



# SENIOR CAPSTONE

## EXTRAVAGANZA

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### IT Project Management

Click the thumbnail to learn more about the project

**Dear, Cultural Butterfly**  
Creating open dialogue to open minds

Madison A.

This project is a website designed to create open dialogue to open minds. It features sections for Introduction, Research, Implementation, and Lessons Learned. It also includes a QR code for scanning and a future section.

**Dear, Cultural Butterfly**  
Creating open dialogue to open minds  
Madison A.

**Nutrition & Insulin Resistance**  
A Comprehensive Guide to the Condition and Management

Shruti B.

This project is a comprehensive guide to nutrition and insulin resistance. It includes sections for Introduction, Research, Implementation, Lessons Learned, and Future. It features a QR code for scanning.

**Nutrition & Insulin Resistance**  
A Comprehensive Guide to the Condition and Management

Shruti B.

**Lego Shopping Center**  
Using Lego Bricks, Lego Techniques, Architectural Concepts, and Stud.io to Create Better Models

Amanda D.

This project is a model of a shopping center built using LEGO bricks. It includes sections for Introduction, Research, Implementation, Lessons Learned, Future Work, and a QR code for scanning.

**Lego Shopping Center**  
Using Lego Bricks, Lego Techniques, Architectural Concepts, and Stud.io to Create Better Models

Amanda D.

**Mental Health is Health**

Lauren E.

This project is a podcast series about mental health. It includes sections for Research, Implementation, and Future Plans. It features a QR code for scanning.

**Mental Health is Health**

Podcast series on mental health

Lauren E.

**TIP-CHOP SHAPE**  
Educating and inspiring teenagers & young adults in the kitchen

Sam F.

This project is a guide to educating and inspiring teenagers and young adults in the kitchen. It includes sections for Introduction, Research, Implementation, Lessons Learned, and Future Plans. It features a QR code for scanning.

**Tip-Chop Shape**  
Educating and inspiring teenagers & young adults in the kitchen

Sam F.

**BLANK SPACE**  
The Art of Designed Destruction

Casey G.

This project is a combat robot built for a competition. It includes sections for Introduction, Research, Implementation, Lessons Learned, Future Plans, and a QR code for scanning.

**Blank Space**  
The Art of Designed Destruction

Casey G.

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# IT Project Management

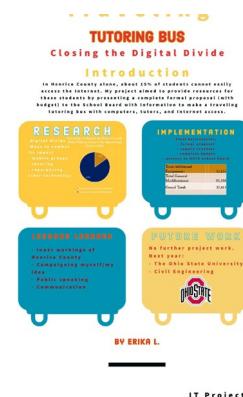
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## Chinese Checkers AI

Creating an Artificial Intelligence that learns to play Chinese checkers

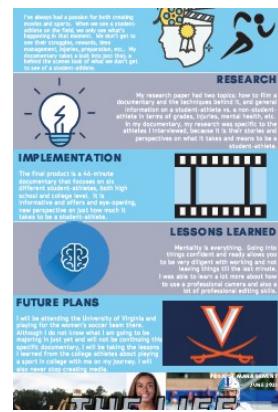
Hanyang L.



## Traveling Tutoring Bus

Closing the Digital Divide

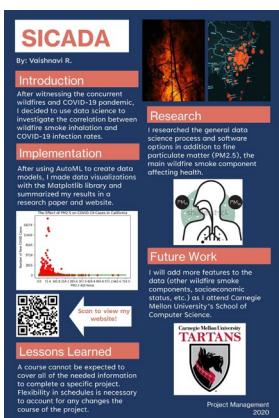
Erika L.



## The Life of a Student Athlete

A deeper look into the successes, struggles, mentality, and physicality behind a student athlete

Camryn M.



## Sicada

Correlation between wildfire smoke inhalation and COVID-19 infection rates

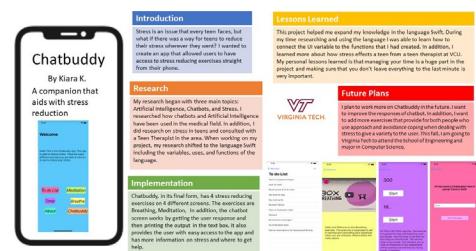
Vaishnavi R.



## Aerolation

Learn a bit of information about aerospace

Reid S.



## Chatbuddy

A companion that aids with stress reduction  
Kiara K.



## Feasting on Fusion

Chinese/Vietnamese Fusion Cookbook

Allie Q.

# Dear, Cultural Butterfly

*Creating open dialogue to open minds*

## Introduction

### Project Scope

- 35 minute documentary on ethnic identity
- interviews with minority upperclassmen students & teachers
- Upload final film to YouTube

### Inspiration

- Participation in protests in 2020
- Dream to make my own film
- Promote Open Mindedness
- Leave a mark on DRHS



## Research

### NATIONAL BESTSELLER

WHY ARE ALL THE BLACK KIDS SITTING TOGETHER IN THE CAFETERIA?  
And Other Questions About Race That Adults Don't Ask  
Beverly Daniel Tofun, PhD



- Racial/ Ethnic Concepts Researched
- Discrimination & Racism History
  - Perspective of Identity
  - (Ethnic) Identity Definitions

### Videography Techniques Researched

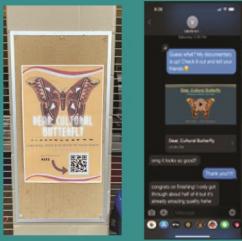
- Best lighting
- Delivery of interview questions
- Avoid "talking head" stigma
- Participant Comfort



## Implementation

### Final Deliverables

- +6 Interview Questions
- Detailed Storyboard
- Upload film to YouTube
- +150 views
- Various Promotional Methods



## Lessons Learned

### Personal Realizations

- Self Trust
- Patience
- Work Ethic
- Determination
- Believe In Myself More
- Keep Moving Forward

### Academic Skills

- Videography Techniques
- Sense of Professionalism
- Scheduling Efficiently
- Flexibility



## Future

### For the Project

- Have a full professional screening of my film
- Keep sharing my film to others
- Probably won't continue things much further for the film itself



DREXEL UNIVERSITY  
College of  
Engineering

### College

- Attend Drexel University this fall
- Major in Electrical Engineering
- Continue my activism
- Use my new found skills as a hobby

## SCAN ME

to watch the final film



2021 IT PM

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# Nutrition & Insulin Resistance

A Comprehensive Guide to the Condition and Management  
By Shruti B

## Introduction

- ❖ 1/3 of the US population has insulin resistance
- ❖ Have seen the effects of the condition firsthand
- ❖ Wanted to make an accessible product to **educate** about insulin resistance management and nutrition

## Implementation

- ❖ Written guide/e-book that was 88 pages long and with 9 chapters
- ❖ Website with the same information as well as interactive tools

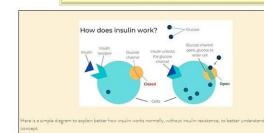
## Nutrition & Insulin Resistance



A comprehensive guide to the condition and real-life management tips  
Shruti Bala  
Reviewed by Sarah Johnson, R.D.N.

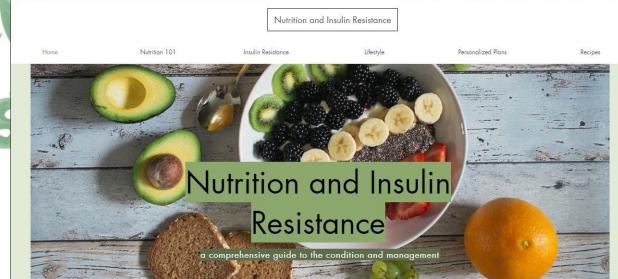
## Research

- ❖ My entire project is research-based
- ❖ Topics- basic nutrition, nutrition specific to insulin resistance, effects of sleep, stress, and exercise on insulin resistance
- ❖ Peer-reviewed scientific studies



## Lessons Learned

- ❖ It's not embarrassing to ask questions
- ❖ Planning is key- write everything down
- ❖ Make realistic schedules and don't get demotivated



## Future

- ❖ Sending website to a doctor's office to possibly be shared with patients with insulin resistance
- ❖ Attending UVA next year in the School of Engineering with Computer Science as my prospective major



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# Lego Shopping Center

Using Lego Bricks, Lego Techniques, Architectural Concepts, and Stud.io to Create Better Models

Amanda D.

## Introduction

I have always loved building with Legos, but have never branched out into making custom models. With this project, I saw an opportunity to learn how to make a bigger and better model than before.



## Research

- Lego Basics and Techniques
- Core Architectural Ideas
- Studio 2.0
- Ideas for What to Include in the Model



## Implementation

Included in the final product:

- 5 unique buildings plus a common area
- Buildings are detachable from the base
- Minifigures can fit anywhere
- All buildings utilized rounded windows

## Lessons Learned

- Complete documentation and project simultaneously
- Utilize my mentor so that the project can go quicker

## Future Work

- Return all the Lego bricks I borrowed
- Revisit this project sometime in the future
- Attend Longwood University



Project  
Management  
2021

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# Mental Health is Health

Lauren E



## Research

The initial research paper was split between intense research on mental illnesses and the evolution of podcasts. I focused on how big podcasts had become and the effects of mental illness on people. I combined the two topics to create a podcast on mental health. Research throughout the project mainly focused on mental illnesses in children and any new topics that came up in the mental health field, such as insurance coverage.

## Purpose

I used anchor as my host platform. I used anchor to record, edit, and upload. From the platform I was able to upload to Spotify and Google Podcasts. I began with episodes covering the education portion and episodes following included my own experiences, guest's experiences, and how to start to break the stigma.

## Implementation

## Future Plans

I hope to continue to create podcasts on mental in the future and follow how society starts to break the stigma. I hope to be able to have seasons of the podcast and be able to look back at this first season. My future plans personally include getting my associates at John Tyler Community College and transferring to a state school in two years.



## Check it out

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• SAM F •

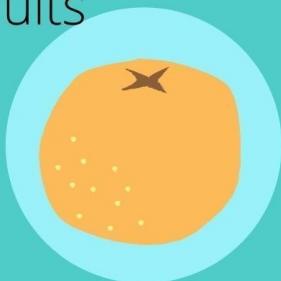
# TIP-CHOP SHAPE

"Educating and inspiring teenagers & young adults in the kitchen."



## INTRODUCTION

In March 2020, I noticed my mom was very busy supporting our family due to isolation. One of her jobs was cooking meals for us. I wanted to learn how to cook in order to help her in the kitchen. She taught me the ways around the kitchen and how to cook in general. This gave me my idea for my project because I wanted to teach other kids my age how to cook and help themselves and their families.



## RESEARCH

I researched many topics related to food and cooking. These topics included: nutrition, diets, and food safety. I was able to gain valuable knowledge that I would eventually implement into my project. This knowledge would also help me personally in the kitchen. For example, I learned what temperatures certain meats should be cooked at, I learned how to store and prepare food, and I learned the importance of each of the five food groups.



## IMPLEMENTATION

From my research, I was able to gain the skills and knowledge to educate others my age. The way I did this was making instructional cooking videos for my target audience of teens and young adults. I also made and distributed a Nutritional & Dietary survey to gain insight about what they eat and how their diets are. I then turned this feedback into a detailed data report.

## LESSONS LEARNED

I learned that getting responses for surveys is not easy during the pandemic because people are busy and have their focus on other things. I also learned how to thoroughly manage my time so that I did not end submitting things at the last minute. However, one of the lessons I learned that was especially valuable to me was public speaking for our presentations.

## FUTURE PLANS

I plan to attend Virginia Tech this fall to study and major in Food Science & Technology, which is the study of food safety, food processing, and nutrition. I do not plan on continuing this project but I hope to make a difference in the world when it comes to the topic of food.

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# BLANK SPACE

## The Art of Designed Destruction

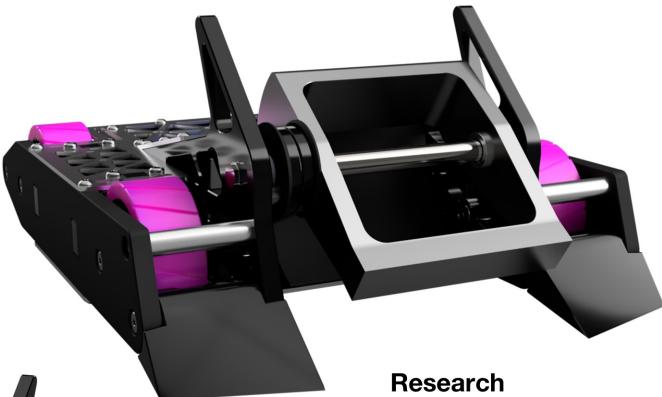
Casey G.

### Introduction

I've been a part of Deep Run's FIRST robotics competition team for 4 years and I'm currently the team captain and design lead. Having designed dozens of highschool competitions robots, I was eager to branch into a different type of robotics. Inspired by the TV show Battlebots I decided to create a combat robot for my project.

#### Implementation

- Powerful brushless motors
  - 4 Wheel drive
- Composite UHMW, Aluminum, and Titanium frame.
- "Egg-beater" Bar vertical spinner weapon.
- 350+ KJ Energy transfer
  - 2.8 lbs

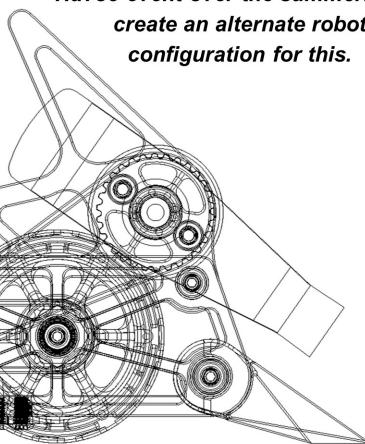


#### Research

- Robot types
- Design theory
- Material selection
  - Electronics
  - Optimization

#### Project Future

I will be competing at the Norwalk Havoc event over the summer. I will create an alternate robot configuration for this.



#### Lessons Learned

- Pay attention to the small details.
- Don't overlook the simple things.

**VCU**

#### Future Plans

I will be attending VCU and am majoring in Mechanical Engineering. I'm plan to continue on robotics projects like this at VCU.

Project Management - 2021

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# Creating an Artificial Intelligence that learns to play Chinese checkers

Hanyang L.

## Introduction

The goal of the project is to create an artificial intelligence agent capable of playing Chinese checkers.



## Implementation

The project included several other components to accomplish this main goal. A Chinese checkers environment was programmed to host the training of the agent. A simplistic AI agent, a greedy action agent, was programmed to play against the reinforcement learning agent during training. This paper contains an evaluation of the results and the capability of the aforementioned agents and components. The agents will be tested against each other as well as a restricted random move generator to gauge success.

## Research

### DFS and BFS

Depth Field Search and Breadth First Search are both search algorithms for graphs.

### Reinforcement Learning

Broken down to the simplest terms, reinforcement learning consists of an environment, an agent, states, and rewards.

### Exploration-Exploitation Dilemma

Applies to the agents in reinforcement learning training. On occasion allow agent to make seemingly "stupid" moves (random) moves that could turn out being positive and beneficial. This would provide an opportunity to learn.

**Q-learning**  
In q-learning, neural nets takes in action state pairs and transforms it into one value, q-value. In the context of my project, it is taking in a visualization of different states of a board and generating an associated q-value based upon it.



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## Lessons Learned

- DFS and BFS
- Reinforcement Learning
  - Neural Nets
  - DL4J

## Future Plans

- Android app
- Improved greedy action agent
  - UVA

IT Project Management, 2021

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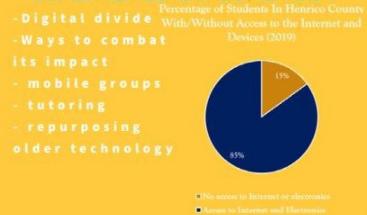
# Traveling TUTORING BUS

## Closing the Digital Divide

### Introduction

In Henrico County alone, about 15% of students cannot easily access the Internet. My project aimed to provide resources for these students by presenting a complete formal proposal (with budget) to the School Board with information to make a traveling tutoring bus with computers, tutors, and Internet access.

#### RESEARCH



#### IMPLEMENTATION

- Final Deliverables:
- formal proposal
  - sample schedule
  - complete budget

Total Additional Equipment:	17,125
Total General Modifications:	20,288
Grand Total:	37,413

#### LESSONS LEARNED

- Inner workings of Henrico County
- Campaigning myself/my idea
- Public speaking
- Communication

#### FUTURE WORK

- No further project work.  
Next year:  
  - The Ohio State University
  - Civil Engineering



BY ERIKA L.

IT Project  
Management  
2021

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# THE LIFE OF A STUDENT-ATHLETE

A deeper look into the successes, struggles, mentality, and physicality behind a student athlete

Camryn M

## INTRODUCTION

I've always had a passion for both creating movies and sports. When we see a student-athlete on the field, we only see what's happening in that moment. We don't get to see their struggles, rewards, time management, injuries, preparation, etc. My documentary takes a look into just that, a behind the scenes look of what we don't get to see of a student-athlete.



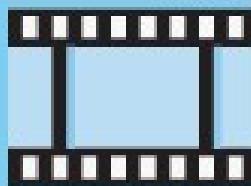
## RESEARCH



My research paper had two topics: how to film a documentary and the techniques behind it, and general information on a student-athlete vs. a non-student-athlete in terms of grades, injuries, mental health, etc. In my documentary, my research was specific to the athletes I interviewed, because it is their stories and perspectives on what it takes and means to be a student-athlete.

## IMPLEMENTATION

The final product is a 45-minute documentary that focuses on six different student-athletes, both high school and college level. It is informative and offers a new and eye-opening, new perspective on just how much it takes to be a student-athlete.



## LESSONS LEARNED

Mentality is everything. Going into things confident and ready allows you to be very diligent with working and not leaving things till the last minute. I was able to learn a lot more about how to use a professional camera and also a lot of professional editing skills.



## FUTURE PLANS

I will be attending the University of Virginia and playing for the women's soccer team there. Although I do not know what I am going to be majoring in just yet and will not be continuing this specific documentary, I will be taking the lessons I learned from the college athletes about playing a sport in college with me on my journey. I will also never stop creating media.



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# SICADA

By: Vaishnavi R.

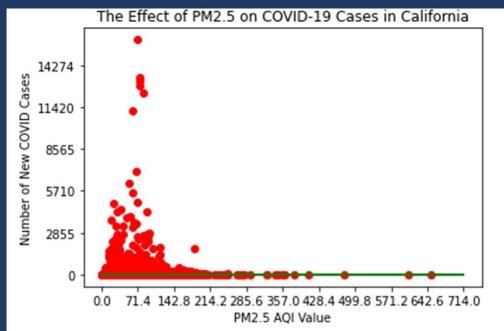
## Introduction

After witnessing the concurrent wildfires and COVID-19 pandemic, I decided to use data science to investigate the correlation between wildfire smoke inhalation and COVID-19 infection rates.



# Implementation

After using AutoML to create data models, I made data visualizations with the Matplotlib library and summarized my results in a research paper and website.



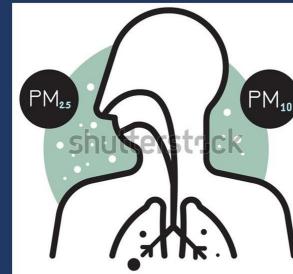
**Scan to view my  
website!**

# Lessons Learned

A course cannot be expected to cover all of the needed information to complete a specific project. Flexibility in schedules is necessary to account for any changes the course of the project.

# Research

I researched the general data science process and software options in addition to fine particulate matter (PM<sub>2.5</sub>), the main wildfire smoke component affecting health.



## Future Work

I will add more features to the data (other wildfire smoke components, socioeconomic status, etc.) as I attend Carnegie Mellon University's School of Computer Science.



Project Management  
2020

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# Aerolation

Reid S.

## Introduction

Airplanes absolutely fascinate me, and I wanted a project I could use to spread my knowledge to other people. I wanted to help people learn a bit about aerospace engineering without having to attend a university.

## Research

To begin, most of my research revolved around aerodynamics with a bit about the design of games and simulators.

## Implementation

The final game did not accomplish exactly what I had wanted, but it allows users to fly planes around a winter mountainous background.

## Lessons Learned

It is always important to keep things passionate when undertaking large deliverables.

Planning meetings far ahead of time helps ensure continued communication and meeting deadlines.

## Future Plans

I do not plan on continuing my project as I get older, but I do plan on attending the University of Virginia to get a degree in Aerospace engineering.

IT Project Management  
2020-2021

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## Chatbuddy

By Kiara K.

A companion that aids with stress reduction

### Introduction

Stress is an issue that every teen faces, but what if there was a way for teens to reduce their stress wherever they went? I wanted to create an app that allowed users to have access to stress reducing exercises straight from their phone.

### Research

My research began with three main topics: Artificial Intelligence, Chatbots, and Stress. I researched how chatbots and Artificial Intelligence have been used in the medical field. In addition, I did research on stress in teens and consulted with a Teen Therapist in the area. When working on my project, my research shifted to the language Swift including the variables, uses, and functions of the language.

### Implementation

Chatbuddy, in its final form, has 4 stress reducing exercises on 4 different screens. The exercises are Breathing, Meditation, Timer, and Chatbot. In addition, the chatbot screen works by getting the user response and then printing the output in the text box. It also provides the user with easy access to the app and has more information on stress and where to get help.

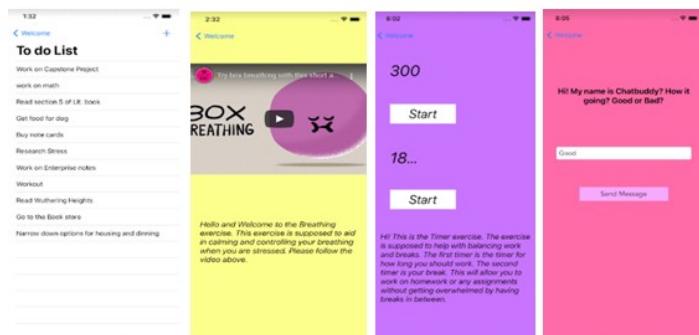
### Lessons Learned

This project helped me expand my knowledge in the language Swift. During my time researching and using the language I was able to learn how to connect the UI variable to the functions that I had created. In addition, I learned more about how stress effects a teen from a teen therapist at VCU. My personal lessons learned is that managing your time is a huge part in the project and making sure that you don't leave everything to the last minute is very important.



### Future Plans

I plan to work more on Chatbuddy in the future. I want to improve the responses of chatbot. In addition, I want to add more exercises that provide for both people who use approach and avoidance coping when dealing with stress to give a variety to the user. This fall, I am going to Virginia Tech to attend the School of Engineering and major in Computer Science.



Kiara K. Project Management Concentration

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# CHINESE/VIETNAMESE FUSION COOKBOOK

## ALLIE Q

### INTRODUCTION

MY PROJECT FOCUSES ON COMBINING HOME RECIPES FROM BOTH CHINESE CUISINE AND VIETNAMESE CUISINE. THIS COLLECTION OF RECIPES AND INGREDIENTS BRING THE TASTE OF MY CULTURE TO YOUR TABLE!



### My Research

- CHINESE CUISINE
- TRADITIONAL CHINESE MEDICINE
- VIETNAMESE CUISINE

### IMPLEMENTATION

THE FINISHED PRODUCT CONTAINS 25 INSTRUCTIONAL VIDEOS THAT WALK THE WATCHER THROUGH THE PROCESS OF COOKING EACH RECIPE.

IT ALSO INCLUDES A COOKBOOK WITH IMAGES AND DIRECTIONS. THE COOKBOOK ALSO HAS AN EXTENSIVE GLOSSARY LOCATED IN THE BACK THAT COVERS UNCOMMON TERMS AND INGREDIENTS.

### FUTURE WORK

I WILL CONTINUE TO COOK AND CREATE VIDEOS TO UPLOAD TO MY YOUTUBE CHANNEL. IN RESPECTS TO MY PERSONAL LIFE, I WILL BE ATTENDING VIRGINIA TECH COLLEGE OF ENGINEERING THIS FALL.



## FEASTING ON

# FUSION

IT PROJECT MANAGEMENT  
CLASS OF 2021

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