

Critical Infrastructure Assurance Group (CIAG)

30 September 2003

### Scholarship Application Essay

As I sit down to write this essay, I have a number of choices for topics and one small dilemma: to read the guidelines by strict interpretation would mean that I could choose only one in order to convey multiple diverse and growing interests of mine; conversely, if I choose to interpret the guidelines from a loose standpoint, the essay in question suddenly becomes an open arena where, as some may say, “anything goes.” Because I am who I am, I believe that the most accurate representation of myself will come from an essay which more closely follows the latter interpretation of the same set of published guidelines; and so, we begin.

What does “information assurance” or “information security” mean to me? Both are rather ominous expressions, so before we jump the gun, perhaps a definition or two would be prudent. I would say that information assurance is the simple concept that information can be guaranteed from source to destination as both present and correct. This involves not only data transmission, but also concepts like hashing and retransmission to be sure that the data received is identical to the data sent. Assurance does not stop with a single completed transmission, but rather continues until information can accurately be *assured*.

Information security could mean simply locking a hard drive in a bomb shelter with 600 tons of TNT rigged to the door, but that does not help a soul if the information must also be accessible. The importance of information security, therefore, is not only that the information remain secure, but also that it be readily accessible for the persons who may need it. To claim that information cannot be accessed simply means it does not exist; to claim that information is *secure* means that someone is in complete control of that information.

So the real question is, how do I apply those concepts to my life and interests? Well, both topics are certainly pertinent to the majority of our society. Even those who never use a computer directly carry credit cards and forms of identification that use electronic verification services. If the data cannot be assured and secure, the system does not work. These two key points are the hinge on which our society rests. If they are well oiled, the door to the future swings wide open without a passing sound; if they are not, than the heavy creek prevents both progress and day-to-day operations.

My personal interests lie in several corners of the technology field. I work for a company where I test and diagnose problems with circuit cards, gaining a higher understanding of the hardware aspects of computing technology. I put some of my spare time into development for a peer-to-peer client, which has allowed me to sharpen my networking senses and gain more knowledge of conventions and practical uses for the technology that exists today. (It has also helped me to “earn” what might be termed as “a minor in copyright law.”) I am now entering my third year as a Computer Science / Software Engineering double major which allows me to tune my abilities in areas of programming and computer architecture. I have spent several years now as a freelance consultant detecting and troubleshooting problems with home and office networks, which has been a wonderful field to gain experience in working with various kinds of operation or non-operational systems. My interests are diverse and continually to my surprise show no signs of narrowing on a single portion, spot, nook, niche, or cranny.

My experiences with the company I work for have led to my interests in the hardware itself, whereas before I was primarily interested in applications of software and programming. Now, I am able to learn why failures occur at the hardware level, which helps me not only to grasp how the software uses the integrated components, but also where certain vulnerabilities

may lie, both to hardware attacks and software exploits. In order to secure any system, one must not only understand the software that the package runs on, but also the flaws and strengths of its hardware. This is rather like saying that in order to make a joke funny, you must not only understand the delivery of the punch line, but *why*, in fact, it is funny.

Through my work in peer-to-peer circles, I have developed several interests directly related with Information Assurance and Information Security. I have certainly been impressed with the sheer numbers of topics, from applications of hashing functions such as SHA1 and TigerTree to concepts like Onion Routing and Extended Star Topologies, all at work simultaneously in a single environment – and new aspects arise from it daily. While the more obvious field interests are secure transmission of data and accurate methods of verification, I also apply XML to create better conceptual models and descriptors for types of data transmitted over peer-to-peer networks. Sometimes, it rather reminds me of the postal service.

While I do consider my ongoing education of primary importance, I would prefer to elaborate instead on my freelance work experience as it says more about myself than most institutional programs could. Practical application of information is probably the most important goal of any research opportunity. I consider my life to be a continuous research opportunity; therefore, I must not only learn new information, but find new ways to apply it in order to accomplish anything worthwhile. This is one of the reasons I have dedicated a portion of my time to freelance consultant work. Through this venue, my abilities have grown through the technological equivalent of brain-teasers or riddles. Every problem has its own unique base and solution. Some are similar, and I can draw from past experiences; some are completely new, and I must learn or discover a novel method of approach. This is very similar to the bustling world of Information Assurance and Security. Climates change, and if you are not prepared for rain,

you had better be prepared to fabricate an umbrella using MacGuyver's three basic supplies: duct tape, a Swiss Army knife, and some chewing gum.

My diversified interests alone mean absolutely nothing unless I can take and apply what I know. What, then, does Information Assurance and Security mean to me? It is not only a crucial concept to the survival of our technologically-based society and a firm interest of mine on many different levels, but more importantly to me, an area in which I can contribute meaningfully. I feel that with knowledge comes power: the power to speak, the power to influence, the power to change. There are many possible roads we can travel towards our delicate future. Through knowledge we can better predict and understand the journey, unlocking our potential along the way.