

First Responder Competition: Firefighter

Design Solution Proposed By: Enhance-VR, LLC

Enhance-VR, LLC is a young startup in Binghamton, New York, that pursues the development of VR, MR, and AR peripherals and systems. Our team (comprised of 4 undergraduate students from Binghamton University), is excited to take on the challenge of creating an AR prototype in a VR simulation to help firefighters. Leading up to the competition, we've met with our local Fire Department to work out the best and most effective solution that meets the requirements of the competition and the needs of the firefighters. We plan to blend actual physical components with the VR equipment (HTC Vive) to produce a simulation that is as close as possible to a real world solution. Our team take pride in the skills we've developed over the years through our own person projects and larger scale projects involving: VR motion platforms, haptic vest, and different VR applications. We fully believe that we have the right connections, resources, and knowledge to create a functional prototype that could win this competition and, if made into a real world device, save lives.

Contact Information:

Mailing Address:

Enhance-VR, LLC
Koffman Southern Tier Incubator
120 Hawley Street
Binghamton, NY 13901

Team:

Matt Gill: Electrical Engineer, Senior, CEO of Enhance-VR, LLC
Dylan Domenico: Computer Engineer, Senior
John Null: Computer Science, Senior
Amit Bachar: Mechanical Engineer, Senior

Email:

enhancevrteam@gmail.com

Phone:

607-426-8205

Skills of Team:

We are Enhance-VR, LLC. We are a newly founded company in Binghamton New York that works towards making peripherals and systems that can truly enhance a VR, AR or MR experience. Our origin is from creating a virtual reality skiing simulator with simple components as a concept project. From there we've expanded to making multiple prototypes from scratch such as: three motion simulator platforms, a haptic feedback vest, VR and AR mobile apps through Unity and multiple mini simulations developed for the Oculus DK1, HTC Vive, and the HDK2. Our work hasn't gone unnoticed over the last three years. We've been featured in multiple newspapers and news stations, given a TEDx talk on VR to 1,200 guest, a University talk alongside directors (also university Alumni) from Intel and Qualcomm's AR/VR departments, and guest lecture at Ithaca College in New York. We're all excited to work on the project and create a prototype that can really help people. The team member's resumes are attached with this document to highlight their own personal skills and achievements.

Project Description:

We've been fortunate to create a great relationship with our local fire department to help us leading up to the submission of this contest. Two of our team members worked in person with the department to learn about the struggles, challenges, and desires of our local firefighters. We gathered as much data as we could from information on their equipment, to even running through putting it all on ourselves and moving around how they would to get first can experience on what our design should possess. Given the requirements of what was to be displayed on the HUD and how the UI should work, this is what we found from our firefighters:

- Speaking, and hearing is hard in a fire, so voice commands wouldn't work for a UI.
- Their gloves get worn out and beat up, having "conductive" fingertip gloves wouldn't work for a UI.
- They need "landscapes" to feel for distinct features on their equipment to know what their touching. Thus we knew we needed to use these with our design.
- Any button they had on electronics were large enough to press through the gloves.
- Between standing, half kneeling and crawling, the one part of their body they could always touch was their face mask. It was also took little extra energy to reach.
- The mask "defogging" works like a car's windshield, so most likely the only "clear area" or clearest line of sight, would be around the nose.
- Less items to press, select, and/or interact with the better. Too much information could be a distraction.

Physical Features:

Based on the information gathered, for our design, the physical interface of the HUD will include 6 buttons. It will also include several on-screen features to display both required atmospheric data as well as map/floor plan/locational data.

The mask will constantly display a thin bar across the top that contains temperature, oxygen levels of the SCBA, and a flash sensor. Based on reports from a few volunteer firefighters at the Johnson City Fire Department that their masks usually fog the least at the bottom, we chose to put this bar at the top so that in low visibility situations they will still be able to see their environment through the bottom of the mask. Most of the bar will be taken up by a sub-bar containing the amount of O2 left in the breathing apparatus. The temperature will be displayed next to this in either Fahrenheit or Celsius based on the users preference. The flash sensor will take into account oxygen levels of the room as well as rising temperatures and begin to blink if there are significant warning signs of flashing in the area. It will remain absent if there is no significant warning signs of the room flashing. Although the sensor blinking does not necessarily mean that the room will flash, it will give the user the ability to know when the atmospheric conditions point to it happening.

The user's screen will be constantly displaying a map in the lower left side of the mask, much like several other gaming scenarios. This small, but detailed map will contain partner location and victim location as well as best route to them and the exits. There will be several map "modes." The default is to have to map in the lower left corner. Pressing the appropriate button cycles through different views such as: enlarged this map to view the general floor plan of the user's current floor. Next will be this enlarged map along with a 3 dimensional view of the building in order to distinguish between multiple floor routes. Lastly, there will be a "no map" mode.

Four of the six buttons will be on either side of the user's head right past their temples, two per side. On each side there will be a plastic divider separating the buttons so that the user can distinguish between the front and back buttons. The mask will also have two large buttons on both of the user's lower cheeks. The competitive advantage section explains how we determined this design. The buttons will operate as follows:

- Mode Switch Button (Upper Right Front Button) - This button will allow the user to switch between different modes, the three modes are Victim Location, Partner Location, and Exit Location. The processes involved in each of these modes will be discussed later in this paper.
- Arrow Toggle (Upper Right Back Button) - For all modes an arrow will be present in the middle of the screen right above the exhalation valve leading the user to either a victim, their partner, or the nearest exit. This button will be used to turn that arrow on and off.
- Bread Crumb Marker Drop (Upper Left Front Button) - Part of the user's suit will include GPS point markers for breadcrumbs. This will allow the user to document their trail during victim location and be able to use the information as a best exit determinant.
- Hazard Marker Drop (Upper Left Back Button) - Part of the user's suit will include GPS point markers for hazards. This will allow the user to document hazards during victim location and be able to use the information to avoid these hazards upon exit of the building.
- Select Toggle (Right Cheek Button) - When the exit navigation is generated, it will give an option to accept the path. The Map Toggle will be the "deny" option in this situation and the HUD will bring up the next best option to select or deny.
- Map Toggle (Left Cheek Button) - This button will toggle the different map modes and will allow the user to continuously choose which map will help them best in each scenario.

The attachments show a realistic physically layout of the buttons. For the HTC Vive, we'll mount the buttons close to where they would be on an actual device.

There will also be a bone conduction headband worn underneath the HUD. Before the firefighter puts on their gear, they would already be wearing a bluetooth headband that both reduces sweat to the eyes but holds the transducers for the bone conduction. These will help the firefighters in multiple ways: They can hear radio commands clearly and/ or individually while still having an open ear to hear sounds around them (unlike typical headphones that "tune out" the world). If the local noise is too loud and the user cannot hear his/her fellow partner next to them, they can talk via the bone conduction to hear each other. Since it's wireless, there's no need for extra wires to link when preparing to leave the firehouse in an emergency

Adjustable User Interface Set-Up:

Prior to beginning a scenario the user will have the ability to adjust certain onscreen preferences. We came to this decision after gaining some insight from the firemen at the JC Fire Department. During a mission, their main focus is locating victims and exiting, everything about their equipment is set to their liking prior to going into the scenario. Therefore, we thought it would be best to allow the users to choose their preferences for on-screen font size and color.

A menu will appear in the beginning of the simulation allowing the users to change and define these settings. The default color of the font and features on the screen will be a shade of light blue. Users will have the ability to change this, as well as increase and decrease the size of the features to their liking. They will do this using the HTC controller. While underway, just like how phone screens can adjust to room brightness, a “photodiode” on the HUD will keep adjusting the brightness of the displays for optimal vision.

Navigation:

To assist the firefighter in navigating a “virtual” emergency, we have designed specific buttons and visuals to accomplish the desired situations such as breadcrumbs, hazards, finding victim, finding partner, finding exit. To note, we assume that we will be provided with simulation information of “GPS” coordinates like in a video game – unlike in the real work where GPS won’t work in a building and thus advanced Lidar or special Ultrasonic sensors would be needed but are beyond the scope of a virtual reality simulation. As mentioned earlier, breadcrumbs and Hazard markers are pressed by their according buttons and will include information on location temperature and oxygen at the time of press for later calculation of exiting. The location data from both will be “uploaded” to the locations GIS data so all floor plans and maps and HUD’s are up-to-date with all the hazardous locations and exit paths.

Additionally as mentioned earlier, there would be a directional arrow located in the middle of the headset in screen zone 2 (see diagram). This arrow will direct the user in the direction of their present objective (find victim, find partner, or exit the building). It will also display a distance in yards the user is away for the total path (not magnitude to objective).

When exiting the building or location the HUD will do all the calculations of best path to exit and fill screen zone 2 with a risk factor number between one and ten (one being almost no risk and ten being life threatening to the user). If the risk factor is over five, the HUD will display in the same screen zone 2 the greatest risk in little word count (i.e. “possible flash”, “Hot Space”, “Exiting through Window”, etc.) and speak it to the user. The calculations to determine risk factor and the best exit path take into account the hazard data, breadcrumbs, and all possible exits and compare that to the time to get out of the building. We believe that giving all of the options at once is too much data to sort through for a firefighter, therefore only the best option will be displayed unless denied.

Also while the area is being cleared, as a user moves through an area, a two yard radius around the user is mapped out and stored to note where they have been and not. This information could be found useful if the victim location isn’t known. On a realism note, the data of “searched” areas can be sent to a tablet to a Captain outside the location and help speed up the searching process.

Movement:

To move around in the Unreal Environment, unless predetermined by NIST, will be done by swinging the controllers. The swinging motion looks exactly how someone would swing their arms while running or walking. As you swing faster you can increase speed. This feature has proven to help reduce motion sickness (feels natural) versus a joystick controlled movement which can induce sickness.

Biggest Challenge:

Two of our biggest challenges is going to be learning Unreal Engine and the navigation feature. While our team has plenty of experience with Unity, we would have a week or two learning curve to transition to Unreal. We are all proficient with the programming languages that both game development softwares use, it’s just the UI’s we’d have to adjust to.

For the navigation, the challenge is the fine tuning process of what data should be valued higher than others (i.e. hazard versus time). To solve this problem, we plan to meet with the local fire department and have them test the environments and scenarios. If they find the risk factors are off and why they think so, we can adjust our parameters.

Performance:

Testing the performance of the mask will include testing amongst the team as well as testing with local firefighters in order to get their insight on the improved mask. We will also make it possible to test the scenario without the upgraded features so that we can compare and see just how helpful the features are. Data for testing will include survival of the user's victim and partner as well as the completion time of a certain scenario. These tests will take place amongst multiple participants and be consistent for the case of a normal mask and the case of an upgraded mask.

Competitive Advantage:

We believe we have multiple competitive advantages. To start, we worked with our local fire department, put all of their gear on and work with them to determine our design. To have them as a resource to get professional opinions will help tremendously. Our team's ability to rapid prototype is going to move the physical features along quickly. We've built motion simulators from scratch in under 24 hour hacking contests as well as a VR haptic vest. Skills our team has grown through the company, through personal project and through our education gives a tremendous advantage to complete the project.

Costs:

To build the physical components, the combined electronics (circuits and buttons) and 3D printed housings will cost us under \$100 US. We already have an HTC Vive but having a secondary computer and Vive to speed up developing will help.

Letter from Johnson City Fire Department:



Johnson City Fire Department

320 Harry L Drive
Johnson City, N.Y. 13790
Phone (607) 729-9512 Fax (607) 729-2187

January 25, 2018

To whom it may concern,

Captain Keith McCaffrey and I, of the Johnson City New York Fire Department, had the pleasure of meeting Binghamton University students Matthew Gill and Dylan Domenico. Mr. Gill and Mr. Domenico discussed with us a project that they are currently working on that we felt could be very useful to the Fire Department and firefighting in general. The Virtual HUD mask could assist in keeping fire fighters safe and could be of great use in locating potential fire victims. I have been in the fire service for 24 years and based upon my experience I feel that the Virtual HUD mask could be of great use to fire fighters during fires as well as in training future fire fighters. We believe it has the potential for saving many lives.

We are more than willing to assist Mr. Gill and Mr. Domenico in any way possible to help move this project forward as we believe in it's merit.

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick Cheevers", written over a horizontal line.

Lieutenant Patrick Cheevers

Resumes:

Dylan Domenico

59 Sarah Circle, Spencerport, NY 14559 ♦ 585.474.0718 ♦ ddomeni1@binghamton.edu
<https://www.linkedin.com/in/dylandomenico>

EDUCATION

Binghamton University, State University of New York, Watson School of Engineering
Bachelor of Science in Computer Engineering
Cumulative GPA: **3.608/4.000** | Inducted into Tau Beta Pi and IEEE-Eta Kappa Nu Honor Societies

Expected May 2018

TECHNICAL SKILLS

Microsoft Office	MATLAB	Python	Amazon Web Services	Machine Learning	Perl
C/C++	Linux	PHP	MySQL	VHDL/FPGA	ISE Project Navigator

PROFESSIONAL EXPERIENCE

Enhance Virtual Reality, Binghamton, NY

Fall 2015-Present

Chief Technical Officer

Contribute to a startup that creates virtual reality systems that simulate real world settings such as Formula One racing

Built a motion simulator that pairs a metal frame to vibrate and move a racing seat with an Oculus Rift headset for virtual driving

Harris Corporation – Electronic Systems, Clifton, NJ

Spring 2017-Fall 2017

Software Engineering Intern

Designed and developed custom build environments that optimize the background and start up processes of several projects

Implemented writing and unpacking functionality in C++ for XML data to be parsed and processed through an internal database

Created and fine-tuned several GUIs using Perl to help teams build, maintain, and test software more easily and efficiently

Harris Corporation – Space & Intelligence Systems, Rochester, NY

Spring 2016-Fall 2016

Software Engineering Intern

Collaborated with a group of engineers to advance Harris Helios—a web-based, weather intelligence application that uses data

analytics along with imagery from traffic cameras worldwide to make accurate, real-time weather predictions (<https://helios.earth>)

Developed a variety of software solutions for Helios to cut company expenses and improve backend performance using Java

Used deep learning and convolutional neural networks to train and test image sets to identify specific features with Python scripts

Watson Capstone Project Management System, Binghamton, NY

Fall 2015-Fall 2017

Project Lead/Database Development Intern

Lead a team of interns to improve a relational database that organizes engineering projects for students enrolled in a design course

Set up and tested database functionality through a Linux-Apache-MySQL-PHP software bundle on virtual machines

Binghamton Engineering Design Division, Binghamton, NY

Fall 2015-Spring 2017

Undergraduate Course Assistant

Supervised and assisted students in a laboratory for three hours a week by instructing them on how to use engineering programs

Trained students to be proficient in programs such as MATLAB, Solid Edge, Arena and Microsoft Word/Excel/Project

PROJECT EXPERIENCE

Mine Detection Rover, Binghamton, NY

Spring 2017

Software Engineer

Built and compiled a Dagu Rover 5 chassis to navigate a random maze with obstacles using HC-SR04 ultrasonic sensors

Programmed rover to autonomously search and detect randomly placed “mines” using C and a custom metal detection circuit

Song Identification Program, Binghamton, NY

Winter 2016

Software/Test Engineer

Developed code in MATLAB to analyze audio signals and identify them based on their unique short-time Fourier transforms

Tested system response to different environmental factors by creating simulation filters and noise interference

Haptic Feedback Vest, Binghamton, NY

Spring 2016

Hardware Engineer/Designer

Constructed a haptic feedback vest that uses transducers to allow users to both hear and feel an audio experience

Designed, engineered and demoed prototype in less than 24 hours (<https://devpost.com/software/beatsvest>)

QTR-8RC Light Sensing Rover, Binghamton, NY

Spring 2016

Software Engineer

Amit Bachar

46 Mellon Lane, Tenaflly NJ, 07670 • (201) 455-9875 • amit.bachar9@gmail.com

EDUCATION

Binghamton University, State University of New York, Watson School of Engineering | Binghamton, NY

Bachelor of Science in Mechanical Engineering

Expected May 2018

Cumulative GPA: 3.54/4.00

AWARDS AND ACHIEVEMENTS

Dean's List | Binghamton University

Spring 2015, Spring 2016, Fall 2017

- Maintained a GPA above 3.50

Athletic Director's Honor Roll | Binghamton University

Fall 2014-Present

- Maintained a GPA above 3.30 while balancing the workload of a student-athlete

National Mechanical Honor Society (Pi Tau Sigma) | Binghamton University

Fall 2016-Present

- Highly selective national mechanical engineering honor society

National College Athlete Honor Society (Chi Alpha Sigma) | Binghamton University

Spring 2016-Present

- Achieved junior academic standing with a 3.40 cumulative GPA while participating in an NCAA sport

TECHNICAL SKILLS

• **Computer:** Proficient in MATLAB, Visual Basic, Creo Parametric, ANSYS Workbench, Solid Edge, Arena Simulation, Adobe Photoshop, Microsoft Office and Project

• **Languages:** Fluent in English and Hebrew

• **Certifications:** CPR, AED, 3D Printing and Lifeguarding

RELEVANT EXPERIENCE

Artificial Leg Muscle Fibers – Senior Project | Binghamton University

Fall 2017-Present

- Collaborate with 4 other students to produce a custom brace for a knee brace capable of assisting the user in the lifting 30 pounds from a squatting position or if the user is seated, to flex the lower leg up and down for rehabilitation purposes
- Research relevant information and conducted experiments to convert the power from a standard US outlet of 120V AC to a mechanical motion of artificial muscle fibers that are made from nylon core with a silver outside coating
- Design and construct a CAD model in Creo Parametric to verify various requirements, to ensure the safety of the user, and to confirm production and operation feasibility of the device
- Analyze numerous stress distribution of several design components in ANSYS Workbench using a finite element analysis method to confirm a rational factor of safety under an equivalent load of 450 active artificial muscle fibers

Covanta Energy Waste Power Plant Intern | Morristown, NJ

Summer 2016, Summer 2017

- Updated training manuals for several of the facilities to incorporate for the new user interface system, including documents that summarize the new features in order to ease the daily tasks of the operators
- Created a user friendly system for one of the facilities, that records, stores and reports daily data using Visual Basic for Applications in Excel that simplify basic facility operations
- Constructed a user friendly system in Excel using VBA that includes numerous functions and automation of calculations that workers commonly use in the engineering department
- Compiled an Excel file using VBA that computes a fluid pressure loss in pipes and ducts according to the Crane text, *Flow of Fluids Through Valves, Fittings and Pipe*
- Conducted a presentation for Covanta's upper management to summarize internship projects and offered future suggestions

Computer Aided Engineering Project | Binghamton University

Fall 2016

- Designed an affordable retracting side step for a car from basic measurements and requirements that can withstand a load of 150 kilograms
- Created a model and a dynamic assembly of the design in Creo Parametric including detailed drawings of the different parts
- Tested the design using a finite element analysis in ANSYS Workbench and verified the results with various hand calculations
- Compiled results into a comprehensive report

LEADERSHIP EXPERIENCE

Division I Men's Swimming and Diving Team | Binghamton, NY

Student-Athlete

Fall 2014-Present

- Participate in 20+ hours per week of practice, conditioning, travel and competition
- Represent Binghamton University in Intercollegiate competition
- Mentor the incoming freshman with managing schoolwork and practices
- Volunteer in several events through the academic year including swim clinics for people around the area

Englewood Field Club | Englewood, NJ

Summer 2015, Summer 2016

Lifeguard

- Worked with a group of 4 people for 30 hours per week
- Exercised professionalism and proficiency in life-threatening situations
- Ensured the well-being of patrons by implementing facility enforced safety rules

Matthew E. Gill

3876 County Road 28, Watkins Glen, NY 14891 | mgill4@binghamton.edu | (c) 607-426-8205

Education:

Binghamton University, State of New York

The Thomas J. Watson School of Engineering

Electrical Engineering Masters of Science Program (4+1)

GPA: 3.27/4.00

Expected Graduation: May 2019

Technical Skills:

Computer: C Language, Solid Edge, ISE Design, Word, Excel, Power Point, Project, Arduino IDE, FPGA

Machinery: MIG welding, Drill Press, Lathe, Soldering, automotive repair, bike repair, 3D printing

Electrical: Troubleshoot circuits, programing, understand electrical schematics, AC/DC electrical theory

Relevant Experience:

Enhance-VR, LLC - CEO

Binghamton University, State University of New York

November 2014 – Present

- CEO of company that broke off from another start up to focus on consulting, development, and innovations in Virtual Reality / Augment Reality peripherals. Presently doing development and managing 6 student interns.
- Designed and built a 1DOF simulator at HackBU in 24 hours in 2015. Redesigning the unit to a 2DOF simulator (pitch and roll) with a second inner motion frame (2015-2016).
- Created Haptic Feedback Vests for more senses in VR as well as building a new motion simulator (2016-2017)
- Won \$10,000 at a "Shark Tank" Pitch event to continue to excel the company with new projects (2017).

Intern in Advance Research

Raymond Corporation, Greene NY

Summer 2017

- Researched and designed systems that could introduce more haptics in a Virtual Reality training simulator.
- Developed a new product line within the summer (cannot disclose information – NDA) alongside Mechanical Engineers, Electrical Engineers, Marketing, Sales and other departments.
- Rapid prototyped multiple systems that could work. Such prototypes were used directly during customer visits to advertise the future product line. Prototypes also used to show the product to directors from Toyota North America.
- Collaborated prototypes and business models with and the VP of Sales and Engineering at Raymond.

Watson Junior Design – Autonomous Rover

Binghamton University, State University of New York

Spring 2017

- Active member of a four person design team to create an autonomous rover that could navigate an obstacles field while detecting "mines" (washers).
- Studied, simulated, and built an analog circuit with another EE that functioned as a metal detector that could filter out "false-positives" and output high signal for true detections. The system, including coil, was made from scratch.
- Constructed components together on a rover and worked with Computer Engineers to have both the detection and driving function properly together.

Communication Skills:

TEDx Speaker

Binghamton University, State University of New York

March 20th, 2016

- Presented in front of 1,200 plus peers, professors, etc. as the TEDx Binghamton Undergraduate Speaker.
- Spoke on the topic of Virtual Reality and its present views, future applications and my present work in it.

Watson Peer Advisor, Head Advisor

Binghamton University, State University of New York

September 2015 – Present

- Direct and manage 9 other peer advisor students who all (including myself) work the front desk of the Watson Advising Office answering emails and phone calls, aiding students, and meeting with professional advisors.
- Speak regularly in front of hundreds of parents and potential students at open-houses answering their questions on the University, Watson School, and personal experiences.

TIER Talk Speaker

Binghamton University, State University of New York

October 7th - 2017

- Spoke alongside project directors from Intel and Qualcomm on the history, importance and future of VR / AR.

Personal Info:

Sports: Div. 1 Cross Country and Track teams at Binghamton, black belt in Tae Kwon Do, sailing, fly fishing

Interests: Restored Triumph GT6, prototype and development, electrical and mechanical systems

John Null

27 Woodworth St. Victor NY, 14564 • 585-698-7235 • jnull1@binghamton.edu • <https://github.com/johnNull>

Education

Binghamton University, State University of New York
Bachelor of Science, Computer Science

Expected May 2018

Overall GPA: 3.393/4.00 | Dean's List: Spring 2015, Spring 2017

Technical Skills

Languages: C++, C, C#, Java, JavaScript, Python

Software and OS: Eclipse, Git, Linux, Windows, Unity, GIMP, Autodesk Maya

Additional: HTML, CSS

Professional Experience

Kamien Technology UI Developer

Binghamton, NY, **October 2014 – September 2015**

- Collaborated in a team of four to create an android and IOS app to simplify Binghamton university bus schedules
- Designed and implemented user interface of the app using HTML and CSS
- Created graphics for the app in GIMP
- Published app in Google Play and App store
- Maintain database of campus bus and Broome County bus routes

Projects

HTC Vive – Android VR Game

Binghamton, NY, **April - May 2017**

- Designed Unity game to be used with HTC Vive
- Designed enemy targeting system
- Implemented network communication to spawn enemies from an Android app
- Created random location spawning system for solo play

Unity 2D Platformer Game

Binghamton, NY, **August 2017 - Present**

- Created game objects in unity interface to make simple scenes
- Wrote scripts to control game objects
- Designed and implemented sprites into game
- Made and implemented animations
- Teaching game design course on how to make similar games

Kernel Module Programming

Binghamton, NY, **October 2016 - Present**

- Created a kernel module for Linux using C
- Used Linux kernel library to retrieve list of processes running on a system
- Provided user space program to read from kernel module
- Work on system call to retrieve current system time

Binghamton University, Linux Shell

Binghamton, NY, **October 2016**

- Implemented shell in C, using forks
- Provided support for multiple background processes
- Created command to list processes run by the shell
- Included functionality for file input/output redirection

Java SMS Messaging Program

Binghamton, NY, **November 2015**

- Designed simple user interface.
- Used Java mail library to allow emails to be sent through program
- Used cell providers' SMS gateways to send messages from the program to cell phones
- Finished the program in 24 hour hackathon and won second place in category

Involvement

Binghamton University Hack BU, Binghamton, NY

September 2014 - Present

- Worked on projects in multiple 24 hours hackathons
- Attend meetings to work on independent projects on Thursdays.

Binghamton University, Swim Club, Binghamton, NY

September 2016 - Present

- Swim in home and away meets
- Attend practice Tuesday, Thursday, and Sunday

Employment

Employee, Pi Craft Pizza

Rochester, NY, **June 2016 – August 2016**

Lifeguard, Cobblestone Country Club

Victor, NY, **June – August 2013-2015**