New Technologies
Thursday 10 - 12 noon
Lathrop Northampton

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We hear buzzwords like "bitcoins" and "virtual reality" and "crowdfunding" and "nanotechnologies," but in many cases have no idea what they are. This is an opportunity to change that. The aim will be to make these topics understandable to non-technical participants.

Today we are surrounded by new technologies. We no sooner get accustomed to thinking about driver-less cars, than we hear that one company is thinking about flying cars. In this seminar we will consider a variety of new technologies, from big data, artificial intelligence, virtual reality, and deep learning to 3D printing, delivery drones, the Internet of things, and warehouse and health-care robots.

Some of these new technologies will turn out to have negative side effects that must be weighed against their advantages. Some, like solar energy, have already proved their merit, but are continuing to evolve. Some technologies will prove unworkable. Some, like gene editing, may have moral consequences. Some may run afoul of politics. Some may be stifled by philosophical opposition. But some will be part of the everyday lives of our grandchildren.

The aim is not for us to become experts in these technologies, but to move a couple steps further in our understanding of what they are and what issues surround them.

The following is a list of potential topics that I have thought of. You may well have others that interest you. Perhaps one of your grandchildren talks incessantly about something technological that means nothing to you. Perhaps you keep reading headlines with technology-related words that don't make any sense. I am very open to other topics, but I do need to approve them. Some may not provide enough material for a 25 minute presentation. Some may need better definition. Just ask me.

Topics

For each topic I will provide a possible online starting point. In many cases, wikipedia will be another place to start. Do keep in mind that wikipedia articles are constantly being edited and changed. In addition, I'll provide an interesting link or two, which you may or may not include in your presentation. It's up to you.

3D Printing. This is also called additive manufacturing, because instead of cutting parts out of larger pieces of material, the object is constructed layer by layer using a specialized printer. According to the Gazette, all four Northampton elementary schools currently have 3D printers for students to use.

Robots in Industry and Commerce. Robotics is such a large topic that I split it into two topics. We all know what robots are, but they are used for more and more tasks. The focus here will be on the use of robotics in industries of all sorts except health care.

Robots in Health Care. I would include here also what are called exoskeletons that are used to help people who are paralyzed walk again.

Drones. I think everyone knows what drones are. They range in size from tiny quadcopters that can fit in your hand to large pilot-less aircraft used by the military.

Gene Manipulation. Manipulating genes in plants has been possible for some time now, but recently a new technique called CRISPR has made it even easier and also much less expensive. An enterprising young scientist does not need to work for a large organization to get access to sophisticated equipment. Check out the book *Biopunk* for some examples of this. It would be best if you understood some basic genetics if you want to choose this topic.

Alternative Energy Sources other than solar and nuclear. This would include wind, thermal, biofuel, and hydroelectric sources. There may be others. Solar energy and nuclear energy are both topics in themselves. In this case, I think the wikipedia article is a good starting point. Many of the other introductory sites are filled with ads.

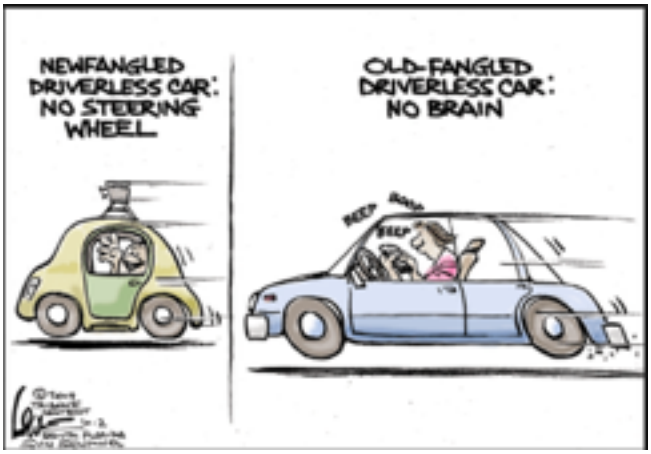
Solar Energy. Everyone knows what solar energy is, but there are several different kinds of solar energy. It's more than rooftop panels. In addition, solar technology is changing rapidly**.**

Nuclear Energy. This would include traditional nuclear energy as well as some new options such as thorium reactors. While a discussion of the pros and cons of nuclear energy should be part of the presentation, it should not be the only aspect that is covered.

Energy Storage. Coal and oil are easy to store. Storing electricity is another matter. Batteries have been around for a long time and larger ones are available for cars that allow them to run for 100 miles or so. But to store the electricity from solar panels or windmills, we need much much larger batteries.

Carbon Capture and Storage. This topic includes both ways to capture carbon just as it's released to prevent it going into the atmosphere and ways to pull carbon out of the atmosphere. In either case, the carbon then needs to be stored.

Driverless Cars. Driverless cars are coming on faster than anyone anticipated. However, there are a lot of factors to consider when it comes to just how we accomplish the shift.



Public Transport. There are a variety of new possibilities for handling public transportation, enhancing or replacing buses and trains.

Nanotechnologies. Nanotechnologies involve the manipulation of materials at the molecular or atomic level. Exactly how this manipulation is done is too complex to be covered here. This topic will focus on what is being done with nanotechnologies and why some people worry about this.

Crowdfunding. Crowdfunding websites allow individuals or small startup companies to request funding from people over the Internet. Usually, there is a promise of a reward of some sort—typically an early release of the product—for large donations. It's a way for startups to get funding with no strings attached and for individuals to support startups that may have no other way to find funding.

Virtual Reality. Virtual reality refers to games and simulations that use multiple senses to create an environment that feels closer to reality. They make use of a special helmet with embedded sound and a screen to make this happen.

The Internet of Things. When tiny computers and sensors are put in objects like your refrigerator or the stoplight on the corner, they can connect to the internet. This is the internet

of things. This topic also includes the use of devices such as Alexa, a device that recognizes speech and can set up reminders to take medications and order things over the internet—to the dismay of some parents.

Artificial Intelligence, Deep Learning and Big Data. Most current attempts to enhance artificial intelligence today involve methods of creating computer systems that learn from interacting with people or large databases. Deep learning refers to artificial intelligence strategies that allow the computer to develop its own way of structuring information by learning from experience—which requires huge amounts of data.

This topic may be chosen by a pair of seminar participants, but does not have to be.

Minecraft. Minecraft is a very popular "game" played by young people and adults. While it does involve blowing things up, what is more important is that it enables players to build things. It has been called the "legos" of the current generation of children and teens, because it is so widely used.

Social Networking Sites. There are lots of these and new ones popping up all the time. They all have slightly different purposes. You should probably include Facebook, Twitter, Pinterest, Meetup, Snapchat, Youtube, and LinkedIn.