## Introduction
The Virtual Soldier Research Laboratory is a University of Iowa research organization composed of many different fields such as computer science, engineering, biomechanics and robotics. They were established to develop innovative technology in digital human modeling and simulation, and are among the world leaders in Posture and Motion Prediction, Predictive Dynamics, Muscle and Physiological Modeling, Body Armor Design, and Motion Capture Technology. They have developed a virtual human named Santos who is the basis for most of the research.

## VSR Mission
To deliver high fidelity, biomechanically accurate research to enable validated modeling and simulation of human activities to assist in biomedical engineering, ergonomic analysis, human performance analysis, human systems integration, and training.

## Responsibilities
- **Project #1: Write Code for Santos, Environment.**
  Used a Physics engine along with C++ code to create several environments that behave like an actual physical environment. Those environments include:
  - **Box, Sphere, and Capsule**, in which you can vary size, position, density, material, velocity, center of mass and linear and angular damping of the object.
  - **Cloth**, in which you can vary shape, position, material, velocity, damping, center of mass, additional torques along with shearing, stretching, bending and stiffness of the cloth.
  - **Particles**, in which you can vary the number of particles, cycle of the particles, shape, size and color of the particles along with acceleration, deceleration and rotation of the particles.
  - **Joints**, in which you can define the type of joint, and change parameters based off of the joint type. Joint types include: Fixed, Spherical, Distance, Revolute, Prismatic, and D6 joints. Parameters which can be changed include: the cone limit, spring strength, minimum and maximum allowable distance, maximum torque and drive velocity.

## Results
- **Project #2: Develop postures to be analyzed.**
  Used the Santos software and its posture prediction capabilities and joint maneuverability to develop real life yoga poses and other postures.

- **Project #3: Researched organ positions of humans and implemented accurate positions into the digital human model.**
  Accurate organ positions are vital in analyzing the impact of explosions, and bullet wounds to the human body so as a result, the model organ position had to be adjusted based off of different size avatars.

- **Project #4: Motion Capture**
  Participated in motion capture experiments which helped to verify the accuracy of the computer model and ensure that the avatar could actually complete tasks that the average human could complete.

## What I Learned
Working at Virtual Soldier was a great learning experience. Throughout my time at VSR, I developed many different skills related to a variety of engineering applications. I became proficient in a variety of different computer programs and languages, learned how engineering relates to the human body and the development of many life saving developments along with participating in once in a lifetime activities that I would not have been given the opportunity to do, had I not been an intern at VSR.

## Location
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