

From Kumasi to Cyber Defender

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IDS 493: Electronic Portfolio Project

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3 August 2023

Abstract

As I reflect upon the path my life has taken, I feel a sense of humility and gratitude, for the opportunities that have brought me from Kumasi Ghana to my role as a cyber defender in the United States Air Force. The story of my journey, entitled "From Kumasi to Cyber Defender; A Tale of Curiosity, Service and Resilience " captures the essence of how my curiosity, adaptability and unwavering passion for technology have shaped my trajectory. It all began with my encounter with a computer—a moment that sparked a fascination with technology. This early curiosity laid the foundation for my enduring love affair with the world. As I matured so did my desire to delve deeper into the realm of cybersecurity leading me to pursue education in the United States. My academic journey began at Northern Virginia Community College (NVCC) where I immersed myself in computer science coursework.

However, it was the allure of cybersecurity that ultimately propelled me to transfer to George Mason University (GMU). This shift in focus posed challenges, which I wholeheartedly embraced as stones toward personal growth and fulfillment within my chosen field. Motivated by a sense of duty, towards my country I made a life altering decision to enlist in the United States Air Force. The military environment ingrained in me an understanding of the significance of discipline, resilience and the strength of teamwork. It also granted me the chance to buy a clearance, which showed trust and further motivated me to safeguard our nation's crucial digital assets. Transitioning to Old Dominion University (ODU) marked another chapter in my journey. During my time I immersed myself in coursework focused on cybersecurity including areas like cryptography, network security and digital forensics. My unwavering commitment to my studies led to a GPA above 3.5 highlighting my dedication to excellence.

Participating in the Cyber Scholars Undergraduate Research Program through the Commonwealth Cyber Initiative (CCI) at ODU was an experience for me. Collaborating with scholars and industry experts allowed me to engage in innovative research deepening my understanding of challenges and solutions within cybersecurity. Throughout my story adaptability appears as a guiding principle. From embracing change to excelling amidst evolving cyber threats, adaptability has played a role in shaping my journey. It has empowered me to overcome obstacles and seize opportunities for growth and knowledge acquisition.

As I reflect on my life at this point, I am grateful, for the experiences that have shaped me into the person I'm today. Being a cyber defender is driven by my passion, determination and unwavering commitment to secure the landscape. I approach the future with a mind and heart prepared to overcome any challenges that come my way. Serving my country and protecting against cyber threats is something I do with dedication and pride. My journey from Kumasi to becoming a cyber defender proves the power of curiosity, service and resilience. It has equipped me for a future of possibilities, in the ever-evolving realm of technology and cybersecurity.

The Start of the Journey

In the heart of Ghana in the city of Kumasi I, Emmanuel Boateng experienced a childhood surrounded by a diverse array of sights and sounds. As a soul filled with curiosity and an unwavering desire to explore the world, I found myself amidst the laughter of children and the hustle and bustle of the streets. The rich history and cultural diversity of Kumasi served as my inspiration to seek knowledge and embark on discoveries. From an age I was captivated by the wonders of technology. It felt like there were possibilities waiting to be unlocked through the keys of knowledge. As I journeyed through my years computers held an allure for me. The mere

sight of those machines fascinated me. Beckoned me into a realm filled with wonders that I could not resist exploring. Day after day my hunger for understanding grew stronger as I delved deeper into this world. I eagerly consumed any information to me – books, articles, or any resources within my reach. My curiosity was not just passive; it was fueled by a determination to unravel the secrets behind technology.

Living in a place where educational resources, on technology were limited presented its set of challenges. However, these obstacles only served to strengthen my resolve. I always knew that technology was more than a passing interest for me; it was my passion, a fundamental part of my identity. As I grew older and embarked on my college journey my love for technology continued to fuel me. I delved into aspects of this evolving field from programming languages to networking. However, it was in the realm of cybersecurity where I discovered my calling. The concept of safeguarding the world from threats and ensuring information security became a mission that I wholeheartedly embraced. I recognized the significance of protecting the landscape for the wellbeing of individuals and societies. Although there were challenges along the way my curiosity never wavered. I understood that every obstacle presented an opportunity for growth and learning. With each step I became more certain that my path lay in becoming a cyber defender. From the streets of Kumasi to the corridors of my college I nurtured that spark of curiosity within me allowing it to ignite an inner fire. The journey from Kumasi to the realm of cybersecurity had only just begun, with unwavering determination and spirit I knew that it would lead me towards a future where I could make an impact – contributing to a safer and more secure digital world.

As I immersed myself further into the realm of technology my fascination with computers and all things digital grew exponentially. The T937, a computer in my apartment had

become my trusted companion sparking a passion for technology. Little did I expect that this innocent exploration of a computer would lead me on a journey spanning continents and shaping my destiny. With each passing day I found myself craving knowledge, yearning to understand the complexities of computers and networks. The world of technology seemed like a universe awaiting exploration. I was eager to embark on a voyage of learning and discovery. However, it soon dawned on me that in my hometown of Kumasi, Ghana opportunities to delve deeper into technology were limited. The available resources were scarce. I longed for more than what my immediate environment could offer. Realizing that satisfying my thirst for knowledge and progressing in the field of technology required moving to a place with prospects. Leaving behind the comforts of my apartment and the community I knew well was not an easy choice. However, it was a decision I considered necessary for growth and future success.

Cross-Continent Decision

My parents made an altering decision to permanently move to the United States driven by their desire, for an education and the opportunity to explore their children's passion for technology on a scale. When I stepped off the plane into this world it was a whirlwind of sights, sounds, and cultures. The United States presented an array of opportunities. Also came the challenge of adapting to an unusual way of life. As I settled into my life in the United States, I realized that embracing the lifestyle meant understanding and appreciating cultural differences. Everything from how people interacted to routines and social norms felt unfamiliar and fresh. However, I approached this change with enthusiasm eagerly immersing myself in this chapter of my life. Even though I was not a student, assimilating into society still required flexibility and an open mind. I had to adjust to the pace of life, navigate through the intricacies of an educational

system and connect with individuals from diverse backgrounds. One of my challenges was language. Despite having a foundation, in English it took some time for me to get used to accents and colloquial expressions.

However, as time went on and I persevered, my confidence in my language skills grew. I started engaging in conversations and forming connections with people from backgrounds, which really helped me expand my horizons. Education in the United States opened a world of possibilities for me to deepen my understanding of technology. I decided to pursue a path in computer science and immersed myself in coursework that challenged me to think critically and produce solutions. The resources available were abundant. I eagerly seized every opportunity to gain experience and refine my skills. Apart from academics I also wanted to engage with the community and build meaningful relationships. Joining clubs and organizations allowed me to meet individuals who shared my passion for technology. Being part of such a network really helped me navigate the complexities of starting in the United States. Adapting to life in a country had its challenges. There were times when I felt homesick and longed for the comforts of home in Kumasi. However, I remained resilient because I saw every obstacle as a chance for growth. As I embraced the way of life it became clear that embracing change did not mean abandoning my roots; rather it meant enriching my identity through experiences and knowledge gained during this exciting chapter of my life. I found myself in a position connecting two cultures. I shared the heritage of Ghana while also embracing the spirit of innovation and exploration that defines America. The journey, from Kumasi to the United States was truly transformative. It taught me the importance of being adaptable, showed me the power of resilience and allowed me to appreciate the beauty of embracing change. Making the move to pursue my passion for

technology and education in America was a decision that shaped my future and set me on a path towards becoming a cyber defender. Down that this was my calling.

Starting Off at NVCC

When I enrolled at Northern Virginia Community College (NVCC) it marked the beginning of my education, in computer science. Driven by determination and a genuine passion for technology I embarked on a journey to unravel the secrets of programming languages, algorithms, and computer hardware. The NVCC campus became my haven of knowledge nurturing my thirst for learning and providing me with a foundation to build upon. Throughout my time at NVCC I carefully selected courses that would equip me with skills in computer science. In my semester I immersed myself in the course titled "CSC 221. Introduction to Problem Solving and Programming." This course laid the groundwork for my programming adventure by teaching me problem solving approaches. How to implement solutions through coding. It was an experience that revealed the power of programming in creating innovative solutions. In addition to my computer science classes I also explored subjects that broadened my understanding of the world around me. Electives in humanities and fine arts exposed me to diverse cultures and perspectives fostering creativity and honing thinking abilities. Courses, like "ENG 111. College Composition I" helped refine my communication skills enabling me to express myself. During the semester I focused on diving into advanced programming concepts through a course called "CSC 222. Object Oriented Programming." This class introduced me to the world of object-oriented programming, where I gained skills in designing and developing software systems using classes and objects. It was a step in my journey towards becoming a proficient programmer.

Moreover "MTH 263. Calculus I" expanded my abilities. Provided me with a strong analytical foundation that is essential in the field of computer science. I discovered how mathematics and programming are closely interconnected in how calculus principles applied across various technological aspects. As I progressed into the semester, I delved deeper into the core of computer science by taking "CSC 223. Data Structures and Analysis of Algorithms." This course exposed me to data structures such as linked lists, stacks and queues well as efficient algorithms used to manipulate them. Gaining an understanding of data structures and algorithms became the backbone of my critical thinking skills—an asset in the realm of cybersecurity. In addition to my computer science education, I had the opportunity to explore mathematics through "CSC 208. Introduction to Discrete Structures. “Discrete mathematics has played a role in the fields of cryptography and network security. I understood that having this knowledge would be essential in my journey to become a cyber defender. While pursuing my computer science coursework I also had the opportunity to delve into the sciences. Taking "MTH 264. Calculus II" and a science elective with a lab did not expand my knowledge but also improved my ability to understand and analyze complex systems. During the semester I found myself at a crossroad where I had to decide whether to further explore computer organization through "CSC 205. Computer Organization" or venture into disciplines. Additionally, there was an opportunity to dive deeper into higher level mathematics with "MTH 265. Calculus III," which would provide me with an understanding of mathematical principles used in cryptography and advanced cybersecurity. Throughout my time at NVCC each computer science course and beyond paved the way, for me on my cybersecurity journey. The knowledge and skills I gained were not just theoretical but practical, allowing me to tackle real world challenges in the realm. As I continued my college path it became clear that my true passion lay beyond computer science. My heart

longed for a field that aligned with my aspiration to safeguard and protect the world against the increasing threat of cyber dangers. My future was destined to be in the field of cybersecurity and the courses at NVCC would function as the starting point for this adventure. With a sense of purpose, I was certain that the next phase of my life would be dedicated to becoming a guardian of cyberspace protecting the realm, for the benefit of all.

George Mason University Cybersecurity Student

Motivated by my purpose and passion for cybersecurity I realized that my path in the field of technology had taken a turn. With unwavering determination, I made a choice to transfer from Northern Virginia Community College (NVCC) to George Mason University (GMU) seeking a program that would satisfy my thirst for knowledge in this rapidly evolving domain. Transitioning from a community college to a university presented its share of obstacles but I was prepared to embrace these challenges as opportunities for personal growth and professional fulfillment. At George Mason University I found myself stepping into a realm of possibilities. The curriculum at GMU was thoughtfully crafted to equip students with the skills to tackle real world cybersecurity challenges providing them with both foundations and practical experience essential for thriving in this dynamic field. One of the courses I enrolled in was "CYSE 101. Introduction to Cyber Security Engineering." This course served as an entry point into the realm of cybersecurity covering concepts such as cyber threats, vulnerabilities, and risk management. It broadened my perspective on the responsibility associated with safeguarding assets and defending against cyber-attacks. To delve deeper into the understanding of systems and computing I decided to take on "CYSE 130. Introduction to Computing, for Digital Systems Engineering. "This program did not enhance my abilities, but it also fostered a deep

understanding of the intricacies of computing systems. This knowledge has proven invaluable in finding vulnerabilities and implementing security measures.

As I delved deeper into the curriculum, I came across a course called "CYSE 211. Operating Systems and Lab." This class supplied an exploration of operating systems and their role in cybersecurity. Understanding how different operating systems work enabled me to find weaknesses and develop strategies to strengthen them against threats. The field of cybersecurity is inherently interconnected through networks making "CYSE 230. Computer Networking" a part of my education. This course shed light on the complexities of computer networks, including protocols, routing and security concerns. With this knowledge, in hand I gained the ability to effectively secure networks and safeguard data from access. To cultivate ability in securing software applications I eagerly embraced the challenges presented by "CYSE 411. Secure Software Engineering." This course equipped me with the skills to design, develop and keep software systems. It ensured that security was integrated at every stage of the software development life cycle.

As my journey progressed, I met topics that sparked my fascination. The course "CYSE 421. Industrial Control Systems Security" shed light on the vulnerabilities that exist in infrastructure and industrial control systems. Understanding these points allowed me to develop strategies for defending against cyber threats that could have severe consequences. As our world becomes more interconnected the importance of communication has become clear. In "CYSE 425. Secure RF Communications " I explored the complexities of radio frequency communications diving into encryption and authentication techniques that protect information. During my time at GMU I did not expand my knowledge but also sharpened my problem solving and critical thinking skills. The curriculum challenged me to think like a cyber defender

foreseeing threats and proactively designing defenses. In addition to my coursework, I eagerly embraced opportunities to engage with GMUs cybersecurity community. Joining cybersecurity clubs and taking part in competitions exposed me to real world scenarios where I collaborated with peers to tackle challenges and safeguard assets. The transition from a computer science program to a cybersecurity curriculum was truly transformative for me. It sparked a passion, within me—a drive to defend and protect against the evolving cyber landscape. As I finished each course my confidence in my abilities. I became more motivated to make a significant difference in the field of cybersecurity. The transition from a community college to George Mason University proved the importance of perseverance and adaptability. By embracing challenges and seizing opportunities for growth I understood that this journey would mold me into a cyber defender. I would be prepared to confront the evolving landscape of cybersecurity with determination and self-assurance.

Enlistment in the Air Force

As I pursued my goals a sense of responsibility towards my country started to appear. My love for technology and cybersecurity had sparked a passion in me. I realized that I wanted to use my skills to serve my nation and contribute to its security. This fervent desire led me to make a life altering decision – I enlisted in the United States Air Force. The decision to join the Air Force was not made lightly. It meant dedicating myself to the purpose of protecting and defending our nation from both invisible threats. The Air Forces mission of safeguarding the skies and digital landscape resonated with me deeply as I recognized that my ability in cybersecurity could play a role in securing infrastructure and national security. The military environment presented a set of challenges. From the demanding training to the discipline required for success in the forces, I found myself pushing beyond my limits. Basic military

training evaluated both my endurance and mental resilience fostering a strength that was previously unknown to me. Throughout it all I embraced this experience with a sense of duty and honor aware that I was contributing to something far greater, than myself. One of the reasons I decided to join the Air Force was because I wanted to obtain a secret clearance. This involved going through background investigations that aimed to ensure my trustworthiness and loyalty. Getting this clearance meant that I had access to information, which was a responsibility I took very seriously. It was truly an honor to be entrusted with the nation's secrets. I fully understood the weight of the responsibility that came with it.

As my military career progressed, I realized the core values of the Air Force. Integrity is the first service before self and excellence in all we do. Perfectly aligned with my principles. These values deeply resonated with me. Became guiding principles that influenced both my actions in the military and in my life. During my time in the military, I experienced firsthand how important teamwork and camaraderie were. Collaborating effectively with my fellow service members became crucial for conducting our missions. Each member brought their skills and perspectives to contribute making us a strong united force. The value of teamwork in the Air Force reinforced for me how vital collaboration is in cybersecurity well. In this field it is essential for us to work together to tackle cyber threats if we want to achieve success. Throughout my tenure in the Air Force, I had exposure to seeing how cybersecurity plays a role, in national security. During my time in the Cyber Defense Division our focus revolved around protecting infrastructure, securing data, and defending against cyber-attacks from adversaries. It was a battle to stay ahead of evolving threats, but I genuinely had a passion for this fight. My experience in the United States Air Force complemented my pursuits. Provided me with invaluable lessons. The military environment instilled in me discipline, resilience, and a deep

appreciation for teamwork. It reinforced my commitment to safeguarding and defending not as a cyber defender. Also, as a proud member of the United States Armed Forces.

Balancing my duties with responsibilities reminded me of the power of adaptability—a trait that has played a vital role throughout my life’s journey. Embracing change and tackling challenges—whether in academia, the military, or the professional world—has given me an advantage when it comes to problem solving and decision making. Joining the United States Air Force was a call to serve that further solidified my sense of purpose as a cyber defender. The combination of my cybersecurity knowledge gained from academics, the discipline instilled by the environment and the values I hold dear have propelled me forward with unwavering determination. I was aware that the abilities and knowledge I bought during my time in the Air Force would keep molding me into a cyber defender prepared to confront any obstacle that crossed my path.

Cyber Defense Operator

During my time, in the United States Air Force I discovered my passion within the Cyber Defense Division. It was here that my love for technology and cybersecurity came together creating a force dedicated to safeguarding infrastructure and national security from the ever-evolving threat of cyber-attacks. Collaborating with a team of experts I had the privilege of contributing my skills and problem-solving abilities to counter cyber threats and protect our nation’s digital sovereignty. Being a part of the Cyber Defense Division was an exhilarating and challenging experience. Each day brought forth intricate cybersecurity challenges that required solutions. As a cyber defender I constantly engaged in learning to stay ahead of adversaries by staying up to date with innovative cybersecurity practices. My time in the Air Force provided me

with insights into the real-world impact of cyber-attacks. It was not about technology; it was about understanding the consequences on a national scale if breaches were to occur. The responsibility to safeguard our country's assets instilled in me a profound sense of purpose and unwavering dedication. As I progressed in my role as a cyber defender, I realized the significance of furthering my education in cybersecurity. I decided to transfer from Northern Virginia Community College to Old Dominion University because I wanted a curriculum that would enhance my skills and knowledge.

During my time at Old Dominion University, I focused on cybersecurity by taking courses. One of the courses I took was "Cybersecurity and the Social Sciences (CYSE 201S)" which gave me an understanding of how cybersecurity impacts individuals organizations and society. This course helped me develop a rounded perspective as a cyber defender. Another course that had an impact on me was "Cybersecurity Strategy and Policy (CYSE 425W)". It exposed me to the policy dimensions of cybersecurity giving me insights into the implications of defending against cyber threats at both national and global levels. This course emphasized the importance of coordinated efforts and policies in strengthening cybersecurity measures. In "Cryptography for Cybersecurity (CYSE 463)" I delved into the world of cryptography where I learned how to encrypt and decrypt information to ensure data transmission and storage. Understanding algorithms along with their vulnerabilities became essential in designing security measures. Lastly "Networked System Security (CYSE 464)" provided me with knowledge about securing systems. This course prepared me to safeguard networks, against actors and cyber intrusions. I have developed the ability to find and address network-based threats. To enhance my ability in managing Windows based systems I enrolled in the course "Windows System Management and Security (CYSE 280)." This program equipped me with the knowledge to

effectively secure and manage Windows environments ensuring protection against vulnerabilities. Through the course "Digital Forensics (CYSE 407) " I was introduced to the world of investigating and analyzing evidence. The ability to conduct forensics plays a role in finding cyber attackers and understanding the full scope of cyber incidents.

Furthermore, I delved into Linux based systems by enrolling in "Linux System for Cybersecurity (CYSE 270)." This course provided me with the ability in securing and managing Linux environments, a skillset that holds value in today's evolving cybersecurity landscape. My time at Old Dominion University, coupled with my participation in the Cyber Scholars Undergraduate Research Program by Commonwealth Cyber Initiative (CCI) presented opportunities for me to apply my knowledge in real world scenarios. Collaborating with peers who share interests and learning from field experts has reinforced my commitment to making an impact in the field of cybersecurity. The combination of coursework at Old Dominion University and my experiences serving in the United States Air Force has shaped me into a skilled defender, against cyber threats.

With an understanding of both the policy aspects I am prepared to take on the ever-evolving challenges of cybersecurity, with confidence and determination. From my fascination with technology to my service in the United States Air Force and my pursuit of studies in cybersecurity I have experienced tremendous growth, learning and resilience. As I reflect on my journey far, I am grateful for the experiences that have shaped me into who I am today – an enthusiastic cyber defender, with unwavering dedication to securing our digital world. I approach the future with a mind and a willing heart ready to confront any obstacles that come my way while continuing to serve my country and defend against cyber threats wholeheartedly and proudly.

Conclusion

The journey, from Kumasi, Ghana to becoming a cyber defender in the United States Air Force has been a testament to my adaptability and personal growth. My life's story reflects how my curiosity and passion for technology have driven me to explore the world and uncover its secrets. Starting from my experiences with a computer to studying computer science at Northern Virginia Community College (NVCC) I have embraced challenges and seized opportunities that paved the way for me to become a cybersecurity specialist. Moving across continents to pursue education in the United States marked a turning point in my life. At NVCC I refined my programming skills. Delved into computer hardware laying the foundation for my journey into the realm of cybersecurity. However, it was my increasing fascination with safeguarding assets and defending against cyber threats that motivated me to seek a specialized curriculum at George Mason University (GMU). Embracing the challenges posed by GMU's cybersecurity engineering program I immersed myself in areas such as network security, cryptography, and ethical hacking. This allowed me to develop critical thinking skills that would later prove invaluable when facing real world situations. The decision to enlist in the United States Air Force solidified my dedication to serving my country and using my abilities to protect against adversaries. Getting a clearance was not just about trust, but also a constant reminder of the huge responsibility that comes with safeguarding sensitive information.

When I transferred to Old Dominion University (ODU) it was a moment as it allowed me to delve deeper into coursework focused on cybersecurity. Each course, from exploring the impact of sciences on cybersecurity to delving into algorithms, expanded my knowledge and ability. Being part of the Cyber Scholars Undergraduate Research Program through the

Commonwealth Cyber Initiative (CCI) gave me opportunities to engage in innovative research further shaping my understanding of cybersecurity's challenges and solutions. Throughout this journey adaptability has been the thread that ties each chapter together. Whether it was transitioning between institutions or navigating the dynamic military environment I embraced change wholeheartedly. The evolving nature of cybersecurity demands learning and staying ahead of emerging threats. And adaptability has always been my trusted ally in this rapidly changing landscape. But my journey is not about skills; it has also been a path of personal growth that instilled in me values like discipline, resilience, and teamwork. The United States Air Force taught me firsthand about the power of collaboration and how a united effort is crucial, in defending against cyber threats. These values have not improved my skills as a cyber defender. They have also had a positive impact on my personal growth and sense of responsibility to protect and serve.

Looking back on this journey I am grateful for the opportunities that have come my way and for the mentorship and support from colleagues who have guided me along the path. From Kumasi to the United States from studying computer science to specializing in cybersecurity each phase of my life has contributed to my development. As I embrace what lies ahead I do so with confidence in my ability to adapt and solve problems. The world of technology and cybersecurity will undoubtedly bring challenges. I am prepared to face them with determination and an unwavering commitment to defend against cyber threats. My journey from Kumasi to becoming a cyber defender is a testament to the power of passion, resilience, and adaptability. It has shaped me into a capable of making a meaningful impact, in securing the digital landscape for the greater good. As I embark on the phase of my journey, I am filled with enthusiasm to keep expanding my knowledge, buying skills, and making a positive impact. The field of

cybersecurity offers potential for creating a more protected world ahead. During my academic career, there are multiple skills that have been valuable in my personal and professional growth. I think one of the most important skills is critical thinking, which is the ability to analyze information, evaluate arguments, and make reasonable judgements.

This skill is necessary in problem-solving, decision-making, and opinions. The next skill would have to adaptability along with resilience because when life presents challenges, difficult assignments, and demanding deadlines; it is important to have the skill to adapt and the resilience to bounce back from setbacks. The final skill would have to be leadership and management skills that I gained through student organizations and group projects. Which in the future I can use to contribute to an organization's success and team cohesion. My 5-year plan after graduation is to pursue my graduate degree. I am currently struggling with what school to attend, since there are so many different options. After obtaining my graduate degree the rest of my plan is simple. I would love to work at a government agency that deals with cyber-attacks and eventually work my way into being Cybersecurity manager. I am not exactly sure where I want to live, but hopefully once the time comes, I will have an estimate of what type of places I like and do not like. But the advancement of my academic career is the most important thing to me right now in my life.

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