

New Technologies Topics with Links

Topics

For each topic I will provide an 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.

A Starting Point:

- <https://techcrunch.com/2016/07/10/whatever-happened-to-3d-printing/>

Interesting Links:

- <https://www.sciencedaily.com/releases/2016/12/161209184317.htm> (prosthetic hand)
- <https://www.sciencedaily.com/releases/2017/01/170112162154.htm> printing metal)

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. (The first link is correct as is.)

A Starting Point:

- <https://www.bloomberg.com/gadfly/articles/2017-01-09/the-robot-threat-donald-trump-isn-t-talking-abou>

Interesting Links:

- <https://www.wired.com/2017/03/delivery-robot-isnt-just-charming-stuffed-pizza/>
- <https://www.youtube.com/watch?v=0gMIL0W-rxM> (Iranian parking robot)

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

A Starting Point:

- <http://blog.centerforinnovation.mayo.edu/2016/05/06/robotsrobotics-in-healthcare/>

Interesting Links:

- <http://www.theverge.com/circuitbreaker/2017/1/12/14253804/elliq-intuition-robotics-elderly-care-ai-assistant>

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.

Good Starting Point:

- <http://www.theuav.com/>

Interesting Links:

- <http://www.npr.org/sections/alltechconsidered/2017/03/02/517043932/someday-disposable-drones-may-deliver-their-load-then-vanish>
- <https://www.sciencedaily.com/releases/2017/02/170209133506.htm> (drones to pollinate plants)
- https://www.amazon.com/Cheerson-CX-10-Mini-Quadcopter-Drone/dp/B00KXZC762/ref=sr_1_26 (I have one of these)
- <http://www.theverge.com/2017/3/31/15135036/drone-hospital-laboratory-delivery-swiss-post-lugano>

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.

A Starting Point:

- <http://www.nature.com/news/crispr-gene-editing-is-just-the-beginning-1.19510>

Interesting Links:

- <https://www.sciencedaily.com/releases/2017/03/170313102417.htm> (Making resistant superbugs sensitive to antibiotics)
- <http://gizmodo.com/the-fda-is-cracking-down-on-rogue-genetic-engineers-1791760888>

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.

A Starting Point:

- https://en.wikipedia.org/wiki/Alternative_energy

Interesting Links:

- <http://www.vox.com/energy-and-environment/2017/1/15/14270240/geothermal-energy>
- <https://www.sciencedaily.com/releases/2017/02/170209133509.htm> (electricity from bacteria)
- <http://www.bbc.com/future/story/20170329-the-extraordinary-electricity-of-the-scottish-island-of-eigg>

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.

A Starting Point:

- <https://www.nrel.gov/workingwithus/re-photovoltaics.html>

Interesting Links:

- <https://www.bloomberg.com/news/articles/2016-10-31/no-one-saw-tesla-s-solar-roof-coming>
- <http://www.vox.com/science-and-health/2017/1/19/14229090/revolution-electricity-utilities>
- <https://qz.com/877351/study-tiny-solar-panels-under-your-skin-are-ready-to-power-the-next-generation-of-pacemakers-and-medical-devices/>

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.

A Starting Point:

- <http://www.vox.com/energy-and-environment/2017/3/27/15043522/nuclear-power-future-innovation>

Interesting Links:

- <https://cleantechnica.com/2016/11/26/thorium-future-option-nuclear-energy/>
- <http://www.npr.org/sections/thetwo-way/2017/01/13/509673094/miniaturized-nuclear-power-plant-u-s-reviewing-proposed-design>

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.

A Starting Point:

- <http://grist.org/climate-energy/the-future-will-be-battery-powered/>

Interesting Links:

- <https://www.bloomberg.com/news/articles/2017-01-04/tesla-flips-the-switch-on-the-gigafactory>
- <http://www.gravitypower.net/technology-gravity-power-energy-storage/>

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.

A Starting Point:

- http://sequestration.mit.edu/pdf/encyclopedia_of_energy_article.pdf

Interesting Links:

- <http://grist.org/briefly/this-plant-in-india-transforms-co2-into-baking-soda/>
- <http://theconversation.com/cant-we-just-remove-carbon-dioxide-from-the-air-to-fix-climate-change-not-yet-45621>

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.

A Starting Point:

- <http://www.techrepublic.com/article/autonomous-driving-levels-0-to-5-understanding-the-differences/>

Interesting Links:

- <https://www.wired.com/2017/02/mits-new-wheelchair-drives/>

- <http://www.theverge.com/2017/2/1/14474790/google-waymo-self-driving-car-disengagement-dmv-california>
- <http://reallifemag.com/perpetual-motion-machines/>
- <http://www.npr.org/sections/alltechconsidered/2017/04/03/522222975/self-driving-cars-raise-questions-about-who-carries-insurance>

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

A Starting Point:

- <http://www.roadandtrack.com/car-culture/travel/a31012/future-of-public-transportation/>

Interesting Links:

- <http://www.theverge.com/2016/2/24/11094524/prt-transit-history-self-driving-cars-alden-starrcar-tomorrowland-1960s>
- <https://www.wired.com/2017/01/slovakias-hyperloop-moves-step-closer-not-joke/>
- <http://www.theverge.com/2017/4/5/15177374/zunum-aero-electric-jet-startup-stealth-boeing-jetblue>
- <https://www.inverse.com/article/29930-siemens-plane-electric-aircraft-330le-world-record-speed-battery>

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.

A Starting Point:

- <https://en.wikipedia.org/wiki/Nanotechnology> (first and last few sections)

Interesting Links:

- <https://www.sciencedaily.com/releases/2017/03/170314140859.htm> (nano particles used to deliver cancer drugs)
- <https://www.sciencedaily.com/releases/2017/01/170118082439.htm> (nanotechnology used in solar cells)
- <https://www.theatlantic.com/technology/archive/2015/08/nanobot-treatment-doctors-cancer/400613/>

Crowdfunding. Crowdfunding websites allow individuals or small startup companies to request funding from individuals 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.

A Starting Point:

- <https://www.forbes.com/sites/tanyaprive/2012/11/27/what-is-crowdfunding-and-how-does-it-benefit-the-economy/#16d9702fbe63>

Interesting Links:

- <https://www.donorschoose.org/> (for funding small educational projects)
- <https://en.wikipedia.org/wiki/GoFundMe> (for funding individuals)
- https://www.indiegogo.com/#/picks_for_you

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.

A Starting Point

- <https://www.theguardian.com/technology/2016/nov/10/virtual-reality-guide-headsets-apps-games-vr>

Interesting Links

- <https://www.sciencedaily.com/releases/2017/03/170306114201.htm> (used for training)
- <https://www.wired.com/2014/05/oculus-rift-4/>
- <http://www.livescience.com/53392-virtual-reality-tech-uses-beyond-gaming.html>

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.

A Starting Point

- <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#1dd2fac91d09>

Interesting Links:

- <http://www.theverge.com/circuitbreaker/2017/1/12/14253804/elliq-intuition-robotics-elderly-care-ai-assistant>
- <https://www.wired.com/2017/01/connected-devices-give-spies-powerful-new-way-surveil/>
- <https://www.wired.com/2017/01/alexa-conquering-world-now-amazons-real-challenge-begins/>
- <http://www.telegraph.co.uk/news/2017/01/08/amazon-echo-rogue-payment-warning-tv-show-causes-alexa-order/>

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.

Some Starting Points:

- <https://www.wired.com/2017/01/googles-go-playing-machine-opens-door-robots-learn/>
- <https://www.wired.com/2017/01/microsoft-thinks-machines-can-learn-converse-chats-become-game/>
- <http://openbookproject.net/py4fun/animal/animal.html>
- <http://www.20q.net/>

Some Interesting Applications:

- <http://www.npr.org/2017/01/16/510096767/robot-lawyer-makes-the-case-against-parking-tickets>
- <https://www.wired.com/2017/01/computers-can-tell-glance-youve-got-genetic-disorders/>
- <http://www.vox.com/science-and-health/2017/3/30/15074376/data-science-crisis-text-line-suicide-prevention>

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.

A Starting Point:

- <https://en.wikipedia.org/wiki/Minecraft>

Interesting Links:

- <https://www.nytimes.com/2016/04/17/magazine/the-minecraft-generation.html>
- <http://www.businessinsider.com/the-minecraft-generation-on-why-kids-like-it-so-much-2016-4>
- <http://www.bbc.com/news/technology-32736808>

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.

A Starting Point:

- <http://www.digitaltrends.com/features/the-history-of-social-networking/>

Interesting Links:

- http://www.huffingtonpost.com/suren-ramasubbu/influence-of-social-media-on-teenagers_b_7427740.html
- <https://www.nytimes.com/2014/11/21/upshot/social-media-deepens-partisan-divides-but-not-always.html>



Social Networking Sites



The Internet of Things