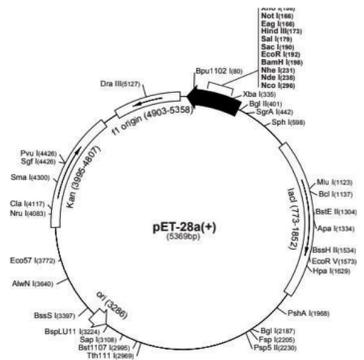


## Introduction

The Graham lab specializes in Chemical Engineering and is focused on performing various experiments that will profound their research. During the SHINE program, I was selected to be put into a chemical engineering lab. In this lab I worked with various instruments to perform various experiments. In these experiments we worked with bacteria and cells and learned the specific ways of how they work or form. Throughout this time we focused on bacteria culture and the different processes that bacteria have to go through.

## Objective & Impact of Professor's Research

Our Mentors research focuses on cancer cell research. Throughout this process they do experiments that can help them better understand the way cancer works and its process within the body. We, as SHINE students, helped them further their research by being involved in the experiments they hosted. Further along in this journey we started learning about bacteria and how everything is somewhat connected to cancer. We learned about vectors and IPTG and the process between them and within cells.



Then we also learned how the bacteria works and functions, about bacteria culture. We also performed various BCA Assays in which we worked further in depth with bacteria and other instruments.

## Skills Learned

Throughout my SHINE journey, I have acquired many skills that I am very proud and pleased to have. I have encountered various instruments that I did not know how to use at the beginning and have also improved my speaking, collaboration, and problem solving skills. In addition, I worked with instruments like centrifuges, pipettes, vortex mixers, PH Meters, NanoDrop, Tubes, etc. Up to now, I have learned how these instruments work and I have also learned to use them.



NanoDrop

It helped us measure the protein concentration after we performed the BCA assay.



PH Meter

The PH Meter helped us measure the certain concentration of various liquids



Bio Rad SDS

The Bio Rad SDS-PAGE instrument helped us work with protein solution within a gel. It helped us realize the molecular weight of unknown proteins.

## How This Relates to Your STEM Coursework

Throughout my Journey with SHINE, I'm glad to say that I have strengthened myself within the STEM areas. Thanks to my Lab for putting my brain to work and always finding a new challenge for me. All the work I did on Lab days or Fridays with everyone relates to my STEM coursework by giving me a stronger and bigger view of what it really is. STEM is not always just science, technology, engineering, or math. It is way more than that. Not only are you educating yourself throughout the process, but one day you can be the reason for an invented cure or a new monument to be built. STEM is something more in depth and within than just the sound of it. My work in the lab (researching and working with cells and bacteria) opened a whole new world of engineering that was unknown to me. While working in the lab, we did experiments and learned to use the various instruments to assist us. We worked with protein and various chemicals, etc. Not only that, but we managed to produce the protein, and the function of this protein is to bind tyrosine-phosphorylated sequences in specific protein targets, which will be helpful to cancer and proteomics research which are the main focus of the research lab. At the end of this journey, I feel complete knowing that work was done and a lot of new lessons have been learned. My work in the lab helped me see more about the engineering field and has overall challenged me and strengthened the areas within STEM.



## Next Steps for You OR Advice for Future SHINE Students

One piece of advice that I can give to future SHINE students is to never give up. It may sound like a normal statement, but once it's put into action you can really see it affecting your life in a good way. Never give up looking for solutions to something. Whether it's a big or small problem the solution is there and will always be there. Although it may be frustrating at times or confusing the answer IS there. It's just up to you to look in deep and unlock it. All in All the solution is always there. Perseverance is all it takes.

## Acknowledgements

I would like to acknowledge my Mentors, Professor Graham, Dr. Mills, and other instructors for giving me the opportunity to experience this Journey.