

# GUNNAR NELSON

GUNNARBNELSON.COM  
GUNNELSON523@GMAIL.COM  
770-354-3639

## EDUCATION

### MASTER'S DEGREE (MS) COMPUTER SCIENCE & APPLICATIONS

2020-2022  
VIRGINIA TECH COLLEGE OF ENGINEERING-GPA 3.7

### MASTER'S OF RESEARCH (MRES) MEDICAL ROBOTICS & IMAGE

GUIDED INTERVENTION 2023-2024  
IMPERIAL COLLEGE LONDON

## EXPERIENCE

### LEAD SOFTWARE ENGINEER

NERVE+INC-SAN FRANCISCO, CA | AUG 2021-MAY 2024

- Performed computer vision instance segmentation on 5 CNN Machine Learning (ML) models to be tested and refined for public domain and crowdsource annotation. Responsible for dataset creation, annotation, filtering, and testing/deploying 5 generic ML models into simulation of 3D model organs. Writing ML models in python, and surgical simulation environment in C++.
- Worked on 3D VR environment for pharmaceutical data analysis and Human-AI interaction workflow environment built with Unreal Engine 5.0
- Developed MVPs for institutional investing and seed round funding for robotic surgical simulation for cross platform applications on console, PC, and mobile development
- Aided and collaborated with surgeons for real time diagnosis and training utilizing SaaS for surgical simulation and training to aid in surgical care, with the development pipeline of classification models to classify medical images to train residents.
- Constructed engineering patents for deep learning model development and design

### LEAD SOFTWARE ENGINEER-IOS

VAROS-WASHINGTON, DC | JAN 2021- JAN 2022

- Responsible for high scale team development of technical solutions and integration of AR/VR development based on CAD designed anatomy to aid in patient education and lead successful launch of VAROS iOS App
- Focused on monetizing Augmented Reality software using the freemium business model
- Integrated Augmented Reality creations into the SwiftUI framework

### AI SOFTWARE ENGINEER RESEARCHER

COMMONWEALTH CYBER INITIATIVE-WASHINGTON, DC | MARCH 2021- JULY 2021

- Responsible for integrating Augmented Reality Design into the Microsoft HoloLens 2
- perform configurations of Hidden Markov Models for public domain data for third party applications
- Worked with hands on GPU CUDA, and PyCUDA for performance on ChexNet ML models
- Supervised and educate colleagues on the basis of Raspberry Pi development, Linux/Unix OS, and lead on projects

### GRADUATE TEACHING ASSISTANT

VIRGINIA TECH COMPUTER SCIENCE DEPARTMENT-BLACKSBURG, VA | JANUARY 2021- MAY 2022

- Graduate Teaching Assistant for CS Systems and Software Security 5590 under Dr Matthew Hicks
- Aided students in both graduate and undergraduate courses for cybersecurity, human-computer interaction, and data structures and algorithms
- Held regular office hours, listen with empathy and understanding to students to help them succeed within the classroom
- Articulated and broken down advanced concepts in computer engineering for students to understand, helping with projects

### PEPPER ROBOTICS SOFTWARE LEAD-GRADUATE RESEARCH ASSISTANT

MIND MUSIC MACHINE LAB-BLACKSBURG, VA | AUG 2020- MAY 2021

- Lead two research projects on human-emotive robot interaction
- Developed custom movements in Kotlin and Java based Android libraries, with 135 Pepper robot movements
- Performed Computer Vision and Auditory tasks for Human-Robot Emotion
- Supervised undergraduate students in coding robot programs
- Managed equipment for Softbank's Pepper and Nao humanoid robotics equipment

### FLUTTER-REACT NATIVE-SQL SOFTWARE ENGINEER

IMAWARE, HOUSTON, TX | JAN 2020- JULY 2020

- Construct React-Native based App in JavaScript for IOS/Android platforms, for transactions between users
- Perform SQL queries on PostgreSQL
- Develop React Based Application

### SOFTWARE ENGINEERING RESEARCHER

SYNERGY LAB-VIRGINIA TECH-BLACKSBURG, VA | JAN 2019-DEC 2019

- Constructed machine learning models from the UNET Architecture for converting CT scans in MRI images built with tensorflow, sci-kit learn, matplotlib, and pandas
- Showcased data plots for CT sonograms using Tensorflow, Sci-kit for medical and non medical applications, including financial projections and real estate data plots
- Performed instance segmentation of robotic surgical arm for binary classification

# PUBLICATIONS & PRESENTATIONS

- **XMARCUS: A PATHWAY TOWARDS REMOTE ROBOTIC SURGICAL TRAINING**  
VIRGINIA TECH THESIS ARCHIVE
- **IDENTIFYING CURRICULUM GAP IN FUNDAMENTALS OF ROBOTIC SURGERY AND FUNDAMENTAL SKILLS OF ROBOTIC SURGERY: HANDLING ADVERSE EVENTS**  
JOURNAL OF SURGICAL ENDOSCOPY | APRIL 2018  
WORLD CONGRESS OF ENDOSCOPIC SURGERY
- **LAPAROSCOPIC RELEASE OF MEDIAN ARCUATE LIGAMENT**  
JOURNAL OF SURGICAL ENDOSCOPY | APRIL 2019  
SOCIETY OF AMERICAN GASTROINTESTINAL & ENDOSCOPIC SURGEONS
- **MINIMIZING ROBOTIC SURGERY ADVERSE EVENTS THROUGH MACHINE LEARNING**  
JOURNAL OF SURGICAL ENDOSCOPY | MARCH 2021  
JAPANESE SOCIETY OF ENDOSCOPIC SURGERY/WORLD CONGRESS OF ENDOSCOPIC SURGERY
- **ACM WORKS OF WONDER SHOWCASE-A PARADIGM SHIFT IN MEMORIALIZATION: LEARNING AND ENGAGEMENT THROUGH 3D VIRTUAL MUSEUMS**  
LIBERATION WAR MUSEUM BANGLADESH-MARCH 2021
- **REDEFINING THE DIGITAL PARADIGM FOR MUSEUMS-CONSIDERING THE COVID-19 PANDEMIC**  
LECTURE NOTES IN COMPUTER SCIENCE (LNCS) | JULY 2021  
INTERNATIONAL CONFERENCE ON HUMAN-COMPUTER INTERACTION
- **KNOWLEDGE IS POWER: LINKING AUGMENTED-REALITY WITH 3D PRINTED INTERNAL ORGANS TO IMPROVE MEDICAL EDUCATION AND INCREASE PATIENT INVOLVEMENT IN CLINICAL STUDIES:**  
JOURNAL OF SURGICAL ENDOSCOPY | AUGUST 2021  
SOCIETY OF AMERICAN GASTROINTESTINAL & ENDOSCOPIC SURGEONS

# VOLUNTEERING

## **STEM CLASSROOM ASSISTANT**

PRICES FORK ELEMENTARY-BLACKSBURG, VA | AUG 2020-MAY 2022

- Teaching 3rd-5th graders about robotics and AI fundamentals.

## **ALLIED MEMBER**

BLACK IN AI | JAN 2021- PRESENT

- Organize and host monthly zoom session to discuss issues on system racism and provide an inclusive community

## **ALLIED HEALTH MEMBER**

SOCIETY OF AMERICAN GASTROINTESTINAL AND ENDOSCOPIC SURGEONS (SAGES) | JAN 2021- PRESENT

- Mentor high school students with advice for pre-medical studies and aid in SAGES' Mini Medical School Bootcamp

# SKILLS

- **AI:**
  - Python
  - AI Libraries: CUDA, PyCuda, PyTorch, Tensorflow, Sci-kit learn, Keras
  - ROS
  - Machine Learning Development
- **Object Oriented Programming**
  - C++
  - Java
- **VR/AR:**
  - Unity
  - Unreal Engine
- **Mobile:**
  - iOS: Swift, SwiftUI, UIKit
    - Notable Libraries: CoreML, ARKit, AVFoundation, StoreKit
  - React-React Native
  - Android (also Java development)
  - Flutter
  - In App Monetization: Google Admob, AppLovin, Liftoff
- **Backend:**
  - Backend as a service: Google Cloud Platform, Azure, AWS, MongoDB
  - SQL: PostgreSQL, MySQL, noSQL
  - GoLang
  - NodeJS
- **Web:**
  - HTML
  - CSS
  - Javascript
- **Kernels/Git Deployment:**
  - Bitbucket
  - Jira
  - Kubernetes
- **Front End-HCI**
  - Lucid Chart, Figma, Adobe

# LINKS TO PORTFOLIO OF WORK



LINKED-IN



WEBSITE



GITHUB



GOOGLE SCHOLAR



THESIS:  
XMARCUS