

# UNDERGRADUATE ENGINEERING PORTFOLIO

NICHOLAS J. GARDELLA

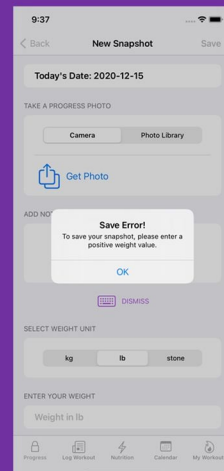
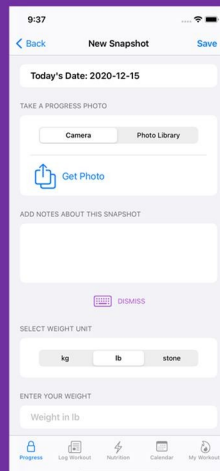
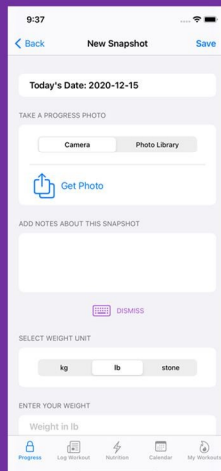
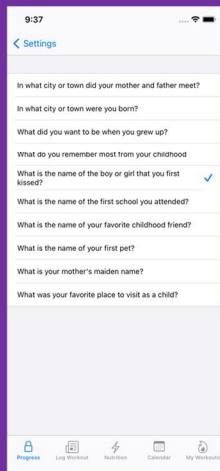
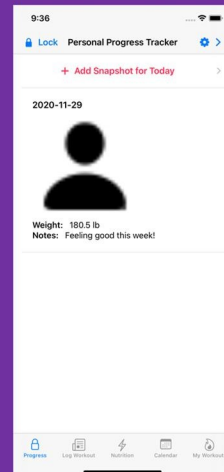
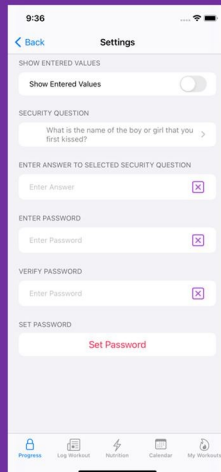
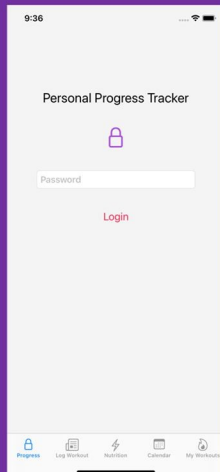
Section	Page Color	Project Name	Term
1	Purple	Workoutology, an interactive logbook for the gym	Fall 2020
2	Pink	Bike Broadcast, a cycling communication system	Summer to Fall 2020
3	Blue	Pandapas Digital Compass System	Summer 2020
4	Green	VT Breeze, a sustainable lawn ornament	Spring 2019
Bonus	--	<del><a href="#">Video Design Walk-through (Link)</a></del>	<del>Summer 2020</del>

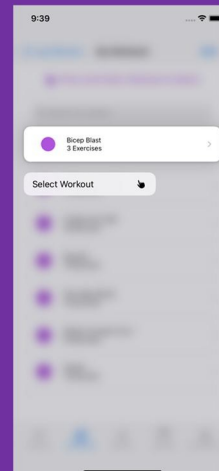
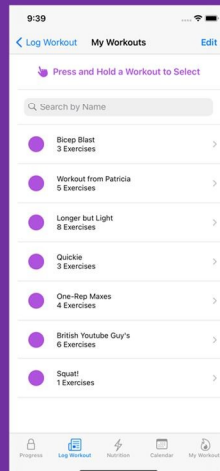
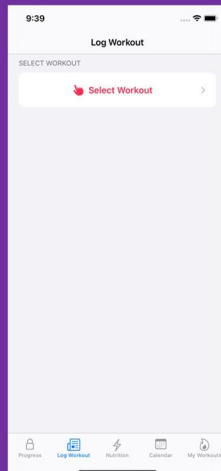
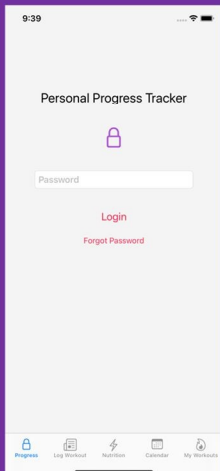
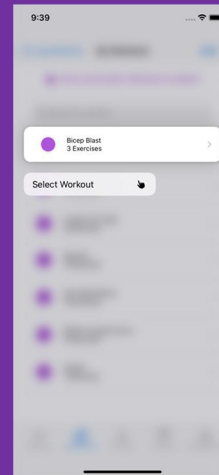
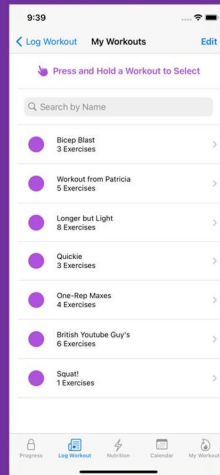
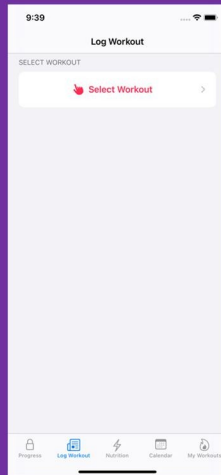
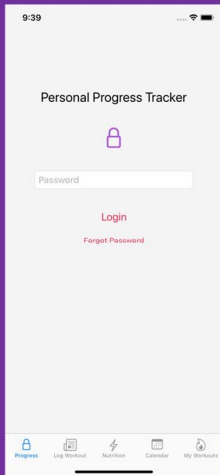
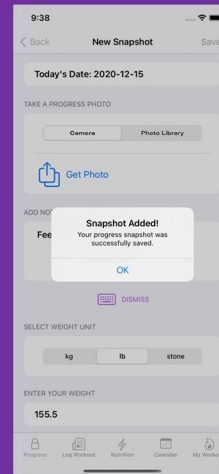
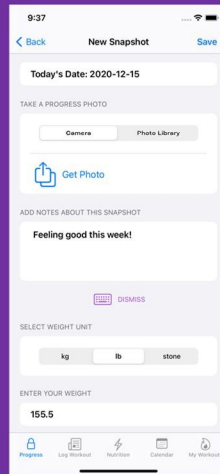
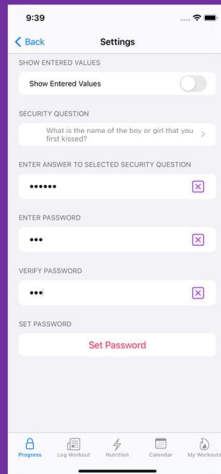
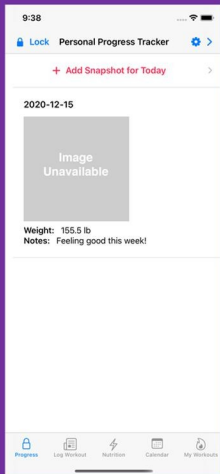
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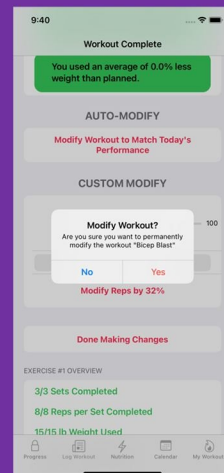
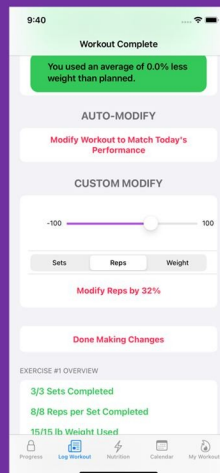
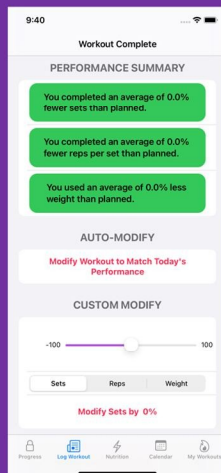
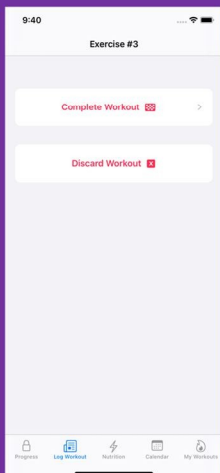
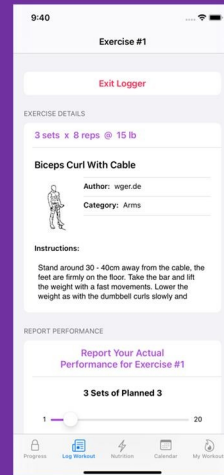
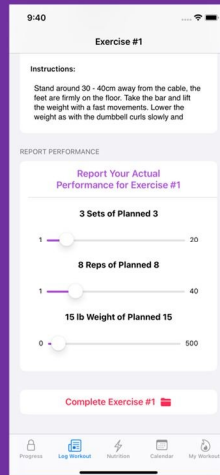
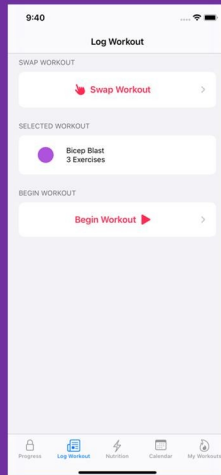
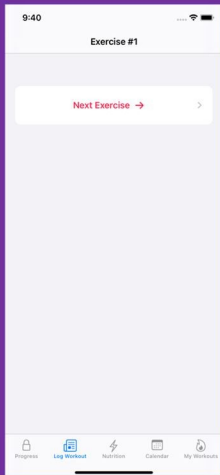
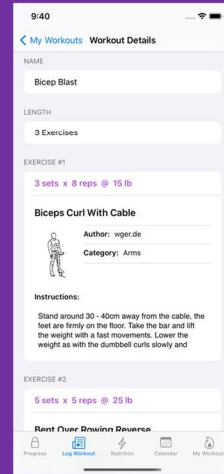
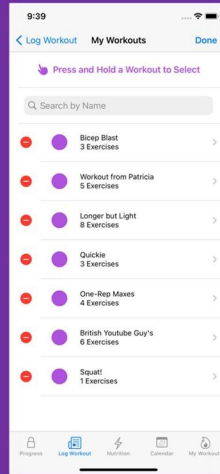
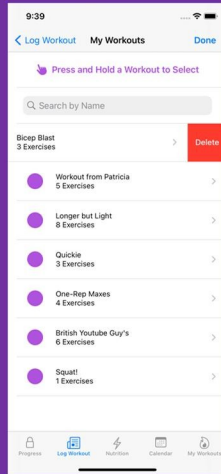
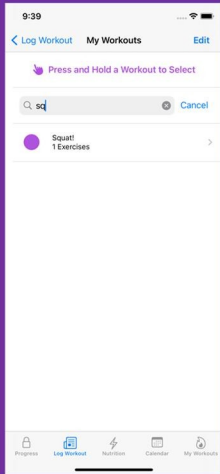
Liam Bobber, William Briffa, Nate Davidson, Paolo Fermin, Collin Gray, Nathan Jordan, Katrina Kosmides, Dr. Scott McCrickard, Rajan Mann, Megan Mott, Nikolas Stankovic, Emily Wong

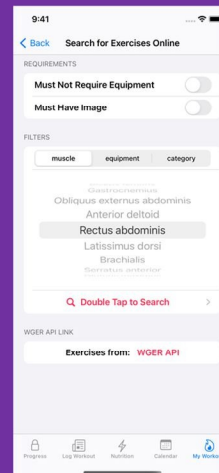
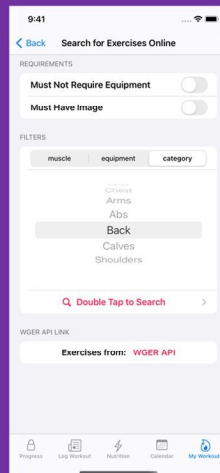
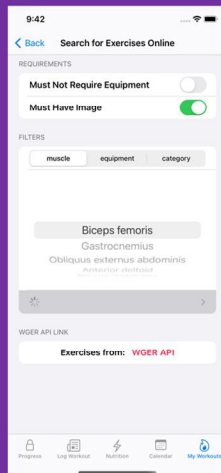
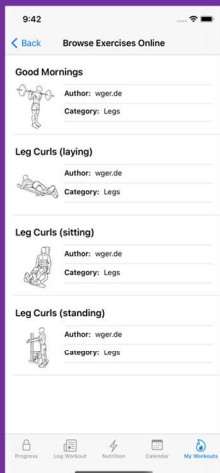
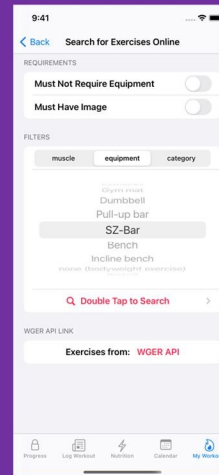
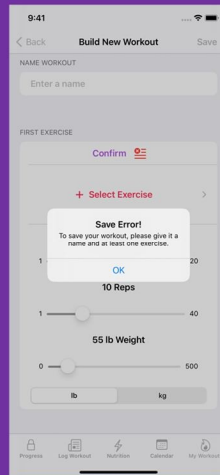
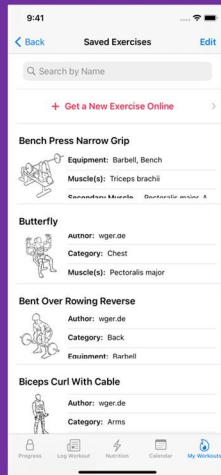
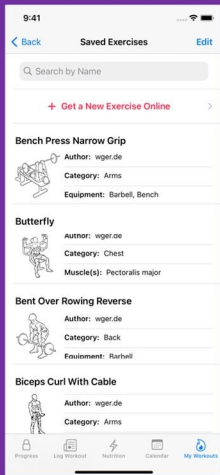
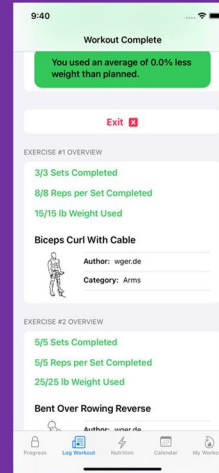
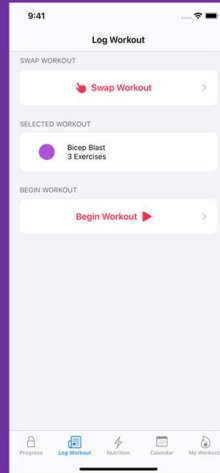
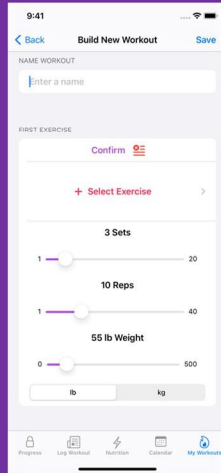
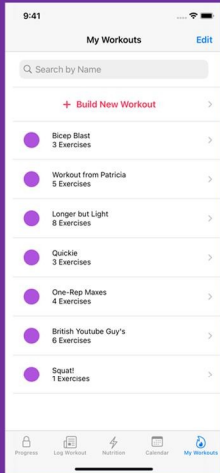
# WORKOUTOLOGY

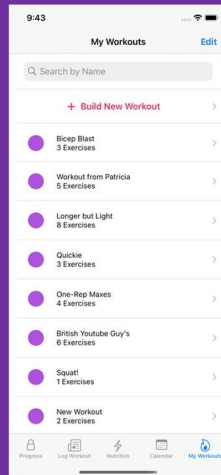
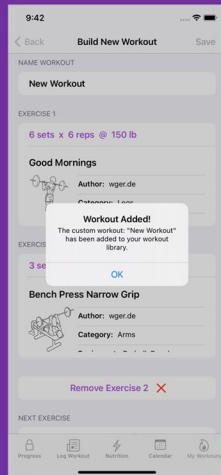
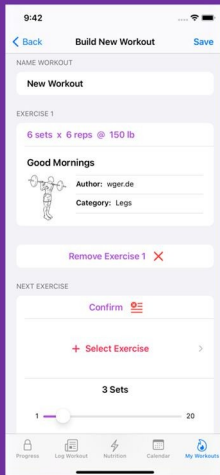
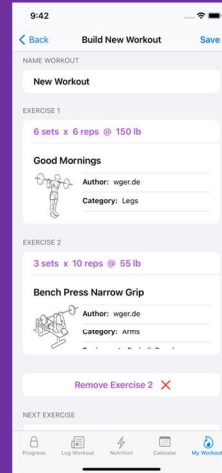
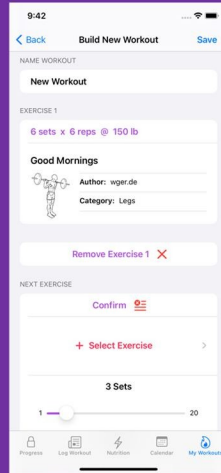
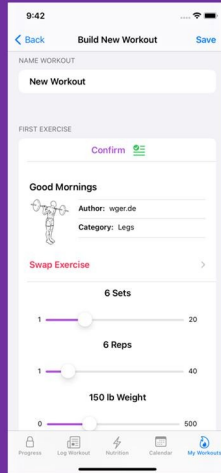
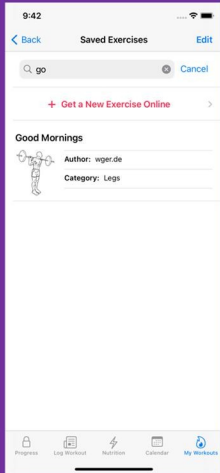
Workoutology was an iPhone app written in swift. I worked part of the time with two other students, who both dropped the related course. The sections of the app I personally wrote. All the features shown properly function on the iPhone. The project earned a 100% in Apple Mobile Software Development at Virginia Tech in Fall 2020.







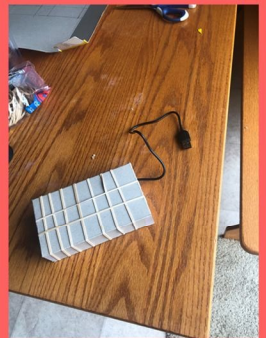
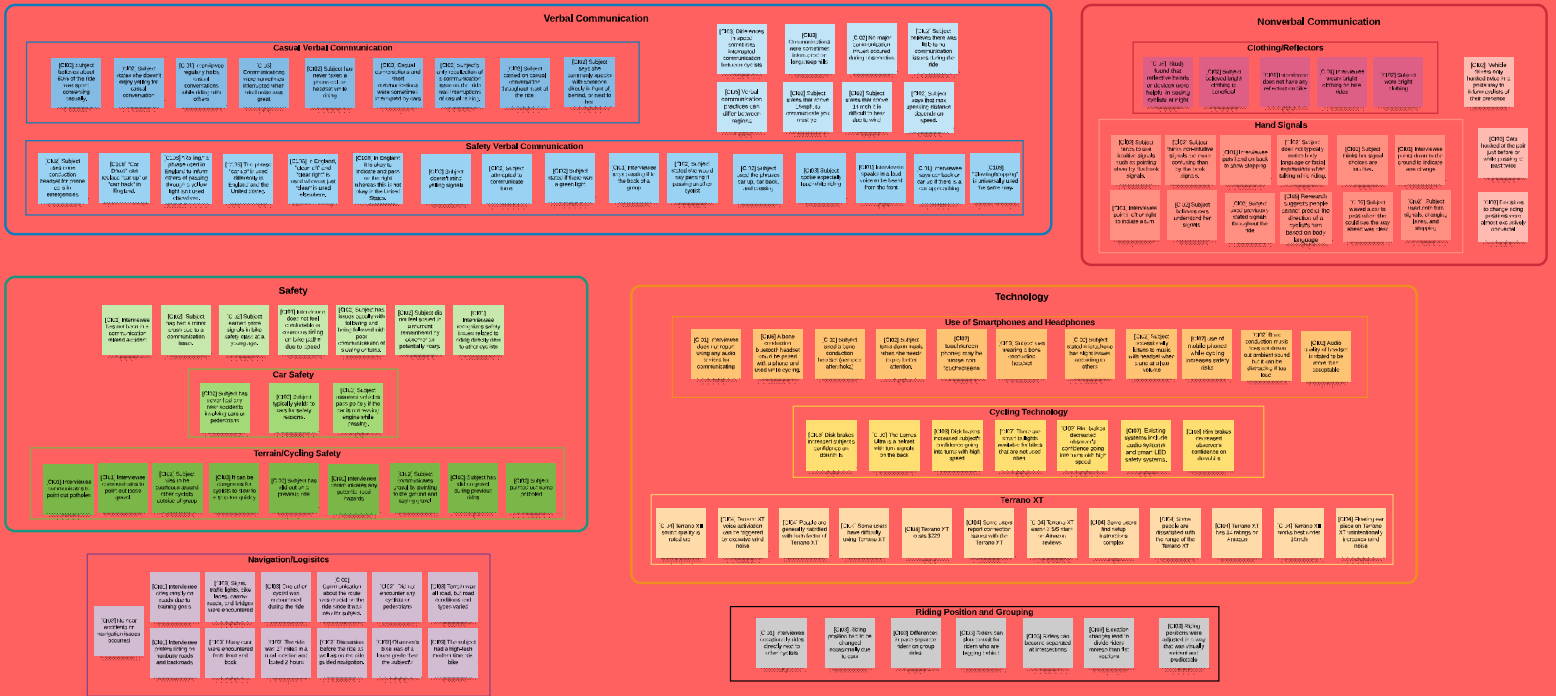


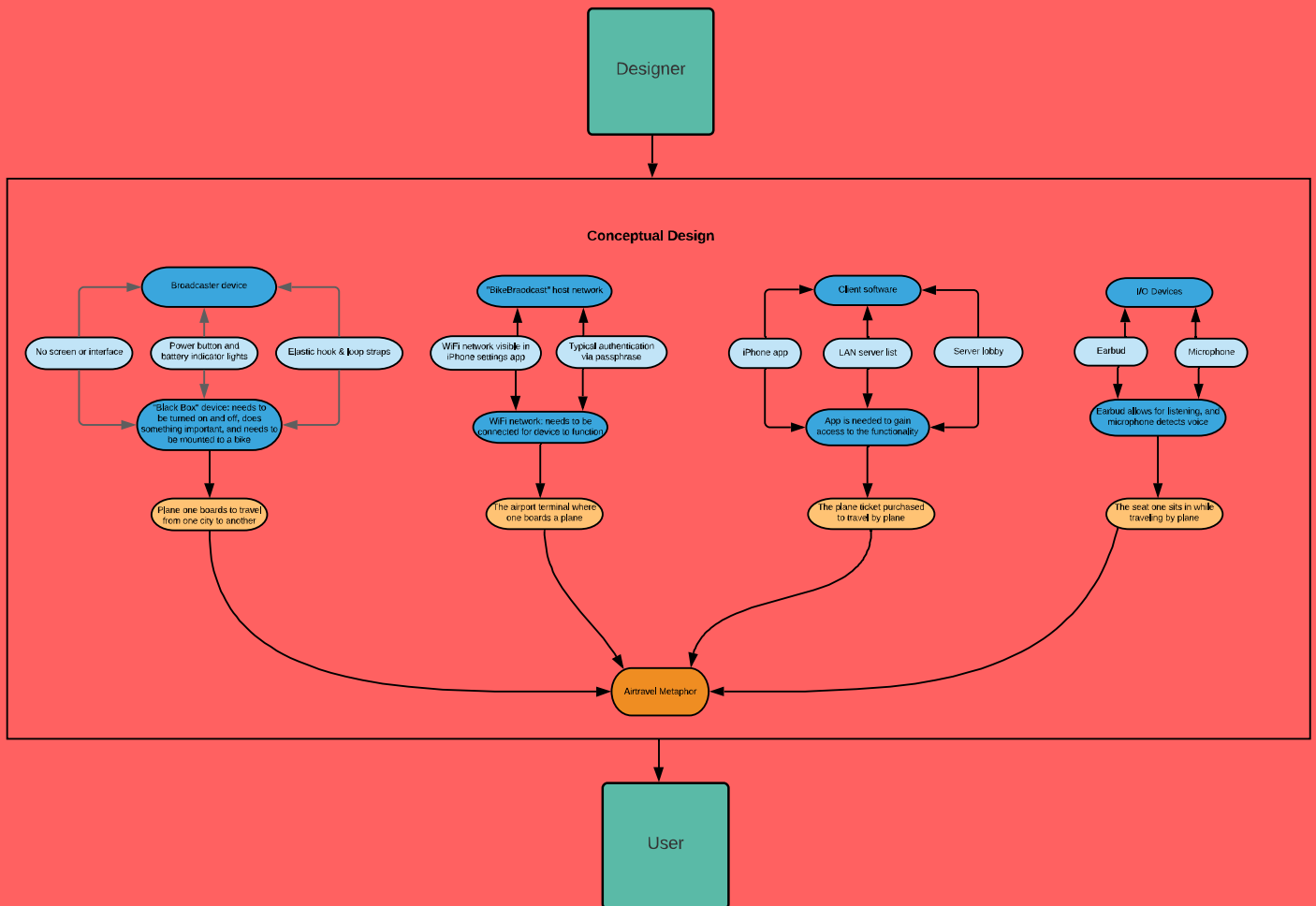
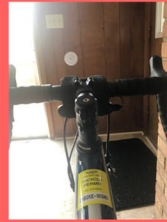




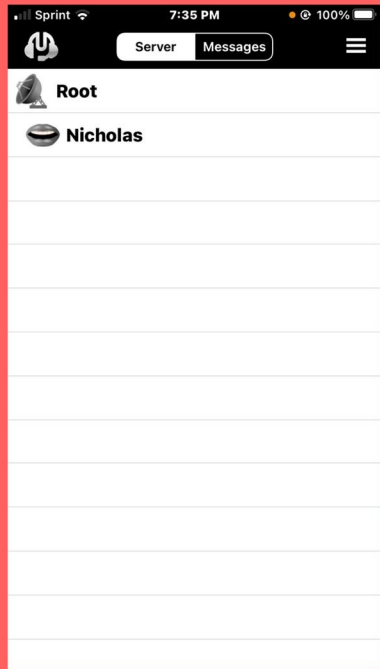
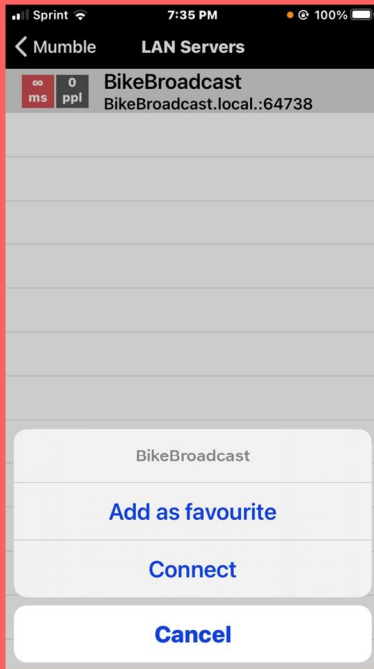
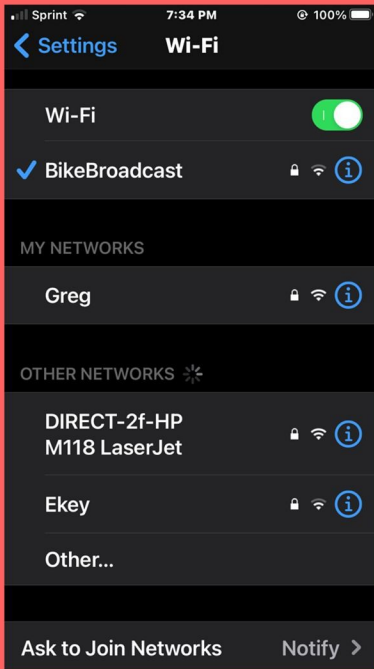
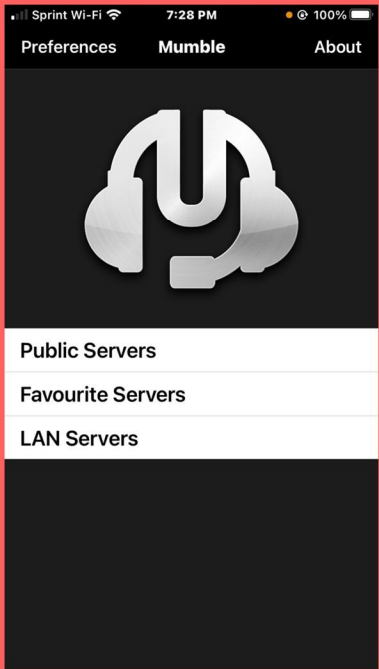
# BIKE BROADCAST

Bike Broadcast was a semester-long undergraduate research project. I led two other students with whom I collaborated on the Work Activity Affinity Diagram directly below. The app shown is an open-source application. The remainder of the images are my own original designs and analysis. My final prototype allowed cyclists to talk wirelessly in real-time at a range of up to 500 feet without the need for cellular service, using iPhones and the headset shown.



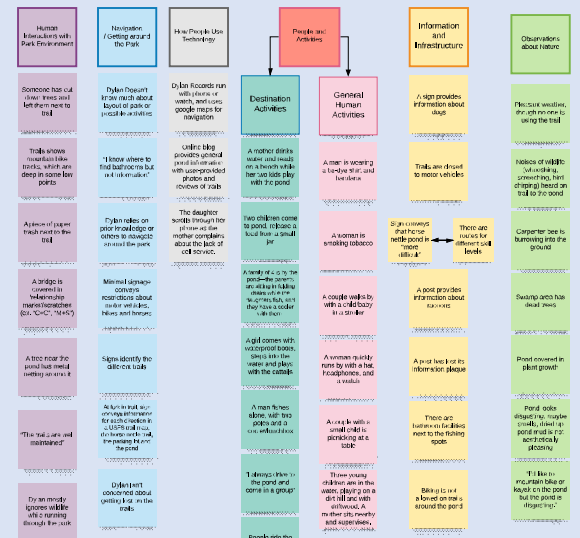
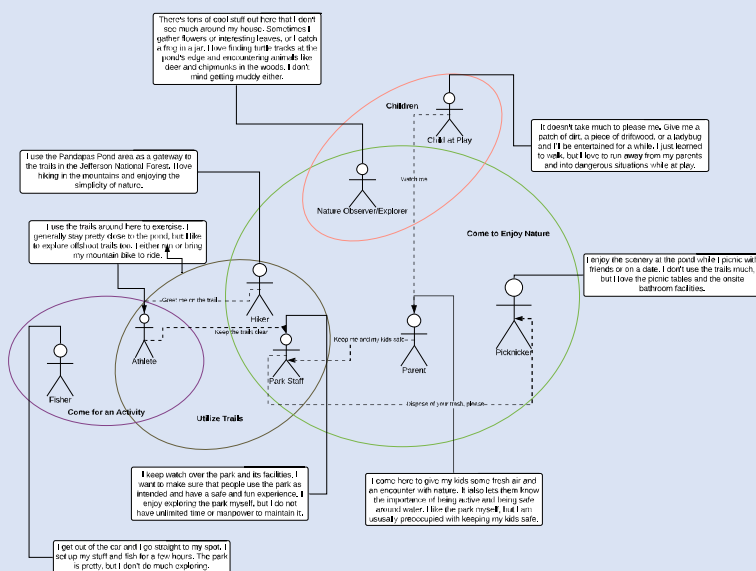
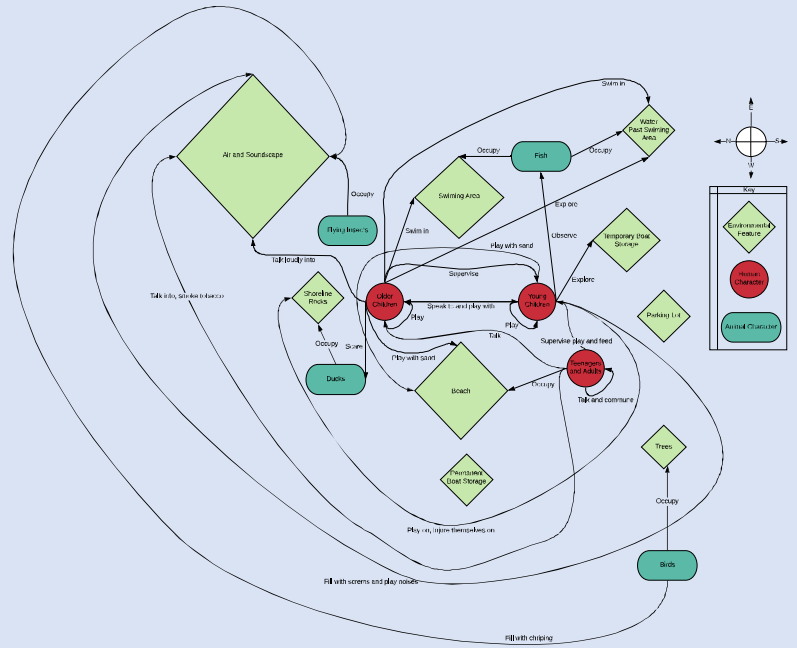
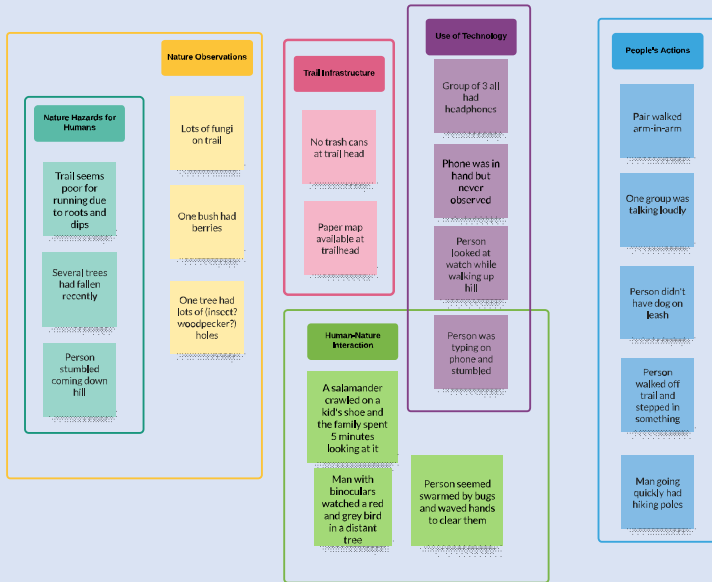






# PANDAPAS DIGITAL COMPASS

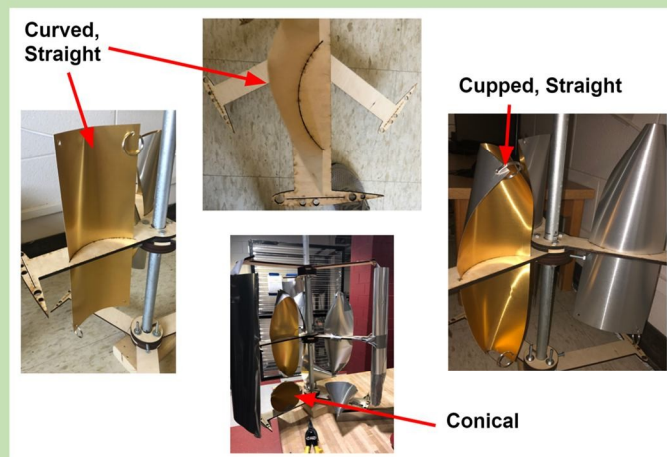
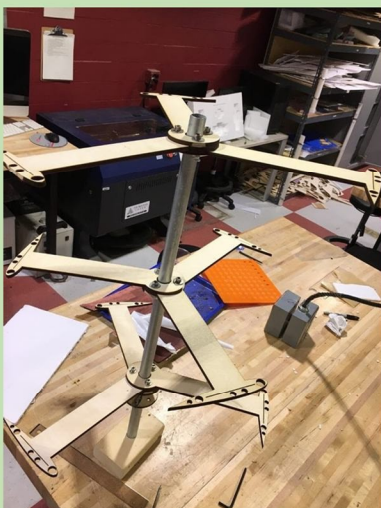
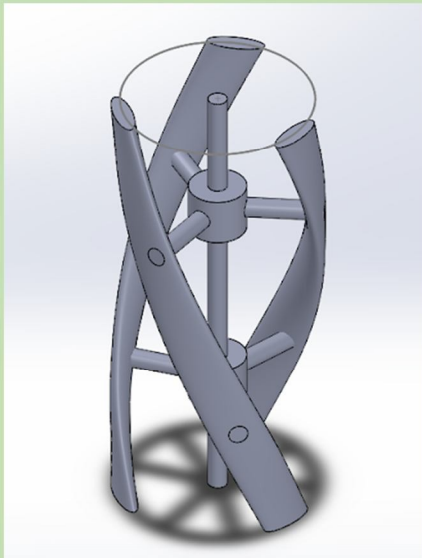
The Pandapas Pond Digital Compass System was a Human-Computer Interaction project. I worked with two other students with whom I collaborated on the two Work Activity Affinity Diagrams on this page and the Wireframes on the next page. All other diagrams and models are my own original work. The final product was a medium fidelity prototype of an information system for a natural area, and it earned a 90% grade in Introduction to Human-Computer Interaction at Virginia Tech in Summer 2020.

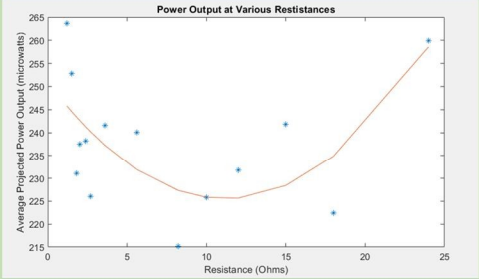




# VT BREEZE

VT Breeze was an Engineering project. I worked with six other students. The 3-D rendering you see on this page was created by one of my partners. I created the sail alternatives and led the construction of the brown airfoils. I also wrote the Matlab script that generated the output on the next page and created those graphs. The final wind turbine generated electricity and earned a 97% in Foundations of Engineering Part II at Virginia Tech in Spring 2019.





Based on the test data, at a windspeed of 1.9 meters per second, the optimal resistance value is 1.2 ohms, which allowed the turbine to spin an average of 65 revolutions per minute. At this resistance, the turbine produced an average of 0.131 volts. A standard electrical outlet supplies 919.5 times this voltage. This resistance and voltage would produce an average power output of 264 microwatts. 1517 times this power would be required to run a small 4 lumen lightbulb, one that produces as much light as four standard candles.

This iteration gathers 0.02 percent of the theoretical 1.31 watts of windpower (Joules of total wind energy available per second) based on the largest crosssectional area of the turbine.

f<sub>3</sub> >> |

