Book Review First Half for ICT Seminar   
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Book: **Physics of the Future, how science will shape human destiny and our daily lives by the year 2100.**

Summary: The book deals with different aspects of society and then gives a baseline where we are today, where we can be in 20/50/100 years based on current discoveries, technology, and ongoing research. The book doesn’t give any winners or losers but gives an open ended prediction to where we could be in some of the best case scenarios. The predictions are based on interviews, studies, research and trends. The book details some of the known issues that will and could prevent the possible future from happening. I am going to give a summer of some of things from each chapter.

**Chapter One:** **Future of Computers – Mind over Matter**.

The near future has the shrinking of processors to the size and cost where they will be spread though the environment making a truly connected world. A rough example paraphrased from the book states that the current Sony PlayStation cost about 300 dollars and has more computing power than a military supercomputer from 1997 which cost millions. There will be a point pretty soon where most chips will be cheap and small enough, some costing a few cents. At that point they become almost disposable and will be in everything from a supermarket label, to money, and clothes. There will not be anything that cannot have some sort of computer power placed in it. This will allow us to have a greater consumer tech such as Augmented Reality with Google Glass, Driverless cars, and almost a near virtual reality of known places on the planet.

The middle century will see an end of Moore’s law because the lines etched in silicon will become too small for reliable cooling via silicon. This isn’t something that has to happen as there are several ideas onboard which will continue to allow greater information via different materials and using light instead of electricity for the transfer of information. The chapter does state at some point we will hit a limit Moore’s law will break down when we get to a transistor size of an individual atom. The cheaper also stated that at some point we will mix virtual and real into one reality. This is already happening with the Google Glass mechanic but it will eventually move to contacts, and then an image directly implanted into our retina. This will become so entrenched that at some point removing the augmented reality will be like drug withdrawals.

The far prediction will be that we will no longer have to use physical mediums to control computers as it will be done with a thought. There are already games on the market which can read thoughts, one where a person can learn to move a ball up and down in a tube of air was released a few years ago. When we are able to read thoughts we can then also start to read and record dreams the hidden mind of a person’s subconscious. This also has several uses for those who have physical disabilities and at some point in the future we might not even be able to tell if someone is disabled. The book also started going into a moral and ethical choice once we are able to read someone’s mind, and it is a question that will have to be answered sooner as these studies are already taking place.

**Chapter Two: Artificial Intelligence.**

The current generations of AI’s are broken really down into three current paths, the robotic where they have to navigate a physical world, learning intelligence which requires the computer to learn from its own mistakes and developing its own knowledge base, and the programed AI like Watson of Jeopardy fame. There are two main problems facing the development of AI’s currently. One is that in a computer like Watson’s case they are really smart in a narrow focus. Outside the focus they fail every time. That can be said for the current generation of robotics, that outside their programing they are not too well suited. Then the third type is where they are trying to teach a computer like we teach a young person with it learning from its own mistakes. It keeps its own record of its environment. This is where most feel the promise of a True AI will come from.

There will be advances mostly in the field of rule based systems or heuristics as we approach mid-century. With every increasing data collections computers will be able to build profiles on what we like without us even knowing that ourselves at some time. These systems will then be integrated into every aspect of our lives. One place where this will have a great impact is in the medical community where we can visit a virtual nurse for most of the common issues and they see a doctor if it falls outside the norm. The field of robots will most likely be featuring something called modular robots which can augment themselves for the task at hand. Robotics will also be more present in most communities as they can be remote operated by skilled individuals, allowing a doctor in New York to service any patient around the world.

They will predict at that some point in the late century that computers will develop some sort of intelligence that can mimic consciousness. This is taken with a grain of salt as there is no true consensus on what the meaning of consciousness is. The book takes the literal definition as based on Webster’s Dictionary and lays out the ways that we will achieve each step, that it will be possible to reach this level of artificial intelligence. It then goes into the two types of AI that most fiction predicts, one that will view humans as a threat, and one that is friendly. It predicts that the latter option will come true because we will really pose no threat to them. Human fight over resources and material possessions, this will mean nothing to an AI.

**Chapter Three: Future of Medicine**

The book details several good examples of the quick advancement of medicine in the last 50 years, how it is increasing along similar lines to computing processing power. It makes a good case that we are currently in what they describe as the DNA stage, where we are currently mapping out, figuring out the basic building blocks of who we are. The costs for such an analysis is getting cheaper every year as new methods and better computers are used. There are extreme advances in medical detection methods currently under trial which will make detecting cancer and other illnesses in the early stages when it is easier and most cost effective to fight with higher success rate. The research into stem cells is giving the human race the ability to grow new body parts rather than trying to transplant them from another person.

There is a lengthy section on cloning and gene therapy, the downsides and benefits to both currently. They are both early in the stages of research and there are many breakthroughs left to come which will advance these fields faster than we can predict right now.

There is going to be an ethical dilemma around midcentury where the idea of designer children will become commonplace. The ability to detect genetic defects, and abort has still yet to play out on the stage of public opinion but the technology will exist, each country will see it as a way to get an edge on the competition. The book details some of the promising research currently that will become the consumer medical treatment of tomorrow, along with the side effects of giving yourself a gene therapy which may make you smarter or faster.

There is a warning as the century closes and we will most likely have the ability to reverse aging, the consequences to the world in general. It details several possible ways that this may be accomplishes along with the current research, the downfalls to each. It asks if we really have to die, what effect will that have on us what may we put off, what will we do with our lives? Currently we are driven by the idea that life is finite due to aging but if all we have to worry about is accidents we have a good chance of overloading the capacity of our planet. It then talks about what we can do with our knowledge of DNA. Would we bring back extinct species, is that really something we want? What would governments do if they could design a genetic weapon?