

Search for Faith Integration in Computer Science  
Lyle A. Reibling  
Azusa Pacific University

The consideration of faith integration into the teaching experience of a mathematical science, such as computer science is quite challenging. I'm searching for faith integration issues that are unique to mathematical sciences such as computer science or computer engineering.

There is always the professional ethics approach that certainly is an important consideration within any discipline. I have been able to use the issue of ethics within courses such as the graduate Software Engineering sequence. There are many cases that we have reviewed through reading assignments. These cases deal with issues such as contract management of software projects, proposal preparation, cost estimation, product liability, and similar related issues that are likely to confront software engineers during their careers.

Ethics as a faith integration focus spans all disciplines. Yet, without diminishing the importance of ethics and its associated complex questions, it doesn't satisfy my desire to find a deeper and more fundamental point of faith integration that is intrinsic to computer science.

The uniqueness of ethics lies in the practice of the discipline as a faithful Christian, not in the discovery of faith within the mysteries of God intrinsic to the discipline. In other words, using ethics as the point of faith integration within the discipline of engineering (for example), I'm going to be focused on being a Christian engineer that resolves ethical issues I face in my practice of engineering by the practice of my Christian beliefs. On the other hand, believing there is a deeper reality of God permeating the fundamentals of engineering as revealed by the realities of His Mind expressing the mathematical truths of engineering, my understanding of the practice of engineering will be saturated with the truth of God's word in the very nature of the endeavor itself! All discoveries, theorems, proofs, facts and experimental evidence will serve only to reveal the presence and practice of the Lord in everything: *"And He is before all things, and in Him all things hold together."* (Col. 1:17). I will be an engineer that as a Christian sees the truth of God in his sovereign dominion over even the smallest electrochemical reaction within the neurons of my brain that enables me to think. And yet, He has given me free will to decide *with these same neurons of my brain*, to choose to love Him. Or is it really just the action of these neurons within my brain? What of my soul? What of my mind? Too many questions – my neurons are screaming!!

Many disciplines have their own specific issues, or at least share issues within a class of related disciplines. The biological sciences have questions concerning the nature of life and its origins. The physical sciences have questions concerning the natural world and its origins. And so forth. But what of the mathematical sciences? It has been said that when one considers mathematics, one is dealing with the mind of God. Although the physical world has natural laws that can be expressed and understood through mathematics, it doesn't require the physical existence of the world for its associated mathematical expressions to be true (or even exist in thought). We can view the existence of the mathematical expressions of the physical world as within the mind of God prior to His speaking it into existence. Thus, we could consider the physical world as merely an instantiation of God's mathematical thoughts, rather than mathematics being "discovered" from the physical world. So mathematics is more the expression of God's mind (and a particular form of expression) revealed, than a human invention to abstractly represent the realities of God's creation.

Kurt Gödel was the mathematician who wrote the famous incompleteness theorem in 1931 that proved that within every consistent formal system there are undecidable propositions, and the consistency of the system cannot be proved within the system. In other words, a mathematical system can't determine its own consistency, and it must have propositions that can neither be proved nor disproved with the system. Propositions such as these are the axioms of the system whose **truth** must be assumed. That is, we **believe** the axioms to be true. Well, isn't this another way of describing faith? Or is faith more than this?

Alan Turing is considered by many to be the first computer scientist, although he was actually a mathematician (as many good ones are!). In 1936 he proved that there are computing problems that are so hard to solve that they are intractable. That is, he proved that it can't be determined whether a solution exists or not to these computing problems<sup>1</sup>. This is very similar to the notion of Gödel's incompleteness theorem. There are undecidable computing problems.

These results have implications for theological questions such as free will versus determinism. Within the discipline of computer science and cognitive psychology, we can view the brain as a computing machine that processes information coming from our sensory neurons and sends commands to our motor neurons, both of which provide our brain's interface to the external

---

<sup>1</sup> Garey and Johnson, *Computers and Intractability: A Guide to the Theory of NP-Completeness*, Freeman & Co. San Francisco, 1979. pg. 12.

world in which our body exists and with which our body interacts. If the brain is a machine, can we have free will? How can free will and determinism co-exist if our exercise of free will (thinking) is embodied in a machine (determinism)?

So where does that leave the computer scientist? In the discipline of computer science there has been much work over the last fifty years in the subject of artificial intelligence. That is, trying to capture within a computer an ability to compute and operate in such a manner that humans would characterize entities exhibiting that ability as intelligence. Achieving such tremendous computational feats as to rival the intelligence of the human is a topic of much debate both in the computer science community, but also theology, philosophy, psychology and many others. Part of the approach has been to consider the human as a computing machine. The brain can be viewed as a highly complex, yet understandable, parallel architecture consisting of a massive number of neurons and their interconnections. But is this architecture comprehensible? How can such an architecture achieve intelligent processing? Well, humans have that ability. What implications does this have for mankind created in the image of God? What of free will? Are we free to think? Or is thinking a by-product of the machinery of the brain?

These are some of the questions that frame my interest in faith integration with computer science and information processing. While much of the artificial intelligence and computational complexity questions are found in upper-level and graduate-level courses, I'm working on finding ways to bring these issues down to a more fundamental basis that I can use with my freshman and sophomore classes to stimulate the faith integration dialogue in computer science as they are introduced to the discipline.