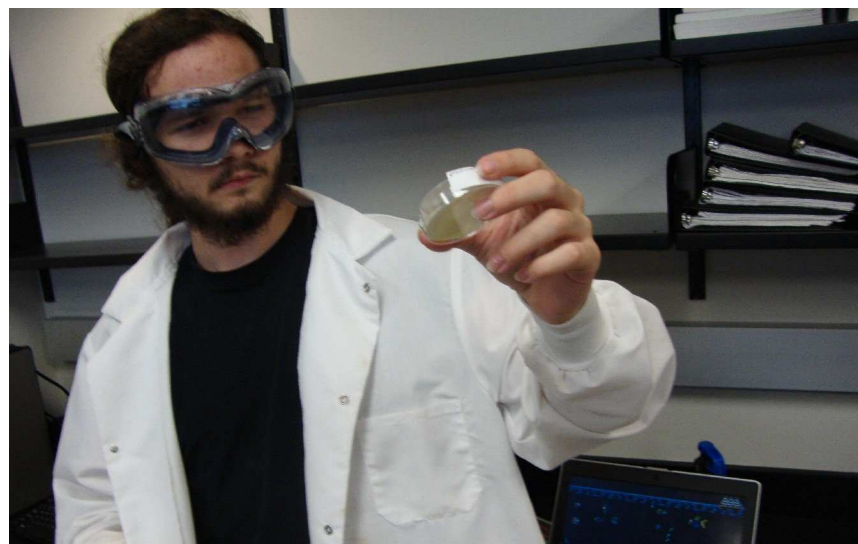
Nicholas Fedorka

Getting to Know Nicholas



"During my second year at the Academy, I am looking forward to taking university classes again. I look forward to once again having a rigorous and rewarding education."

"This is quite different from most high school students' summer. While many people may have a summer job, that job usually has nothing to do with what they aspire to be and how they hope to contribute to society. I'm doing exactly what I want to do when I'm out supporting myself through my work: I'm doing science."



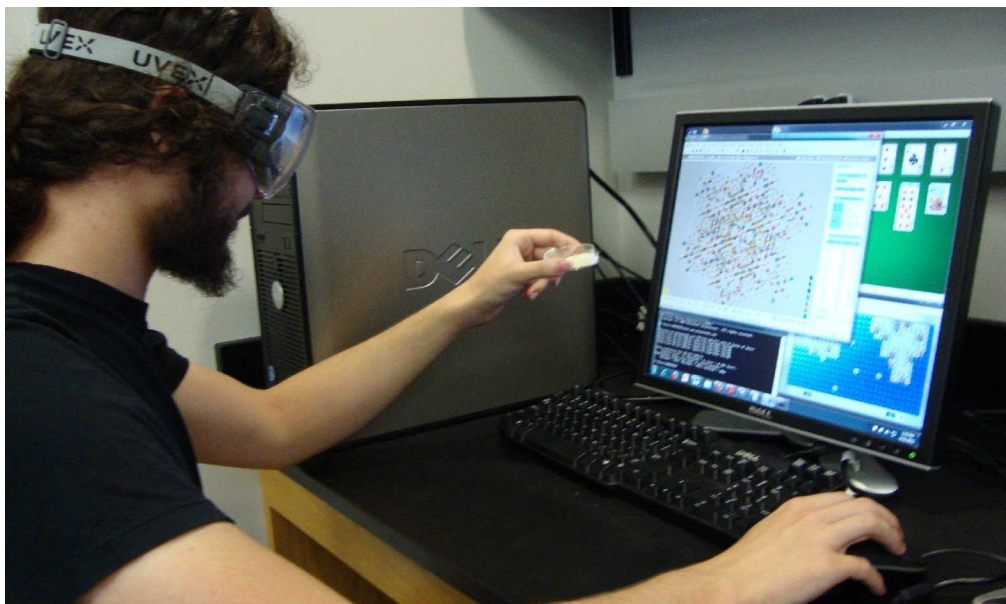


"As a young person interested in STEM, this research experience means a lot to me. It's a taste of what I could be doing for the rest of my life. In STEM there are many options for me in the way of work. Chemistry and research are two very promising ones for me. I am doing both. Through this research I get more experience, and through that experience I grow in my understanding of myself and what I want to do."

Home High School: Boyle County High School

Research Area of Interest: Inorganic Chemistry

Extracurricular Activities: Writing, Gaming



"This research experience fits quite nicely into my educational goals: get as much education as possible in what interests me. I find chemistry interesting and by getting hands on, actual, 'real-life' experience I am getting an excellent background in it."



Matthew Gonzalez
Brodhead, KY (Rockcastle County)

Dear Mr. Gatton,

Thank you-those two little words that I was taught back in elementary school to say when you're being polite or after receiving a gift. Well, your gift to me deserves a little more than just those two words. My name is Matt Gonzalez, and during the school year I attend Gatton Academy. I'm sure you've heard of it, so for once I won't have to explain what it is. During the summer of 2012 I received the Research Internship Grant that allowed me to stay on WKU's campus and continue my research in nanotechnology and protein synthesis.

Your contribution to the Academy has changed my life so much that looking back I can't imagine where I'd be without it. Before the Academy I lived in a small rural town where my efforts in school were a waste. I sat through classes and wished that one day I could move on so I could go to college and get a real job. So when I heard about the Academy I jumped at the opportunity to finish high school and get started on college at the same time. For me, the Academy has been a dream come true for my academic life. And it all started with you and your generous contribution so kids like me, all across Kentucky, could show everyone what we're made of and that we are able and ready to advance our lives.

So again, Mr. Gatton, thank you.

Sincerely,

Matthew Gonzalez

Getting to Know Matthew



"My research experience will definitely help me with future goals. I plan on using my research to enter into competitions, apply for scholarships, and attend research conferences to increase my experience. The Research Internship Grant has facilitated my research to an extent that wouldn't have been possible if I was only performing research during the fall and spring semesters."

"Scared is an understatement when I talk about my first day at the Academy. After a little while it felt like an extended camp. I was making all the friends I would normally and then classes came and I realized this is now my life. When I think about the Academy now, I think of home. It's where I live and where I belong at this point in my life."





Home High School: Rockcastle County High School

Career Goal: Medical Doctor

"In the next ten years I can see myself completing medical school and finally having a real job. I aspire to be a doctor, a real MD, for many different reasons but the Academy has put me on an express lane to help me get there."



Research Area of Interest: Biochemistry

Extracurricular Activities: Research, Y-Club, Band

"The Academy atmosphere is something unique. I don't think you could find our life style anywhere else in the country. While it's difficult to explain such a special thing, I think it is my favorite part of Gatton."



Emily Gordon
Paducah, KY (McCracken County)

Dear Mr. Gatton,

Thank you so much for all you have done for the Gatton Academy. Thanks to you, students at the Academy have opportunities unmatched by any other high school in America! Indeed, your support has helped the Academy transform from just an idea to the nation's number one high school in five years.

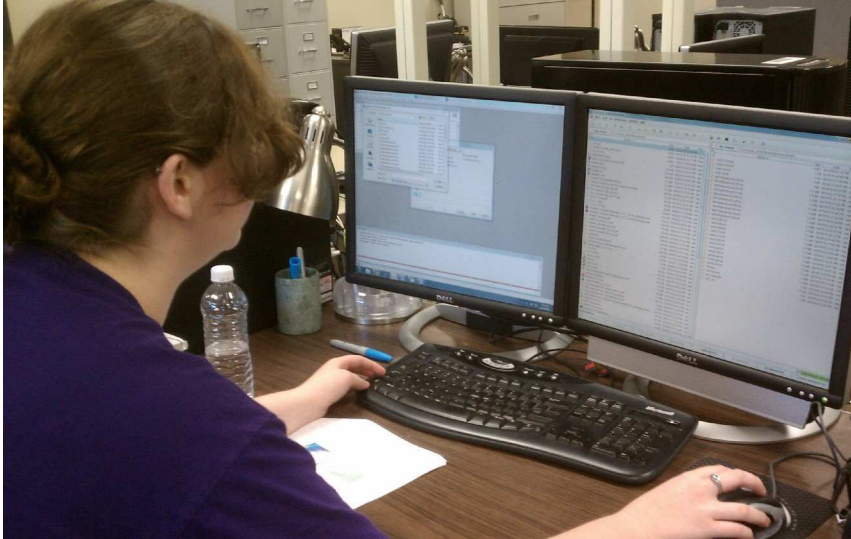
Without your generous gift, my summer probably would have been spent working in a retail store, going to the beach, or doing nothing at all. Instead, I'm working in a university laboratory with the goal of solving a high level problem, and I will enter my results into several competitions, including the Siemens Competition and the Intel Science Talent Search. Since I intend to major in physics, the chance to observe physicists at work has been a "window into the future" to see the kind of job I might have in fifteen years. My summer will have an impact on the rest of my life, and I have had an opportunity that few high school students can claim. Your continual support of gifted education has made it possible for many students, including myself, to have a summer experience unlike any we could have dreamed of otherwise.

Thank you again for all that you have done, not just for the Gatton Academy, but for all of gifted education.

Sincerely,

Emily Gordon

Getting to Know Emily



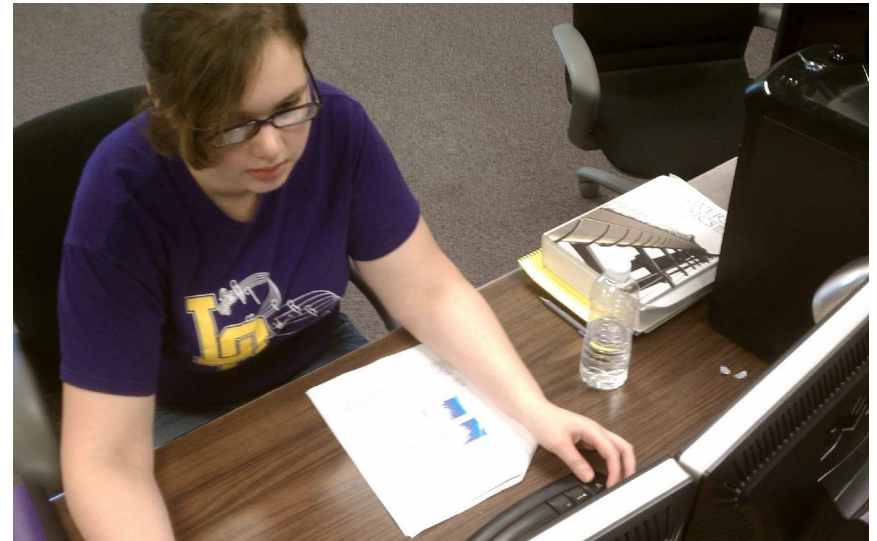
Home High School: Lone Oak High School

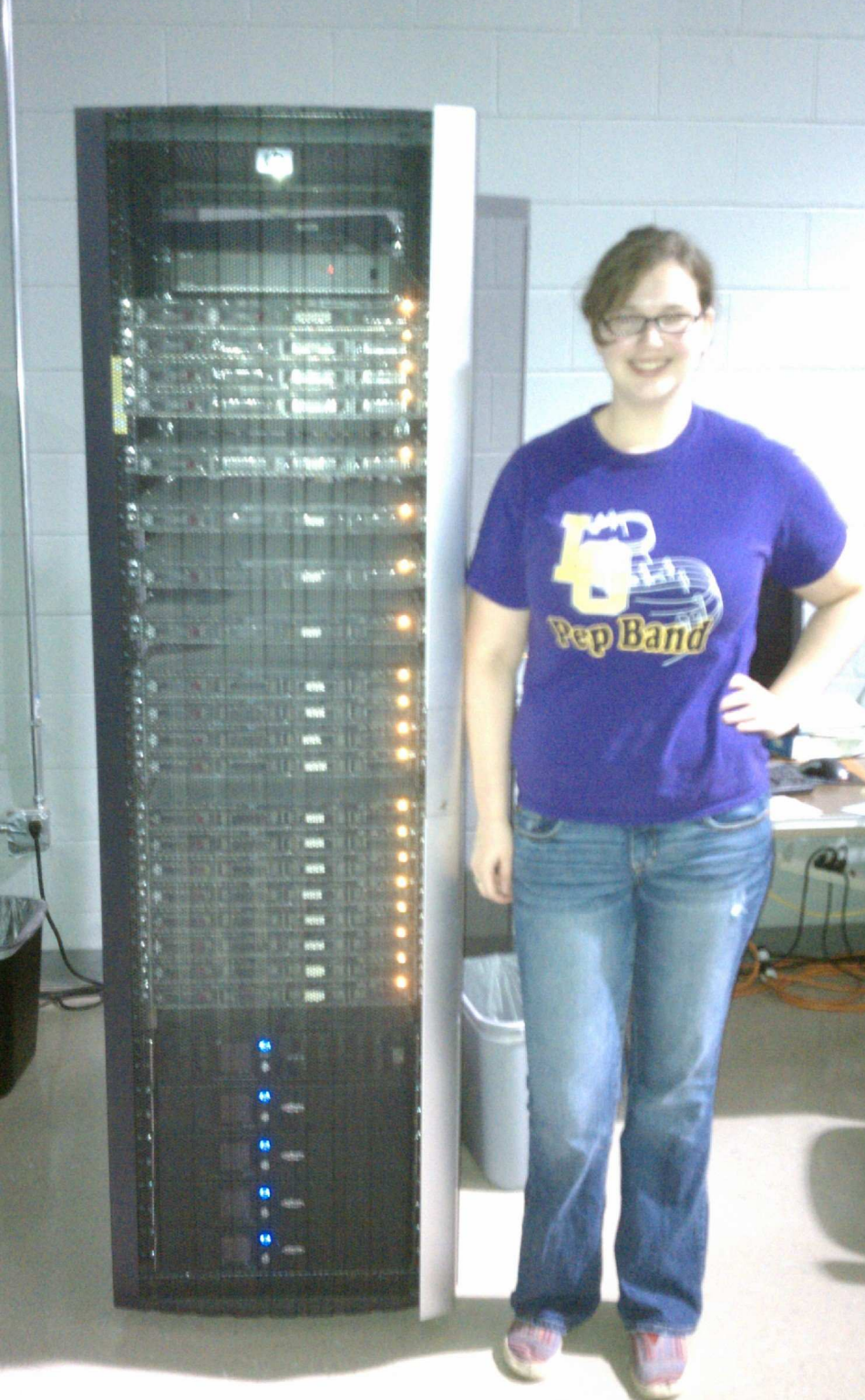
Research Area of Interest: Nuclear Physics

Career Goal: Research Scientist

Extracurricular Activities: Band, Music

"The Academy is a springboard for all the infinite possibilities of the world, academic and otherwise. Once students succeed in whatever opportunity they choose to take advantage of, they can give back to their home state, whether it's through research or community service."





"What I most enjoy about this summer experience is the chance to dedicate all of my time to research. During the school year, I have to scramble for time to work on my research between classes and homework. The summer allows for complete immersion into a problem, which is very rewarding."

"To me, research is a way of making some part of the science world better known. Research is taking mystery out of science and replacing it with wonder and awe."

"I am most looking forward to ushering in a new group of students to take over the junior class. I can't wait to see what these new students will add to the Academy culture! This fall, I will use my research experience to enter the Siemens Competition and Intel Science Talent Search. I will also apply for the SMART Scholarship."



Ryan Gott
Bowling Green, KY (Warren County)

Dear Mr. Gatton,

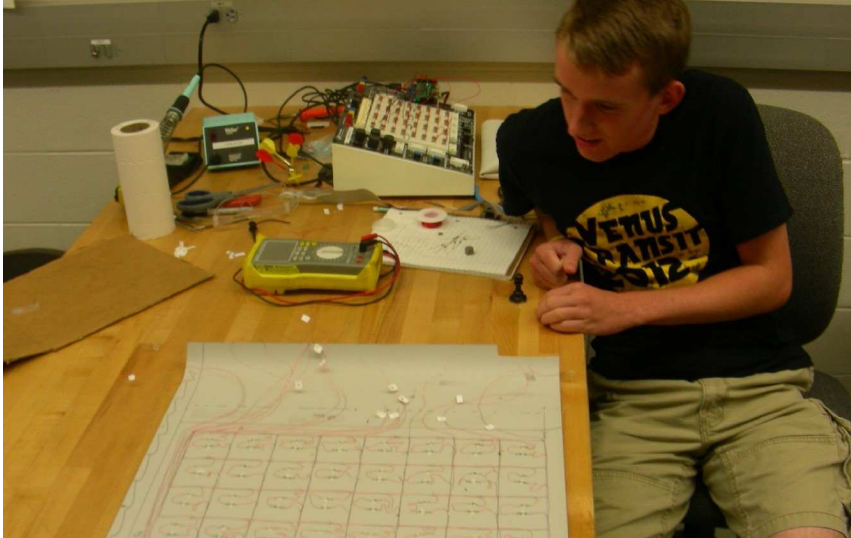
My name is Ryan Gott, and I am one of the rising seniors participating in the summer research program. Being the son of the director and the brother of a former student, I have known about the Gatton Academy for a long time. It has been my dream to attend Gatton since the school opened. Now that I'm living that dream, I have absolutely loved my time at the Gatton Academy, and I'm looking forward to another great year. The friends I've made and the experiences I've had have changed my life. The opportunities here cannot be found anywhere else. Thanks to you, these experiences have carried over into the summer.

I've always wanted to be an aerospace engineer, and now that dream is on its way to becoming a reality. Due to your gracious gift to the Academy, I was able to have an internship with the engineering department at Western Kentucky University. This summer, I have worked with mechanical and electrical engineers on several different projects. I am building relationships and making connections that will help me achieve my goals in the future. This kind of hands-on experience is also preparing me for the kind of work I want to do. Instead of lying around on a couch watching television, I'm working hard every day to attain my dream. Thank you for allowing me to have this kind of summer. Without your immense generosity, none of this would be possible. You have done so much for so many people, and we are all grateful.

In appreciation,

Ryan Gott

Getting to Know Ryan



Home High School: Bowling Green High School

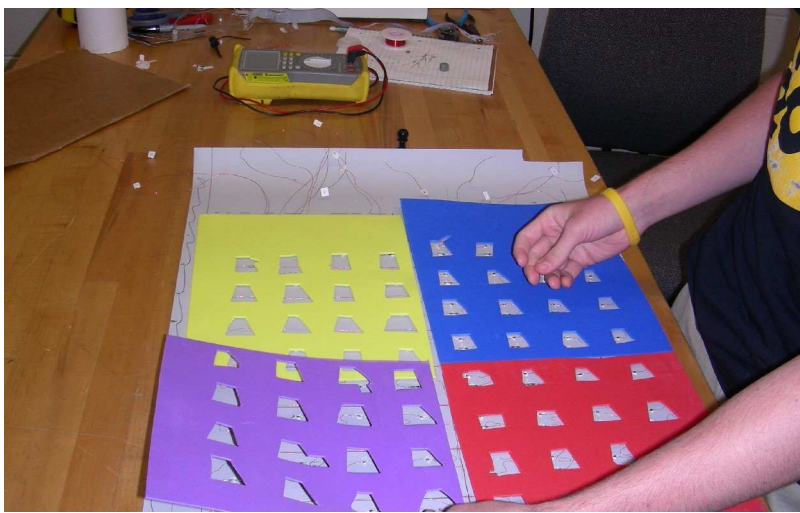
Research Area of Interest: Electrical/Mechanical Engineering

Career Goal: Aerospace Engineering

Extracurricular Activities: Soccer, Ultimate Frisbee, Running, President of the Student YMCA, Big Brothers/Big Sisters

"This internship is a great way for me to get ahead as an engineering student. Eventually, I'd like to go into aerospace engineering, but there is a lot of crossover between aerospace, mechanical, and electrical. I'm getting real, tangible experience with what I want to do for the rest of my life."

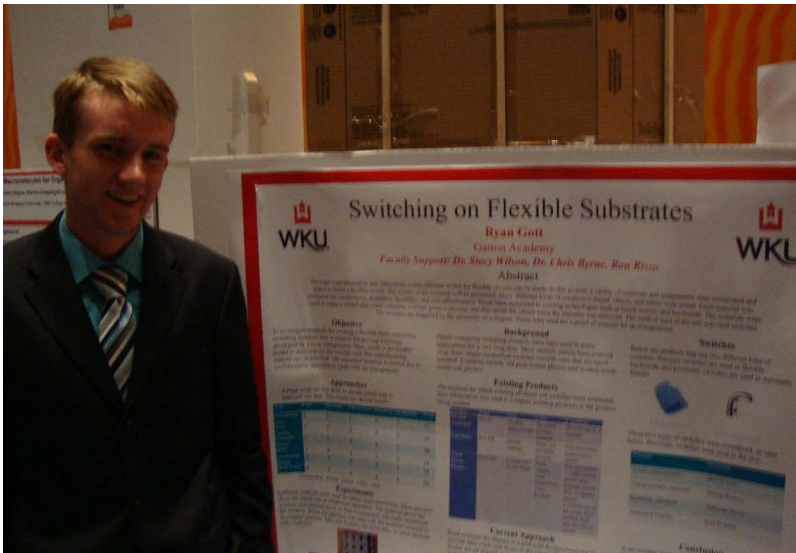


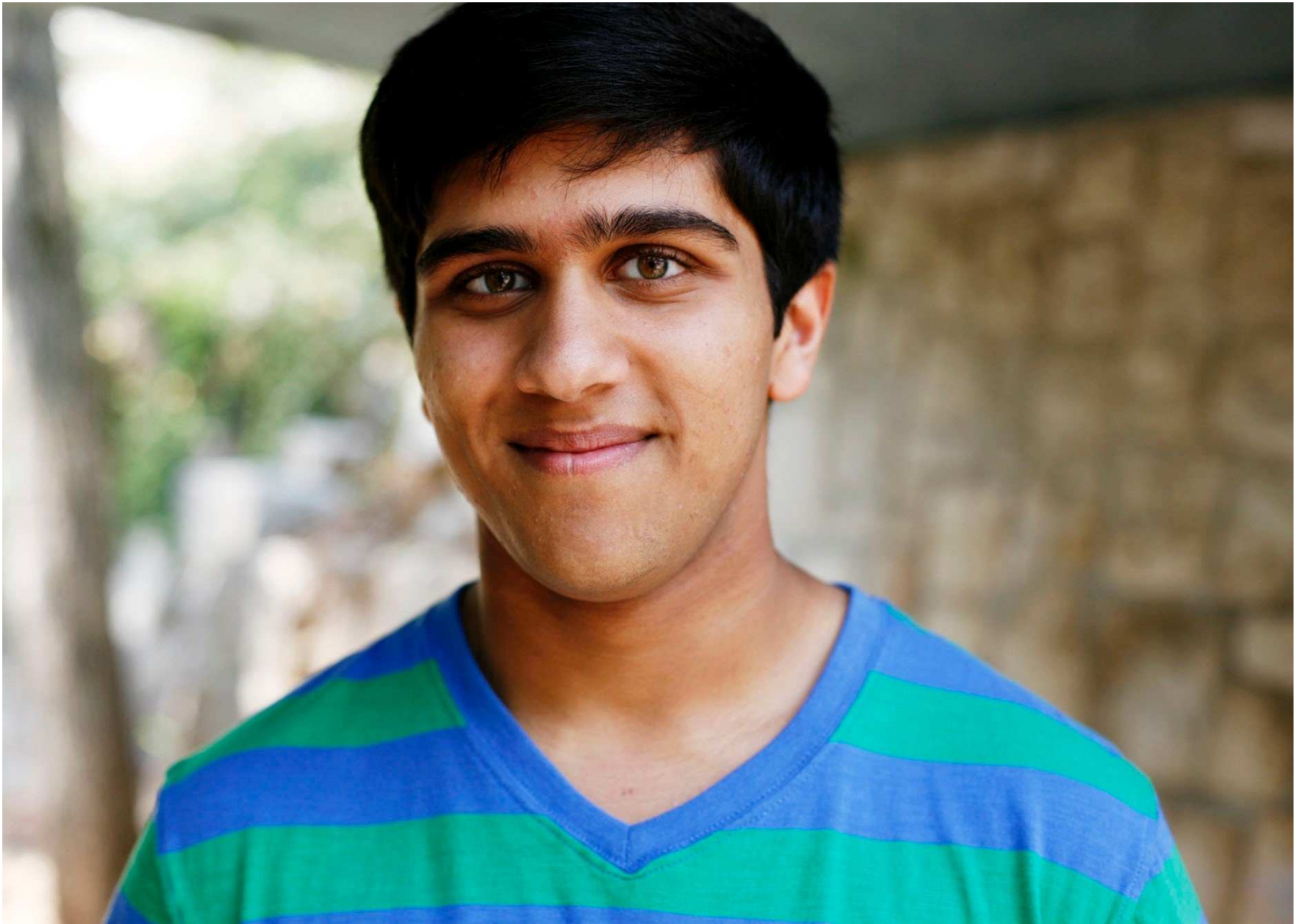


"The Gatton Academy is an asset to the state of Kentucky. The educational experiences that are available here allow all students to reach their full potential. The limits of a typical high school education have been taken away."



"My favorite memory of Gatton showed me why this school is so important. One Saturday night, I decided to walk around the building to see what everyone was doing. Each group of people I saw looked so happy, so alive. They were all with people they loved doing things they loved. The best part for me was I could have joined any group, and I would have felt perfectly included. The community we've built here is absolutely incredible."





Chiraag Kapadia
Madisonville, KY (Hopkins County)

Dear Mr. Gatton,

I would like to sincerely express my gratitude to you for impacting my life. The Gatton Academy has allowed me to extend my education well-beyond a traditional high school. Taking classes alongside actual college students and being able to enter a college environment early have enhanced both my skills and my interests. These classes will aid in my pursuit of a career in medicine.

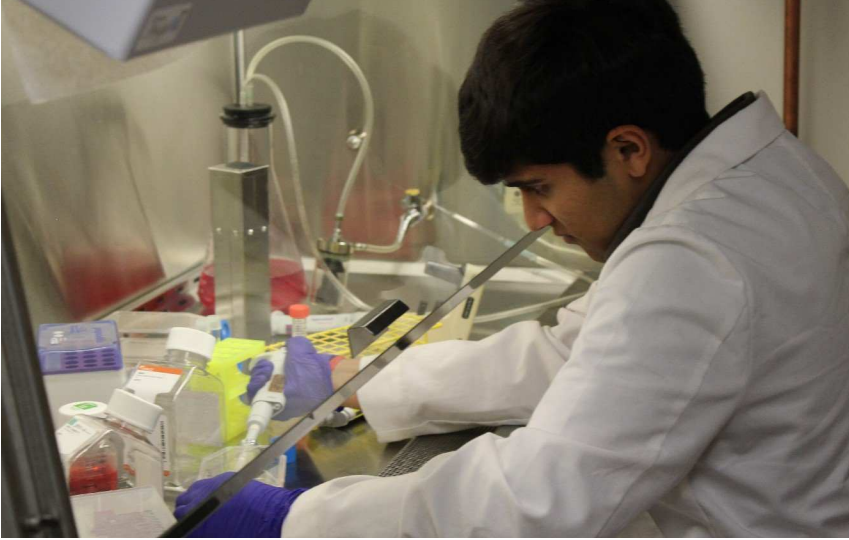
Through the Research Internship Grant you funded, I gained experience at the Mitchell Memorial Cancer Center in Owensboro, KY under the mentorship of Dr. Uma Sankar. With Dr. Sankar's guidance, I researched the novel paradigm of cancer stem cells and found evidence of these cells in lung cancers. With these findings, researchers can develop new and better treatments to combat cancer — something that is much needed in the world. Thank you for granting me the opportunity to get hands-on experience in a state-of-the-art facility and to make a contribution to modern biology.

Thank you so much for the Research Internship Grant and for your support of the Gatton Academy and all of the students there. You have given me the amazing opportunity to work alongside career researchers, to gain insight into the world of research, and to contribute to the field of stem cell biology. I will utilize all I have learned this summer in my future endeavors and am very appreciative for all you have done.

Best regards,

Chiraag Kapadia

Getting to Know Chiraag



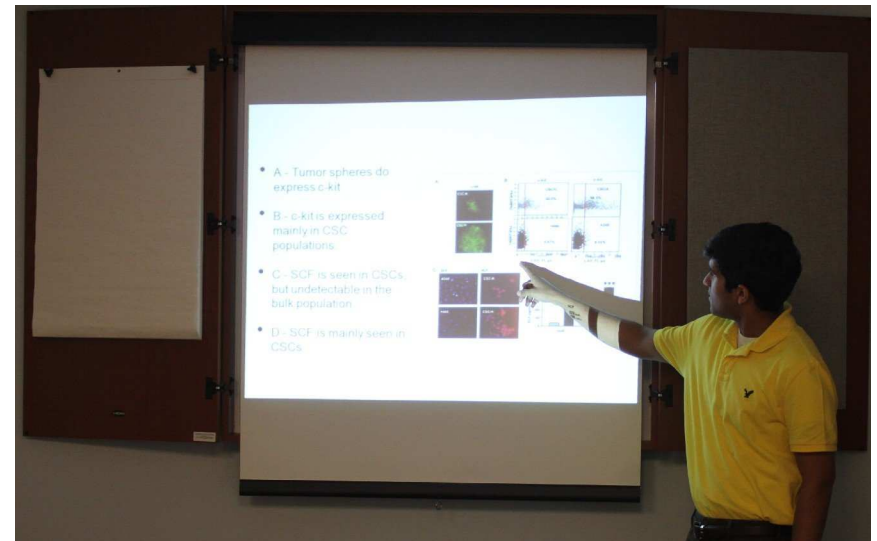
Home High School: Madisonville North Hopkins High School

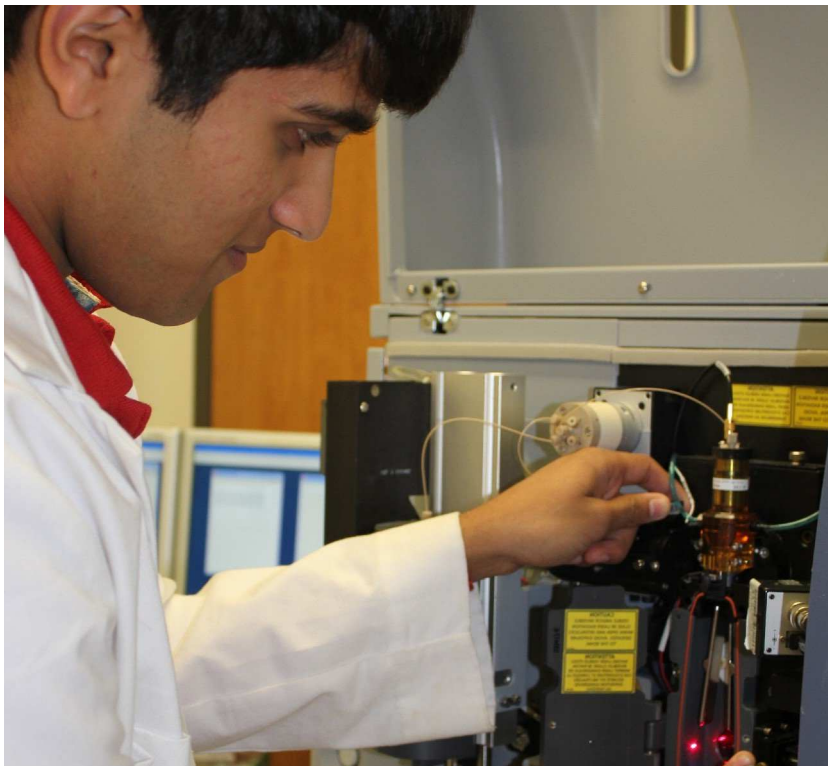
Research Area of Interest: Stem Cell Biology

Career Goal: Cardiologist

Extracurricular Activities: WKU Health Occupations Students of America (HOSA), Global Relief and Sustainable Societies (GRASS) Club, Volunteering

"My professional goal is to be a physician, so getting to do cancer research that may lead to therapeutic treatments is very exciting. As an added plus, many schools look positively on students with previous research experience, so this research will hopefully help further my academic career."





"Research is my opportunity to dive into the world of science. I get to make hands-on contributions to the collective scientific knowledge, something a young STEM-focused student like me values greatly. I am very excited to use the data and results from my research this summer to enter the Siemens Competition and apply for the Goldwater Scholarship."



"Unlike most high school students, I am getting to work in a state-of-the-art cancer research facility and make lasting contributions to the field. I am certain my summer is more productive and interesting than that of an average high school student."



Madison Preece
Owensboro, KY (Daviness County)

Dear Mr. Gatton,

I would like to thank you for the incredible learning opportunity furthering my interests in research and biology. It was made possible by your generosity. My summer experience was doing research at the Owensboro Cancer Research Program. My project was studying the effects of 2-Deoxy-D-Glucose in combination with ascorbic acid in hopes of finding a synergistic effect on killing non-small cell lung cancer.

My aspirations have always been to study medicine and by having this opportunity to do cancer research, it confirmed my career direction. Without this grant, I would not have been able to work at the cancer center this summer because there were no paid positions available. Additionally, the funding I received will help offset future college expenses.

My experience helped me to understand the internal workings of the medical/research field. I have learned a lot of laboratory techniques as well as met many people who work for medical schools. Through talking to them, I have learned what types of things I should expect at medical school and more about the application process.

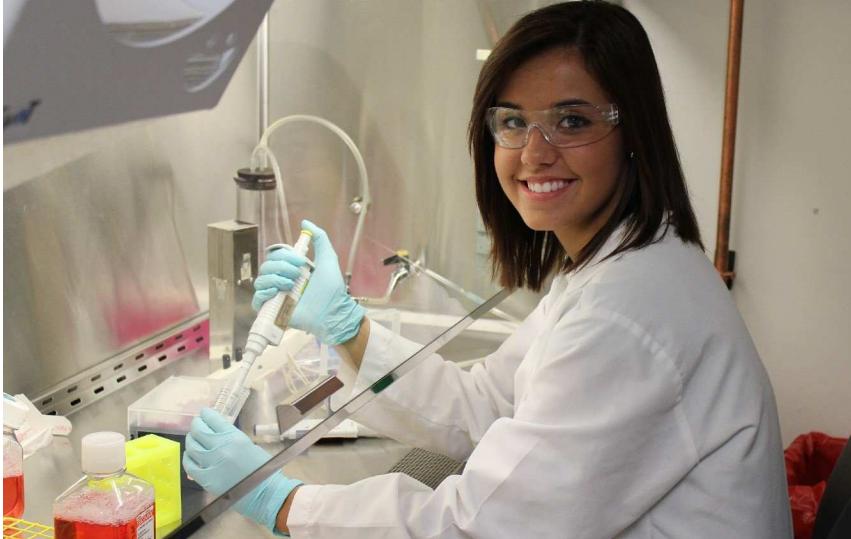
Another thing I learned through my summer experience is how much work it takes to get from research to clinical trials. Years and years of research have to be done before any possible cures can be determined. It wasn't what I was expecting, but now I understand what it takes to find a cure for cancer.

Again, thank you for the grant and for your interest in seeing Kentucky students excel in mathematics and science. I really appreciate being able to spend my summer working on something I am passionate about.

Sincerely,

Madison Preece

Getting to Know Madison



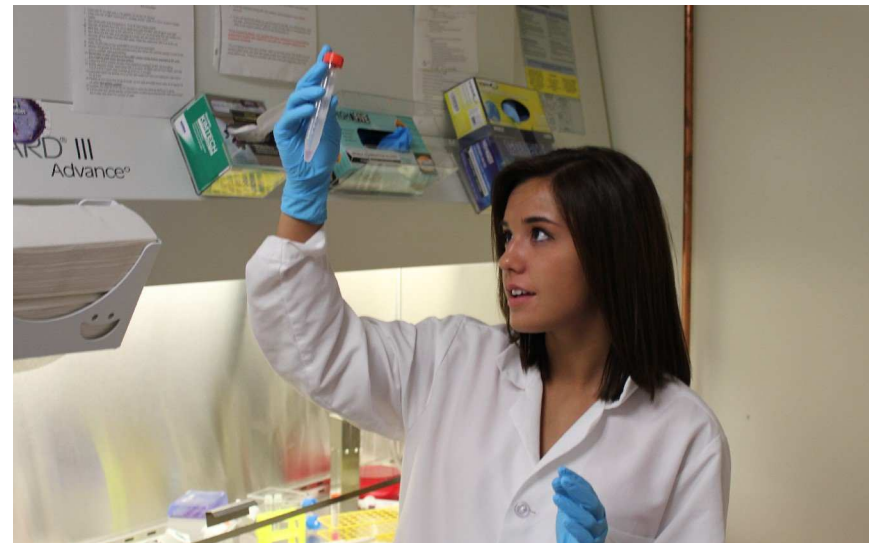
Home High School: Daviess County High School

Research Area of Interest: Biology

Career Goal: Physician

Extracurricular Activities: Volleyball and Working Out

"What I love most about the Gatton Academy is the opportunity to live in a learning-oriented environment with other high school students who share my passion for science and mathematics. We all strive to do our best and push others to do the same. At my old high school, I never had the chance to make friends who are so much like me."

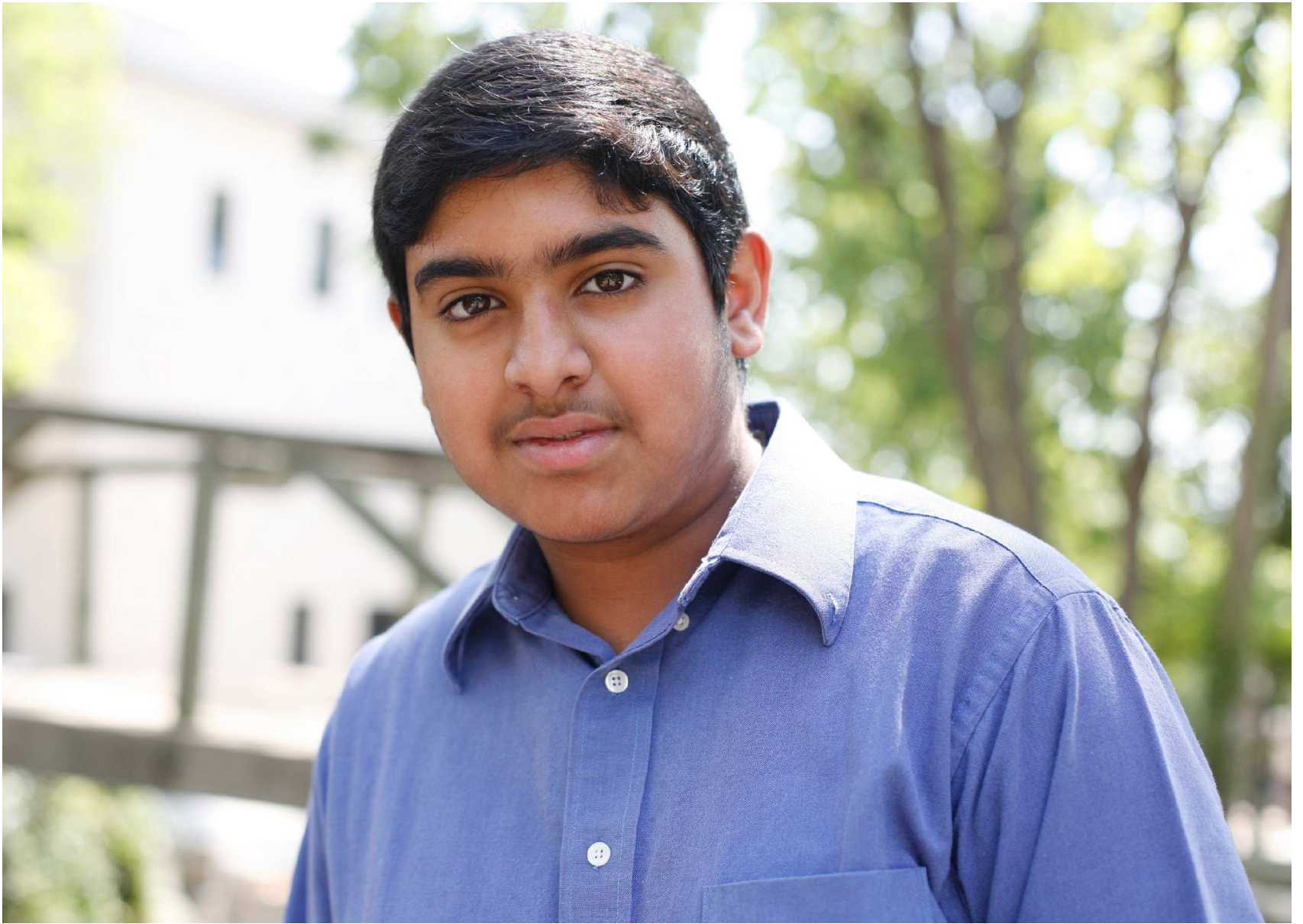




"I will be using this research experience as a launching point to enter the Siemens Competition this fall. It will also help me stand out during the college application process. In the next ten years, I aspire to be complete my education and become a physician. My passion is for helping others. My goal is to open free clinics in Myanmar for the civilians who are being attacked because of their religious affiliations."



"From my perspective, the Gatton Academy helps improve Kentucky's educational image. By recently being selected as Newsweek's #1 public high school in America, it illustrates that when our bright students are combined with excellent leadership, teaching, resources, and opportunities that great educational milestones can be reached. With such an outstanding education, students from Kentucky can truly impact the world."



Sibi Rajendran
Frankfort, KY (Franklin County)

Dear Mr. Gatton,

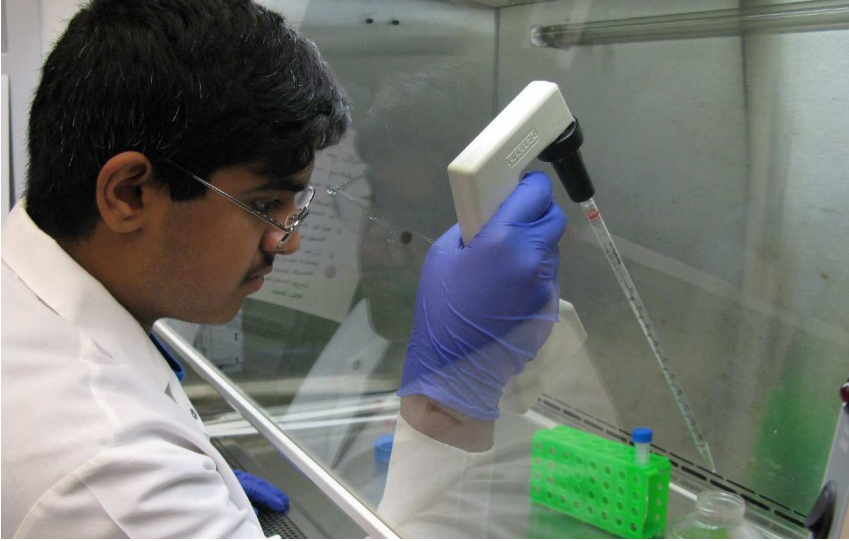
Thank you so much for funding my summer research experience this year at the University of Kentucky's Spinal Cord and Brain Injury Research Center! Your generosity has helped me on a research journey that will last a lifetime. In what is already shaping to be one of the best summers that I have ever had, I am able to join in and conduct cutting-edge research in the field of neurobiology and medicine, an experience that a typical high school student could never even dream of. My average day this summer consists of me entering a secure medical research facility, joining colleagues in a biological wet laboratory, working with neurons in a tissue culture room, and learning procedures and protocols that I would never get the chance to learn about in a normal school environment.

While there has never been a dull moment this summer, there have been an infinite number of occasions where I have paused and asked myself how I got to the position I was in. I asked myself how I am able to work in lab with graduate students, professors, and other lab personnel. I asked myself how I am able to work with million-dollar equipment on a day-to-day basis and how I could be involved in research that has the potential for revolutions on a large scale. There are few ways to describe how monumental of an experience you have given me, and also how much I have to be thankful for. I will not forget the experience I am having this summer and I know that this opportunity could not be made possible without your kind support. It is with that happiness that I once again offer you thanks for all of your help and support in shaping one of the best summers of my life.

Sincerely,

Sibi Rajendran

Getting to Know Sibi



"As a student looking forward to a career in the health field, there is no better way to start research than in the field of neurobiology and medicine. Research experiences like the one I am currently involved in will guide me closer to my career path and strengthen my applications to various educational opportunities and into a profession that I am closely looking forward to joining."

"Due to the nature of my research project, I think it would be very likely that I enter the results of my research this summer into competitions like the Intel International Science and Engineering Fair or the Siemens Competition. Spending a summer doing high-level research is sure to be a unique program that I would not hesitate to add to my college applications that are so swiftly heading my direction."



"While there are a thousand different reasons as to why I am looking forward to my second year at the Gatton Academy, the one that sums all of them up is because of the infinite opportunities that I have as an Academy student. The opportunities like study abroad, research, tutoring, volunteering, and learning allow me to do things that a normal high school student could not even dream of."

Home High School: Franklin County High School

Research Area of Interest: Neurobiology, Medicine

Career Goal: Physician or another Health Related Field

Extracurricular Activities: Frisbee, Soccer, Tennis, and Reading

"Research, in my opinion, is a pivotal component in education. We accumulate mountains of knowledge during lectures and seminars, but without the practical understanding of doing hands-on research, the message relayed during lectures is only partially received. As a young person interested in the STEM field, doing research in a subject that I love makes me feel whole or complete, finishing the puzzle that ordinary education leaves behind."





William Roach-Barrette
Frenchburg, KY (Menifee County)

Dear Mr. Gatton,

The summer research project funded by your scholarship has been a life-changing experience for me. I have spent the summer mentored by innovative space science experts at the Morehead State Space Science Center, one of only five of such institutions in the United States. This opportunity has allowed me to work on satellites and experiment with computer programs that have the opportunity to revolutionize the way we see and use satellites. If my research is successful, we may very well see satellites become a valuable teaching tool in future classrooms.

When I was thirteen years old, I began developing apps for the iPhone, as well as running my own business. The Gatton Academy has helped me direct my skills and interests and has challenged me academically. It has also been good to meet other students who share my interests and drive to succeed. It is my goal to study electrical engineering and computer science in order to pursue a career in the space industry. This research internship has provided me with the opportunity to network, observe professionals in space science industry and engage in research of my own.

I can't thank you enough for funding this research grant; it is thanks to you that I have had the opportunity to do all the things described above. The research you helped start has the opportunity to change the way we as students see and use satellites.

Sincerely,

William Roach-Barrette

Getting to Know William

Home High School: Menifee County High School

Research Area of Interest: Aerospace Science

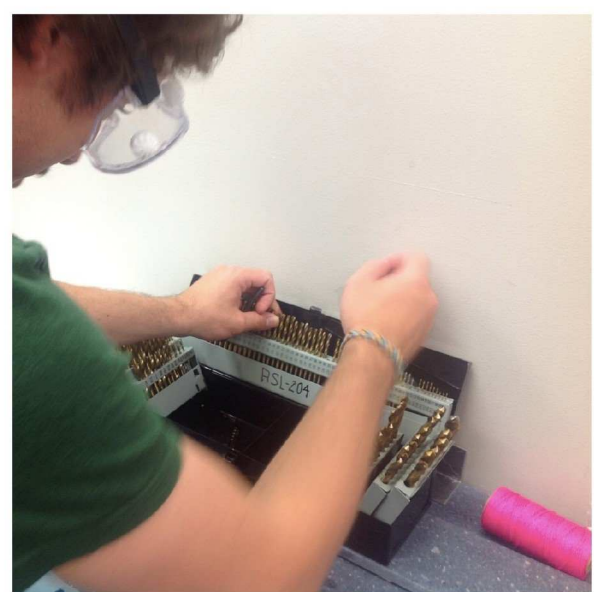
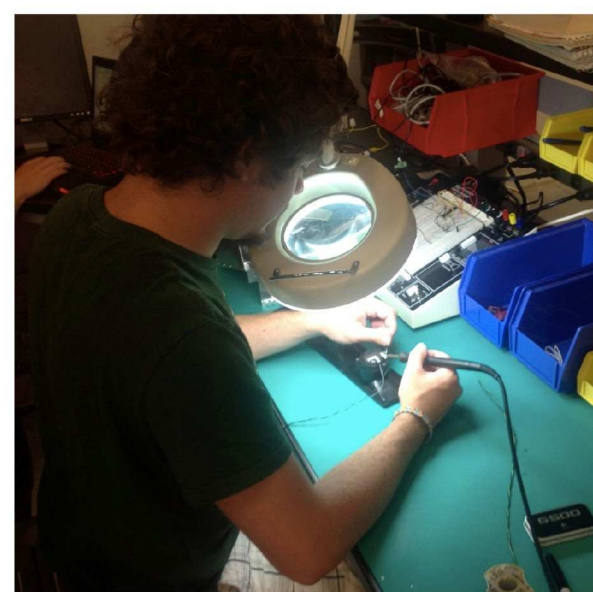
Career Goal: Computational Scientist

Extracurricular Activities: Developing Applications, Working on Construction Projects

"I have always seen research as the process of testing and implementing a new idea. Research has always been a key part of all sciences as it is the way most intellectual advances are made. In a way, research is sciences' form of evolution because it is the means by which ideas can be formed, tested, changed and challenged. This grant has provided me an opportunity to work in my scientific field of interest, something I don't think other students get the opportunity to do."

"The end goal of my research is to develop a computer language that is usable by high school or younger students as a learning tool designed to teach the basics of satellite programming. If successful, I would like to use it to apply for such competitions as the Siemens and the Intel International Science and Engineering Fair."

"I can't wait to get back to the Academy to start my second year. Not only do I get to pursue new sciences, ones such as chemistry and physics, I also start taking more advanced courses in areas like computer science and logic."





Samuel Saarinen
Shelbyville, KY (Shelby County)

Dear Mr. Gatton,

Thank you for your generosity with respect to the Academy. I was one of the recipients of the Research Internship Grant this summer, and I have enjoyed an incredible research experience through this funding. I was doing work in knot theory and how the construction mechanisms of a given class of polygons affect their geometric properties. This was a field of study that I had little to no background in, so my internship was educational as much as it was product oriented.

For me, this experience was eye-opening. To begin with, I'd taken a year of calculus, and thought I was reasonably prepared for anything I would encounter. What I realized early in my internship is that thinking that math is trivial after basic calculus is like thinking that knowledge of basic arithmetic fully prepares one to take the anti-derivative of the arccosine of x . Dr. Claus Ernst at WKU provided me a breadth of reading material, and I was introduced to novel ideas like hyperbolic space, where triangles with points infinitely far apart can enclose finite areas, knotted planes in four-dimensional space, and how we might test whether our universe is topologically closed. Through this experience, I discovered that mathematics has a far richer depth and complexity than I had ever imagined.

Further, I can begin to appreciate the difficulty and work involved in serious mathematical research, as well as what I must do if I aspire to pursue this field further. Seemingly unrelated topics end up being integrally related in a surprising and powerful theorem. This experience has provided powerful motivation for me to continue studying fervently the vast realm of mathematics that has already been established.

So, thank you once more. This would not have been possible for me without the grant.

Sincerely,

Sam Saarinen

Getting to Know Sam



"This research is an opportunity to begin to understand the machinations of science. I get experience working with real issues in this field of study, and I get a feel for the nature of the work involved. Additionally, this research has proved invaluable to my continuing education; I have learned a huge amount both about the specific work surrounding my research and tangential areas that have a strong application to this work."

Home High School: Shelby County High School

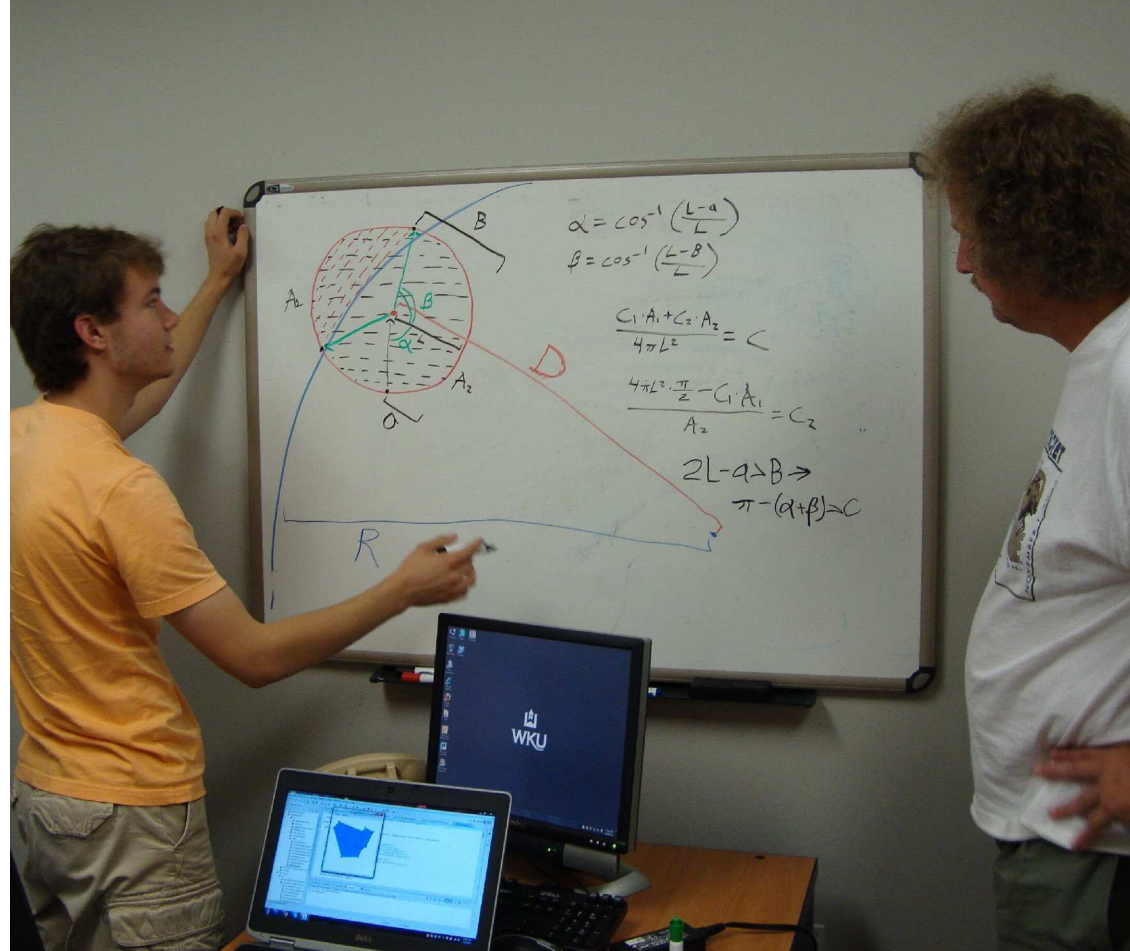
Research Area of Interest: Everything--
Currently, Mathematics.

Career Goal: Academia or Starting My Own
Application Development Studio

Extracurricular Activities: Running, Music,
and Creating Video Games



"The biggest change at the Academy, for me, was actually having to work at my classes. Unlike my previous school experience, which by and large consisted of review for me, classes here are full of new ideas, challenging assignments, and fantastic senses of humor. All of these keep me on my feet, even when I'm sitting down."



"On the surface, this really is like what most high school students do with their summers. I have a job which I show up to every morning, I read in the afternoons, and I pursue my hobbies on the weekends. Except that my job is thinking of things that nobody has ever thought of before, the books I read are mostly on knot theory or computer programming, and my hobbies include designing fonts, creating videogames, and studying great works of art."



Alexandra Sunnenberg
Lexington, KY (Fayette County)

Dear Mr. Gatton,

My name is Lexi Sunnenberg and I am a student at the Carol Martin Gatton Academy of Mathematics and Science in Kentucky. I am a rising senior, and I applied for and received the Gatton Academy Research Internship Grant which enabled me to spend my summer in a very rewarding way. I wanted to thank you for allowing me this opportunity.

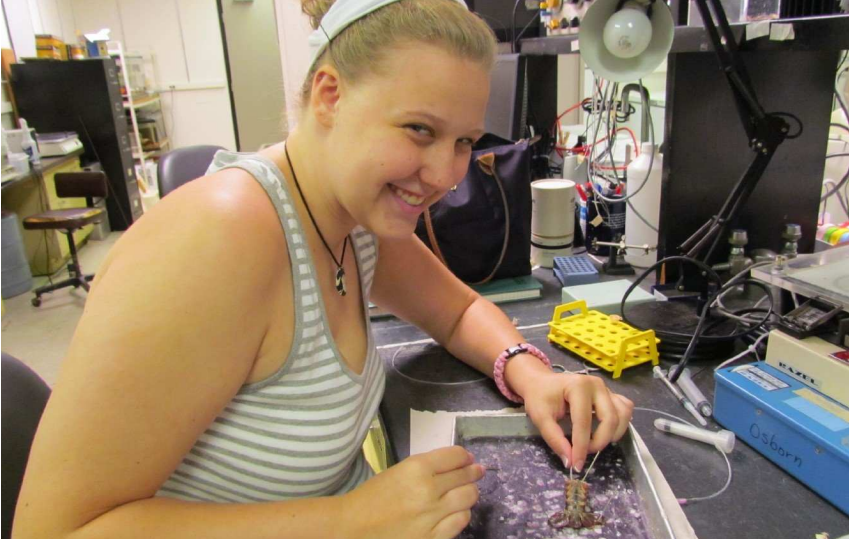
Thanks to you, I am spending my summer working in a biology lab at the University of Kentucky under the supervision of Dr. Jeffrey Osborn. My summer research is focused around studying how different saline solution concentrations affect sodium absorption and excretion in the crayfish *Procambarus clarkii*. I have already learned so much this summer, and I continue to learn more each day. The skills and knowledge I am acquiring through this experience are ones which I will be able to carry with me throughout my schooling and professional career.

When I was first thinking about what I wanted to do over my summer, I knew I wanted to do something science related. I did not want to just sit around and sleep the summer away, but I also wanted to be at home and have the chance to spend time with my family. Through this research internship grant, I was able to do both. This afforded me the opportunity to find a research area which I was interested in and still be at home enjoying my family. Without you none of that would have been possible. I am extremely grateful for this opportunity and cannot thank you enough for providing it.

Thank you,

Lexi Sunnenberg

Getting to Know Lexi



Home High School: Henry Clay High School

Research Area of Interest: Biology

Career Goal: Pediatrician

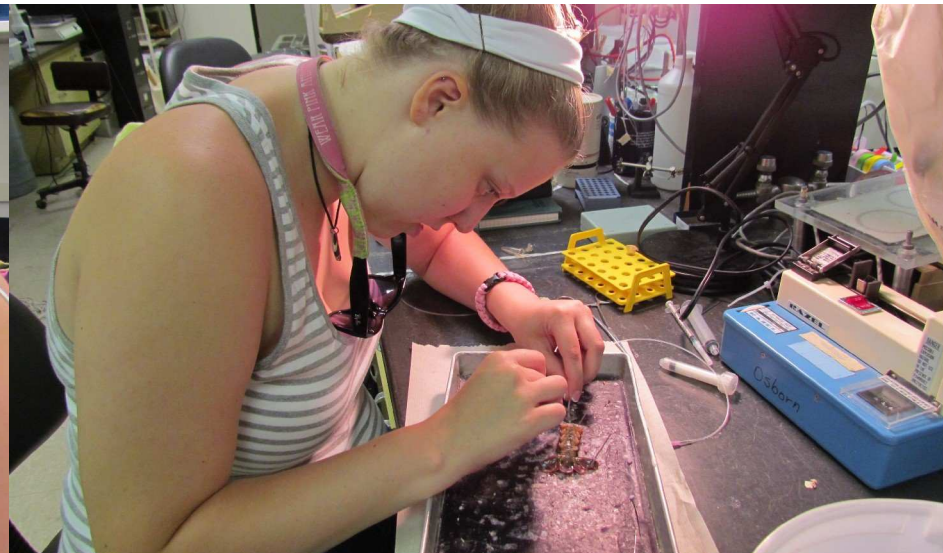
Extracurricular Activities: Violin

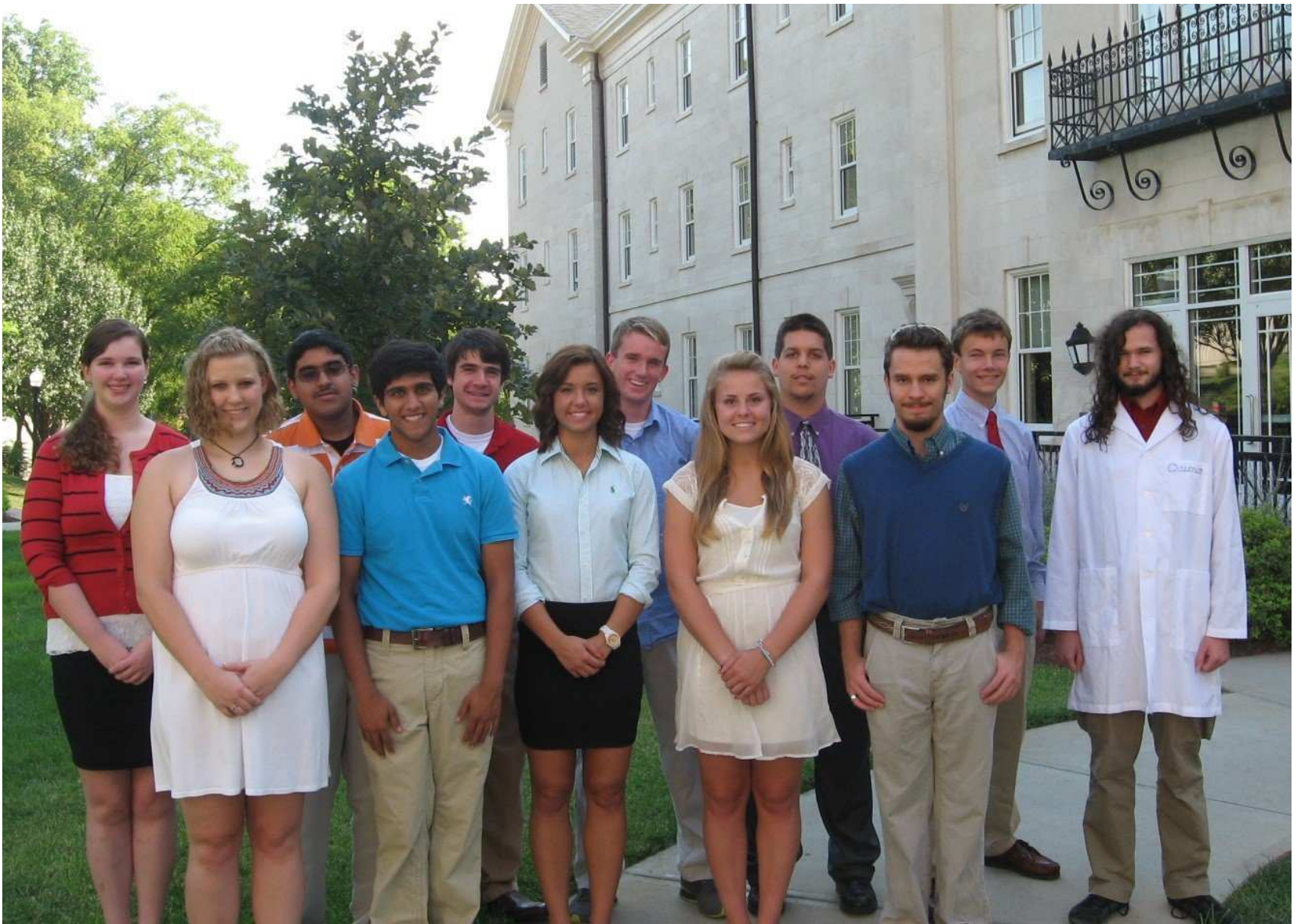
"The thing I love most about Gatton is the feeling like everyone belongs. No one is left out because they are a little bit quirky. Everyone is a little quirky and we just accept each other for who we are."



"Research is something that I'm really interested in and I plan on doing throughout the rest of my time in school. This research experience has helped me to better understand specifically what I want to do. In the next ten years I hope to complete my undergrad in Biology and then later graduate from medical school."

"For me the biggest change I experienced my first year at Gatton was living away from home. I've always been independent and I've never had a problem leaving home for a few weeks to go to camp or something else exciting, but coming to the Academy was different for me. I was fully independent for longer than just a few weeks. My first day at Gatton I was a little bit excited and really nervous for what was about to happen. But now I'm really excited to experience my senior year."





Mike Puzanek

David Brown

William Z. Roach-Barnes

Jessie Stummberg

Leah Cannady

Thank you, Mr. Gatton!

Chinampredia



Ryan
Salt

Matthew Dampley

CAROL MARTIN GATTON
ACADEMY OF
MATHEMATICS
AND SCIENCE
IN KENTUCKY

Mavisen Price

Emily Gordon

Nick Feltner

Sam
Saarinen





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