Tech Curiosity
Session 2 of 6

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Delaware Valley University

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Welcome

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Tech Curiosity Presentation Archive

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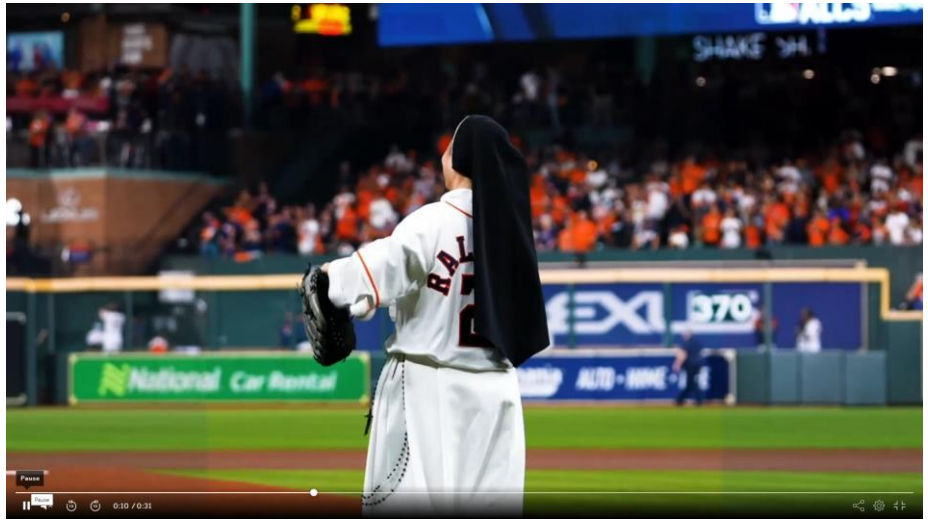
Devine!

Sister Mary Catherine taunting the Sox

[Astros close out Red Sox in Game 6 of ALCS, return to World Series for the third time in five seasons]



Tech Quiz

Question:

- What is the furthest an EV has travelled on a single charge?

Tech Quiz

Answer

- 1.8 billion miles
  - Actually, it should be a single "launch" not "charge". Because, according to the website www.whereisroadster.com that is how far Elon Musk's Tesla roadster has travelled in its orbit around the Sun since being launched about 3 and 3/4 years ago.

New Toy

- Aluratek 8 Inch Touchscreen Wifi Digital Photo Frame 16GB Memory with Built-In Clock, Calendar, Alarm, Weather, Black (AWDMPF208F)
  - **Used - Like New** $41.17 (normally $87)

Revisiting the chip shortage discussion

Re: Secretary Raimondo's "**America makes zero percent of the most sophisticated chips**". How true is it?

https://www.visualcapitalist.com/how-to-invest-in-the-booming-chip-tech-industry/
They divide the chip industry into 4 segments:

Integrated Device Model (IDM): e.g. Intel ($77.9 B 20) Samsung ($57.7 B 20) * 21/Q2 Samsung no. 1
Fabless Model: NVidia, Qualcomm, Apple
Foundry: TSMC ($45.5 B 20)
Wafer Production: numerous, globally diverse

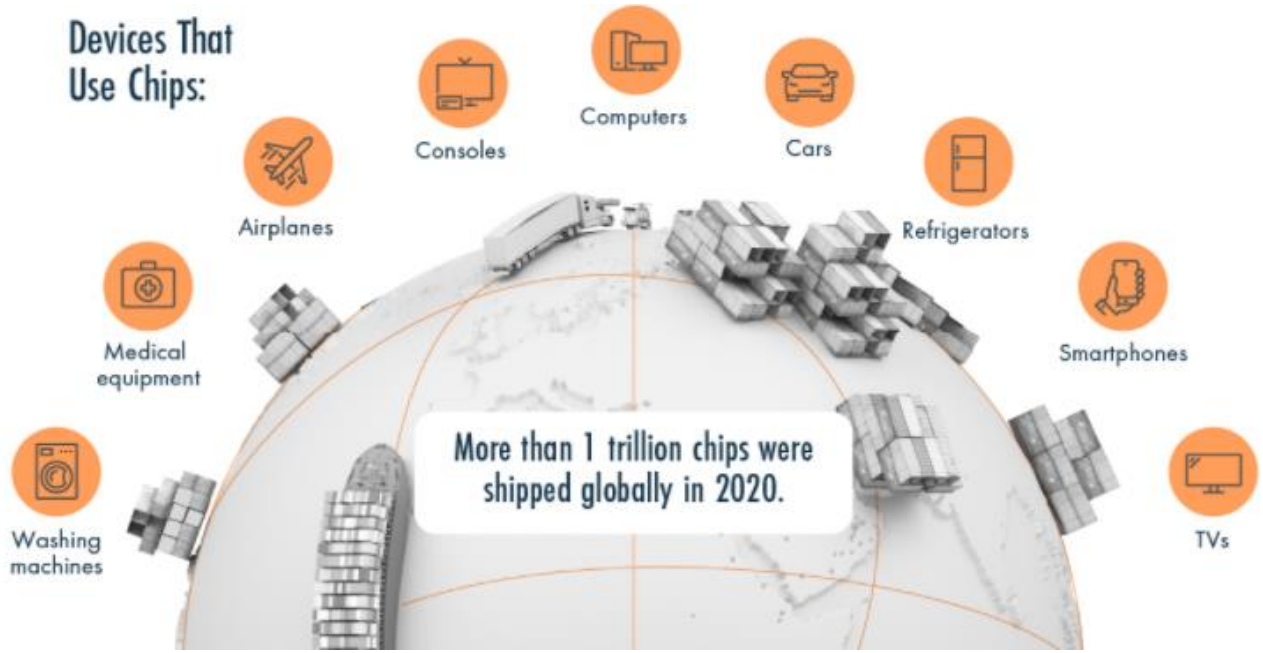
		IDM	Fabless	Foundry	Wafer Production
Estimated Global Total 2020:		$150 B		$90 B	$11 B
Market Share by region:					
	US	51%	65%	**0%**	13%
	Taiwan	2%	1%	63%	21%

But this zero seemed a little too simple.
https://www.investopedia.com/articles/markets/100214/inside-intel-look-mega-chipmaker.asp
https://www.asml.com/en/technology

2019: **TSCM**: Began using **Extreme Ultra-Violet (EUV)** commercially for N7+ node
2020: Only Samsung and TSCM using EUV commercially

Foundries versus IDMs

- **Foundry model:** Also known as fabless design, companies like NVidia and Qualcomm outsource production of chips to fabrication foundries like TSMC. They are then assembled and tested by specialty companies (OSATs) before being received by the end consumer.
- **Integrated model:** Integrated device manufacturers (IDMs) are companies like Intel that design, manufacture, and sell their own chips. This was the traditional model of chip development before foundries took off, and many IDMs now outsource part of their production to foundries and OSATs.



The underlying technology that creates these chips, also known as semiconductor devices, is part of a massive and sophisticated global supply chain with many different business models.

Fabless companies

Companies that design and sell chips while outsourcing manufacturing to foundries.

Examples: AMD, NVIDIA, Qualcomm

Foundries

Companies that manufacture chips for fabless companies.

Examples: UMC, TSMC, GlobalFoundries

OSATs (Outsourced Semiconductor Assembly and Test)

Companies that assemble, test, and package chips (for fabless companies) and devices (for electronics companies)

Examples: Amkor Technology, ASE GROUP

Integrated Device Manufacturers

Companies that design, manufacture, and sell their own chips.

Examples: intel, NXP, Analog Devices

Suppliers

Companies that supply equipment, services and software for the manufacture of semiconductors.

Examples: ASML, Applied Materials

The result? An extremely robust manufacturing system capable of making miniscule devices en masse in an industry with very high entry barriers.

Foundries versus IDMs

Market Share by Region	IDM	Fabless	Foundry	Wafer Production
U.S.	51%	65%	0%	13% (North America)
South Korea	29%	1%	18%	20%
Taiwan	2%	17%	63%	21%
Japan	9%	<1%	0%	16%
China	<1%	15%	6%	15%
Europe	9%	2%	0%	6%
Rest of World	0%	0%	13%	9%

Company	Announced Fab Investment (2021)	Fab Location
TSMC	$12B–$35B	U.S. (Arizona)
Intel	$20B	U.S. (Arizona x2)
Intel	$20B	Europe
Samsung	$17B	U.S. (Texas)
GlobalFoundries	$4B	Singapore

I think this what she meant - **No one in the US is fabricating chips commercially with EUV yet**

Taiwan & Korea are themselves dependent on Europe.

The **only suppliers** of EUV lithography systems are the combination of **Advanced Semiconductor Materials Lithography** (**ASML**)(Netherlands) + **Zeiss** (Germany) +**Cymer**(San Diego).

It is complex technology that has taken over 30 years from early lab to commercial use

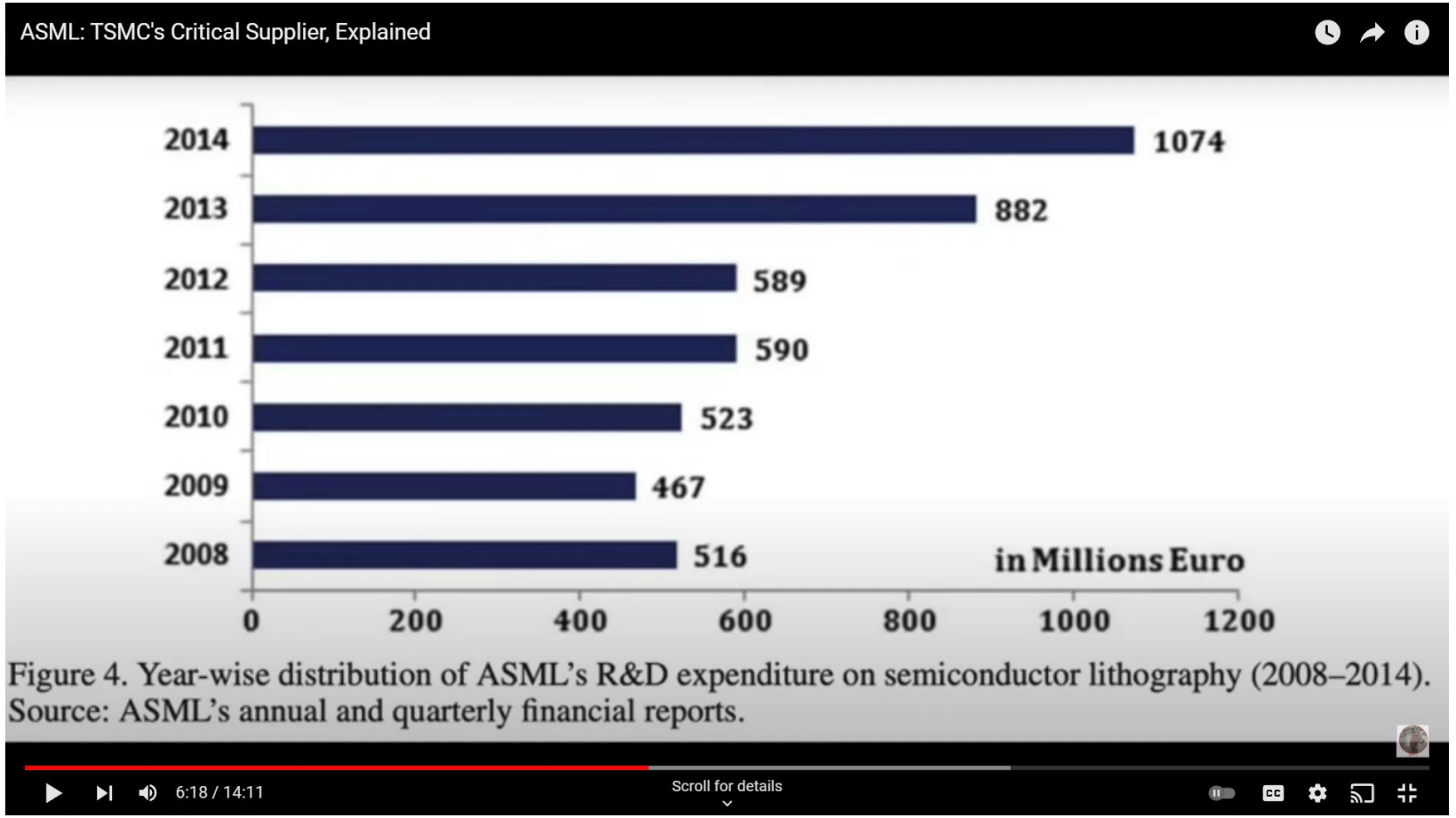
ASML's EUV uses 13.4 nm radiation from laser produced tin plasma, multi-layer mirrors (Bragg diffraction) all in high vacuum. The flagship model, the NXE:3400C costs $150 m per station (TSCM has 40?)

Here is a short (11 sec) video of the NXE:3400C in action:
https://www.youtube.com/watch?v=skUCP2f4HIM

Intel: Started receiving NXE:3350B in 2018: No reports of it being used commercially by them yet.

Fab Future: Supply chains are beginning to be shortened and allow for redundancy
TSMC: Began construction of fab in Arizona (2021)
Samsung: Announce plans for fab in Texas (2021)

https://www.youtube.com/watch?v=CFsn1CUyXWs



SUPPLY CHAIN DIFFICULTIES

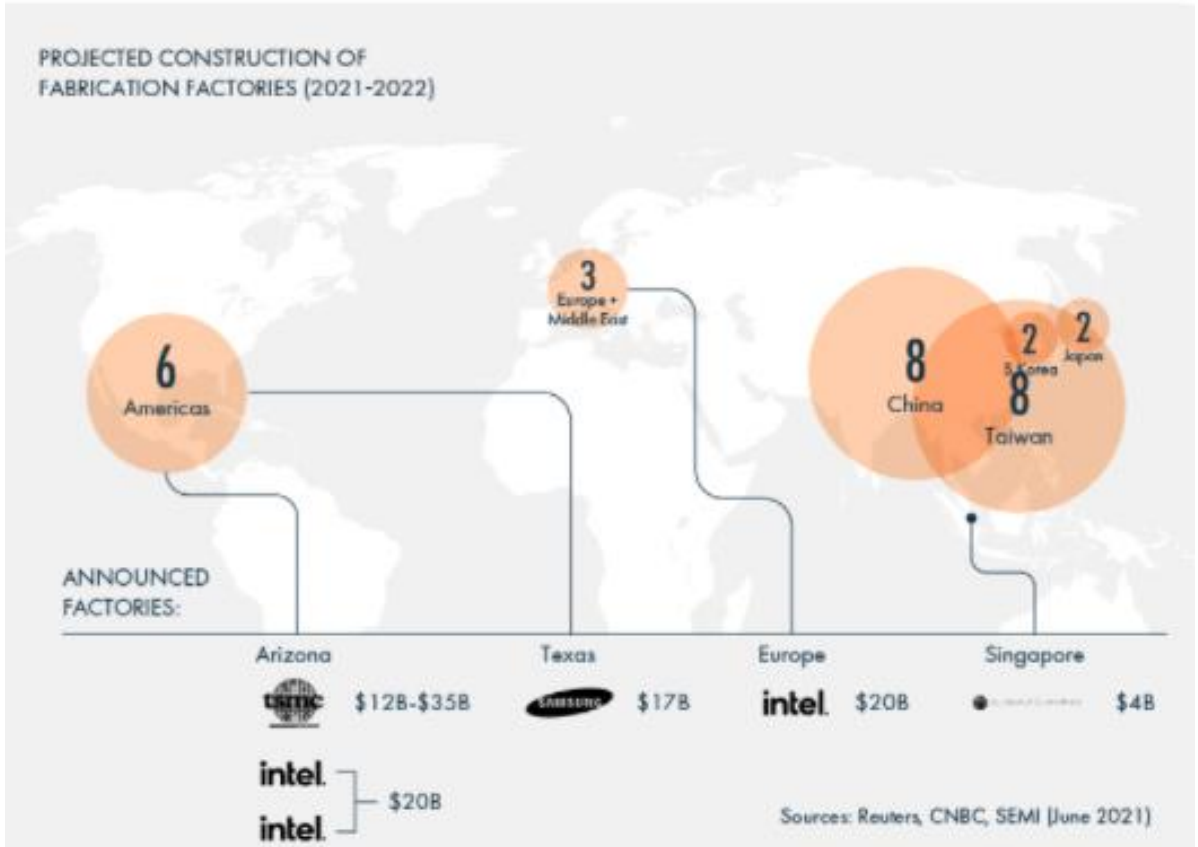
The COVID-19 pandemic led to an unexpected global shortage of chips, affecting massive industries and exposing an investment shortfall.

$110B

Estimated lost revenues for global automakers in 2021.

AN EXPENSIVE OPPORTUNITY

The semiconductor industry operates at massive scale, with a high floor for factory costs, and a high roof for investments and potential profits.



Investment in these 29 fabs is projected to surpass

$140 billion.

The lithography machines that print chip designs on silicon wafers each cost roughly

$100 million.

Source: Washington Post

I’d Like to Introduce You to Leonardo

And the Final Word About Pig Kidneys

In a First, Surgeons Attached a Pig Kidney to a Human, and It Worked

- A kidney grown in a genetically altered pig functions normally, scientists reported. The procedure may open the door to a renewable source of desperately needed organs
- A steady supply of organs from pigs — which could eventually include hearts, lungs and livers — would offer a lifeline to the more than 100,000 Americans currently on transplant waiting lists, including the 90,240 who need a kidney. Twelve people on the waiting lists die each day.
- Genetically engineered pigs “could potentially be a sustainable, renewable source of organs — the solar and wind of organ availability,” Dr. Montgomery said.

A Word or Two About Elon Musk

Musk saves a life (or two)

Elon in the News

Tech in the News

- **Hertz ordered 100,000 Tesla Model 3s as it seeks to electrify its fleet.** The $4.2B in revenue for Tesla is the single largest order ever for EVs.
  - The cars will be available to rent in the U.S. and Europe starting in early November.
  - They'll be delivered over the next 14 months and will comprise 20% of Hertz's global fleet.
  - Hertz is developing its own EV charging stations to supplement Tesla's superchargers.
  - And Elon is happy - Tesla passes $1 trillion in market value after Hertz orders 100,000 of its vehicles, boosting founder and chief executive Elon Musk's fortunes by billions…

A Word About China

China is Watching You

- Even if you have never set foot in China, Hikvision's cameras have likely seen you. By 2017, Hikvision had captured 12% of the North American market. Its cameras watched over apartment buildings in New York City, public recreation centers in Philadelphia, and hotels in Los Angeles. Police departments used them to monitor streets in Memphis, Tennessee, and in Lawrence, Massachusetts... **The Atlantic**
- **Home Depot, Best Buy, and Lowe's pulled Lorex and Ezviz security cameras from shelves due to their links to human-rights abuses in China.** Their parent companies, Dahua Technology and Hikvision, have supplied Beijing with surveillance tech that has been used to monitor Uighurs and other ethnic minorities in China.

Despite the economic restrictions on the blacklist, the Lorex and Ezviz cameras are not banned in the U.S.

Because You Asked

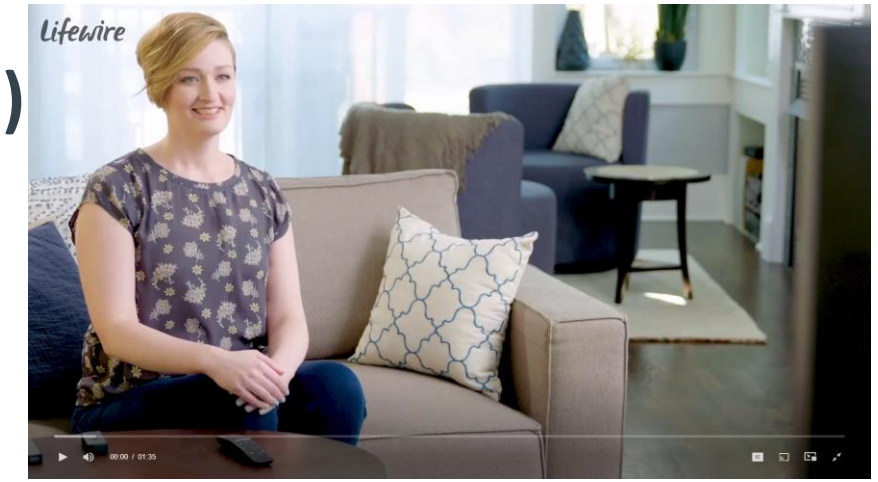
Led disposal

- How to Dispose of LED Light Bulbs. You can either dispose of **LEDs with the rest of your trash items** or you can find a recycling facility that will take them. They don't contain mercury, but some of them contain metals such as copper, nickel, and lead. Most communities don't require you to recycle LEDs. (source) Or
- Light emitting diode (LED) bulbs are less toxic and use less energy than compact fluorescent bulbs. At end of life, they are considered hazardous waste and should be disposed of properly. (source)
- Bottomline: It depends where you live an who you ask. Mine go into the garbage…

‘Smart’ TVs

What Is a Smart TV, Anyway?

- In a nutshell, a smart TV incorporates an operating system/platform that allows you to access, manage, and view online and network-based media content without the need to connect to an additional box (such as a Roku or Fire Stick).
- **Smart TVs: What You Need To Know (video)**
- **Smart TVs: Everything you need to know**
  - The best TVs we've reviewed
  - TV buying guide
  - The best smart TVs for streaming



A word about Streaming Services (source)

- My top 3
  - Netflix - Premium, $19.07/month
  - Amazon Prime - $10.52/month as part of Prime subscription (paid annually)
  - Hulu - $13.77/month – no commercials
- And the others
  - PBS - $5/month donation to WHYY ($60/year gets access to all content)
  - Acorn TV - $5/month (paid annually)
  - Disney Plus – probably $5/month (paid for 3 years when first announced)
  - Apple TV - $5/month (just cancelled)
  - HBOmax – probably $10/month (using my brother's account)
  - CBS All Access (now Paramount+ - cancelled, usually $10/month)
  - Great Courses Plus (now Wondrium – usually $20/month, I pay $10/month*)

Streaming Cost Bottomline

- I pay $55 for internet access
- Total out of pocket monthly cost for streaming services:

$68.36

Something to consider when comparing

streaming to conventional cable services and costs

- And you still might not get 'local' channels without resorting to a 'TV' subscription like YouTube TV or Hulu + Live TV (each $65/month). These channels are available via Roku or your Smart TV interface

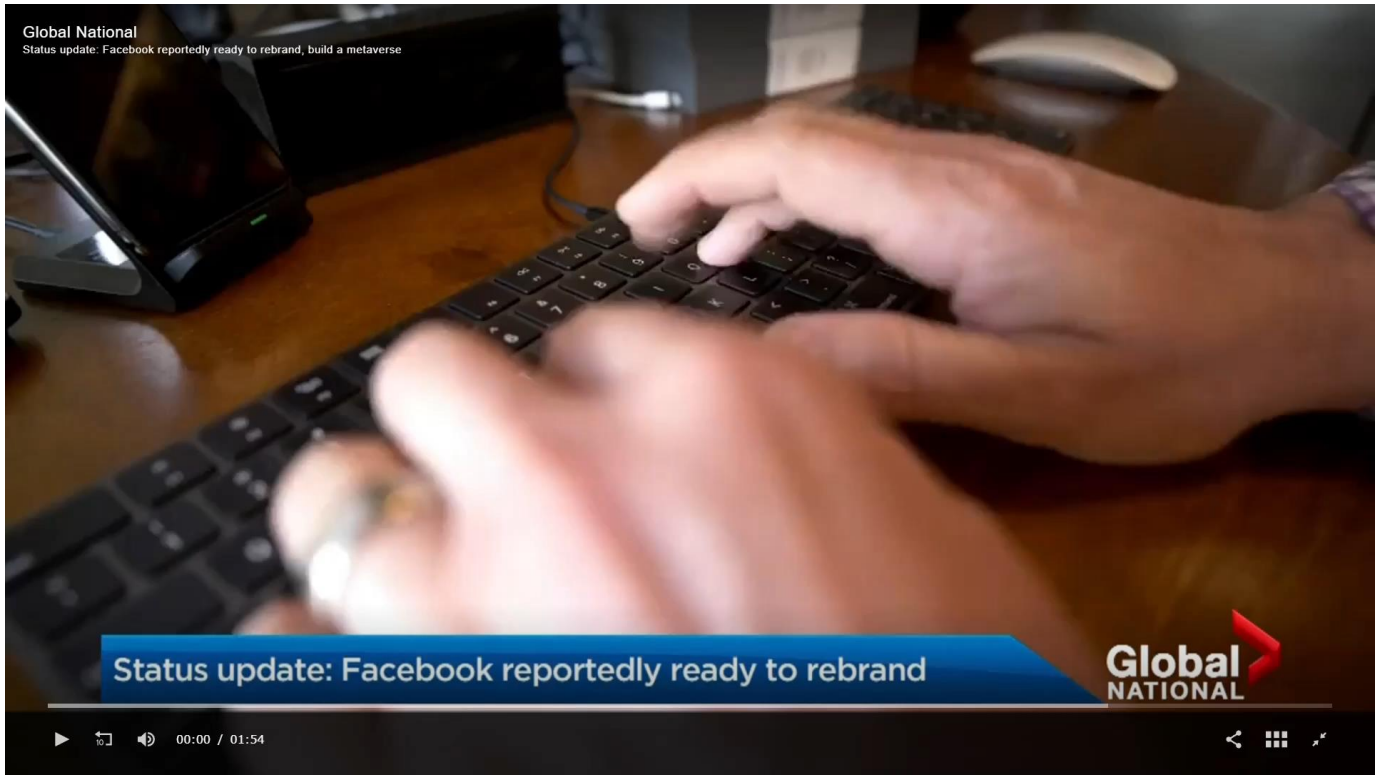
More Tech in the News

Tech in the News

- **Google also released Android 12 on Pixel phones, including past versions.** At its Pixel event, the tech company also announced the release of Magic Eraser, which lets users remove unwanted shapes and objects from photo backgrounds.
- **Facebook is reportedly planning to change its name to resemble its focus on the metaverse*.** The social media company is believed to be considering a rebrand as an umbrella company, under which Facebook, WhatsApp, Oculus, and Instagram would be organized.

Tech in the News

What is the ‘metaverse’ and what does it have to do with Facebook?



Tech in the News

- **Google's Threat Analysis Group (TAG) on Wednesday reported a 99.6% decrease in phishing email volume on Gmail since May.** Google blocked 1.6 million messages, in addition to 2,400 files that were blocked prior to reaching targets.
  - Google displayed approximately 62,000 safe browsing phishing page warnings. TAG observed attackers shifting away from Gmail, to addresses by email.cz, seznam.cz, post.cz, and AOL*.
  - An estimated 4,000 Google accounts were safely restored. YouTube detected and recovered 99% of hijacked channels.
  - TAG said that wider adoption of multi-factor authentication** has made it more difficult to conduct phishing.

What is Multi-Factor Authentication

aka ‘2-step verification’

- It's easier than you think for someone to steal your password
- Any of these common actions could put you at risk of having your password stolen:
  - Using the same password on more than one site
  - Downloading software from the Internet
  - Clicking on links in email messages
- 2-Step Verification can help keep bad guys out, even if they have your password!

Tech in the News

- **Climate change will "exacerbate risks to U.S. national security interests" and current efforts to address the crisis are "insufficient," according to a new report from the U.S. intelligence community.** The new document, released Thursday suggests that climate change has the potential to destabilize nuclear states like North Korea and Pakistan, and will cause rapid population displacement in areas with rising sea levels. China and Russia are poised to take advantage of such instability, the assessment said.
  - It lists 11 countries considered the most vulnerable to climate change and related political instability – Afghanistan, Colombia, Guatemala, Haiti, Honduras, India, Iraq, Myanmar, Nicaragua, North Korea, and Pakistan.
  - The assessment presumes that countries that have signed on to the Paris Climate Accord will not meet their emission-cutting goals or prevent global temperatures from rising 1.5°C above pre-Industrial levels.

Tech in the News

- **Russian hacking group Nobelium has targeted 140 tech companies since May, Microsoft said Monday.** The hackers behind the SolarWinds breach have turned their focus on software and cloud service resellers in the global IT supply chain.
  - The attacks compromised up to 14 of the companies through phishing and guessing user passwords.
  - Microsoft warned 609 customers of 22,868 hacking attempts from July 1-Oct. 19. The success rate was in the "low single digits."
  - Nobelium wants to "piggyback" on direct access that resellers have to their customers' IT systems.
  - Russia is attempting to gain long-term access to various parts of the tech supply chain and surveil government "targets of interest."

Tech in the News

- **NATO defense ministers approved the alliance's first-ever AI strategy.** The alliance is seeking to "future-proof" its 30 member states and protect against ‘dangerous’ artificial intelligence.
  - The AI strategy covers areas like imagery, data analysis, and cyber-defense.
  - A document stressed the need for cooperation among NATO members on “any matters relating to AI for transatlantic defense and security.”
  - Its allies face increasing threats from countries like China. Secretary-General Jens Stoltenberg said authoritarian regimes are "racing to develop new technologies, from artificial intelligence to autonomous systems."

Tech in the News

- **10/26 - YouTube, TikTok, and Snapchat executives appeared before a Senate subcommittee today to answer questions about how they protect young users online.**
  - Topics covered how algorithms and more can harm young people through addiction and intrude on their privacy.
  - The hearing comes as some lawmakers push for stricter regulations of tech, with a particular emphasis on how they negatively affect children and teens.

Tech in the News

- **10/26 The 14-inch and 16-inch MacBook Pro releases today but is experiencing a backlog of four to eight weeks at minimum.**
- **What's the reason for the backlog one might ask?**
  - the chip supply shortage and other supply constraints.

- This appears to be the 'new norm'…

Tech in the News

- **Blue Origin plans to deploy a private space station, called Orbital Reef, in low Earth orbit between 2025 and 2030.** The station would accommodate up to 10 people at a time and be geared toward commerce, tourism, and research.
  - Blue Origin, Jeff Bezos' space company, called it a "mixed-use business park" in space.
  - Multiple tenants would share module berths, utilities, vehicle ports, and more.
  - Customers would likely include private industry, space tourists, and national governments.
  - Blue Origin plans to build and deploy it with Sierra Space as a primary partner, along with support from Boeing, Redwire Space, Genesis Engineering, and others.
  - It could eventually take over after the ISS is retired in the latter 2020s

Tech in the News

- **The labor shortage has more restaurants and fast-food joints turning to robotics.** An EMSI report notes that robots can't fully replace human workers, who are still needed to actually build the systems. *Really?*
  - California Pizza Kitchen has been testing the Matradee food runner robot from Richtech.
  - Kitchen United is doing a five-day test of Kiwibot's robotic sidewalk delivery bot within a half-mile radius of a mall in the Bay Area.
  - Domino's is testing Softbank-backed Nuro's R-2 autonomous vehicles for deliveries in Houston.
  - Buffalo Wild Wings is testing Miso Robotics' Flippy robots to fry wings, with plans to scale in 2022 and later. Miso's robots have already been piloted by White Castle.

Tech in the News

- A Swedish company has unabashedly adopted the pop culture name synonymous with flying cars and is now taking orders for what might be a viable personal eVTOL. The production model Jetson One was unveiled last week and the 12 ultralight and drone-like single-seat aircraft being built in 2022 have already been sold at the introductory price of $92,000. The company's brazen adoption of the name of the iconic space age cartoon family made popular in the 1960s is also reflected in its mission statement. "Our mission is to make flight available to everyone," the company said in its news release. "The Jetson ONE is an electric helicopter that you can own and fly. We intend to make everyone a pilot."
- The actual operation of the aircraft blurs the line between passenger and pilot, however. The occupant steers and decides how fast to go (up to a limit of about 50 knots) but the computer looks after mundane details like keeping it in the flight envelope and away from objects thanks to a suite of LiDAR (Light Detection and Ranging) sensors. Like a drone, the aircraft will automatically hands-free hover over a point. Endurance is about 20 minutes. Because it's an ultralight, no certificate is required. The Jetson has eight motors and rotors and can fly with one motor out. If things get more serious than that, a ballistic parachute is standard equipment. It comes as a 50 percent kit that has "detailed build instructions" but the company doesn't say how long it takes to complete.
- https://www.youtube.com/watch?v=FzhREYOK0oo

Meet the Jetson(s)

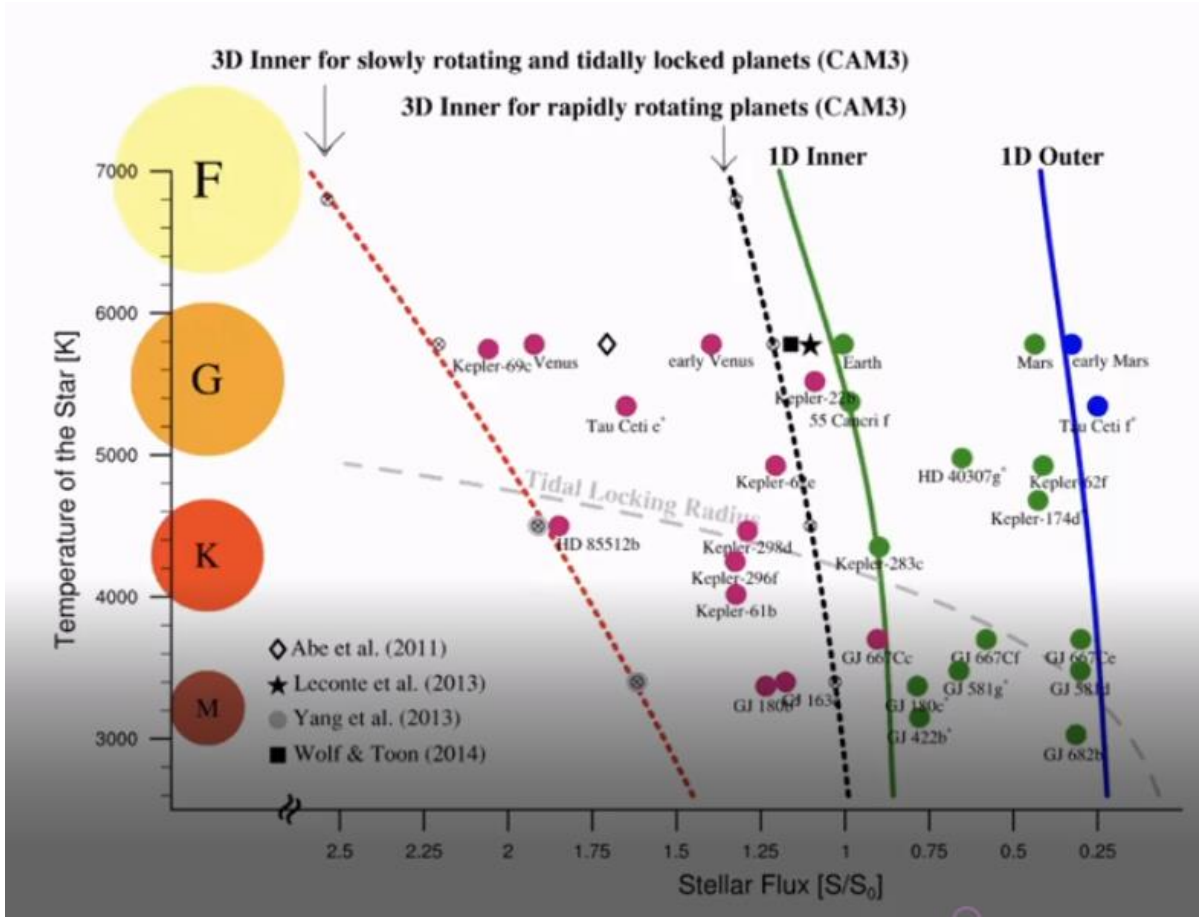
What about the ‘Potential for Life on Other Planets’?

Climate and the Potential for Life on Other Planets, Dorian S. Abbot (Univ. of Chicago)

- Quest: Determine which planets have liquid water on their surfaces?
- What is an exoplanet? A planet that exists outside our solar system, at least one for every star we see – many! Presence ‘inferred’.
- Two methods: radial velocity method gives us ‘mass’, transit method gives us the ‘radius’ – mass + density tells us what the planet is made of
- Earth 2.0 orbiting Sun 2.0 – both equivalent our earth and sun – 2040-2050 before we have telescopes capable of determining this
- Searching for the ‘Habitable Zone’ – liquid water at surface

Climate and the Potential for Life on Other Planets, Dorian S. Abbot (Univ. of Chicago)

- Role of JWST (launches in December) to help measure earth-like M-Star planets
- What is the Fermi paradox and the Future of Humanity (where are the aliens?)
- Darned physics gets in the way every time…

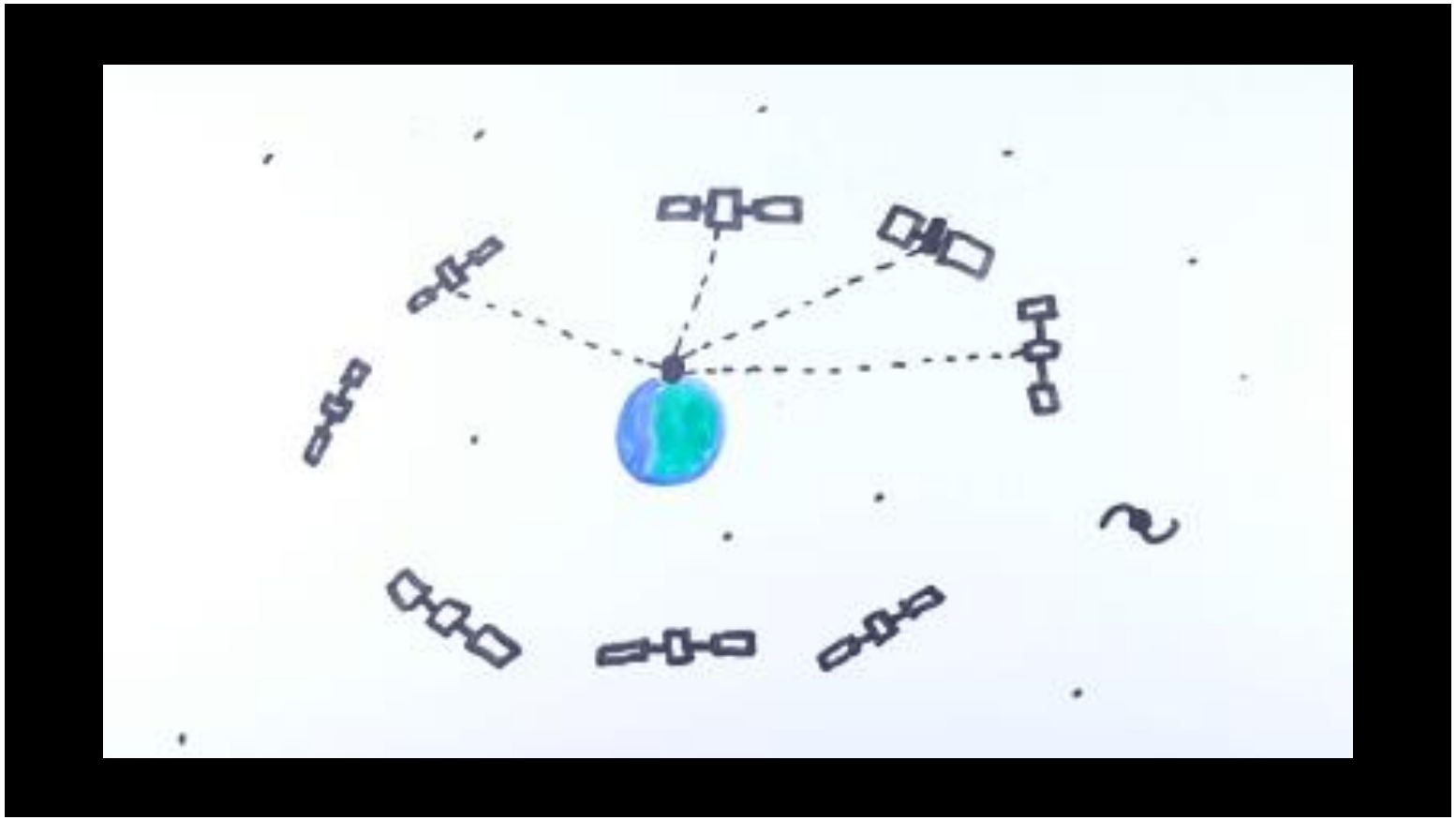


Climate and the Potential for Life on Other Planets, Dorian S. Abbot (Univ. of Chicago)

- Answer 1: “complex life is rare” – most optimistic
- Answer 2: “once beings become complex, they destroy themselves and/or the environment”
- Bottomline:
  - Astronomical observations can test predictions of the climate models that might help us improve the models’ behavior in regimes uncommon on ‘current Earth’, which could improve our climate change forecasts.

GPS

What is GPS and how does it work? (source – video 2:10min)

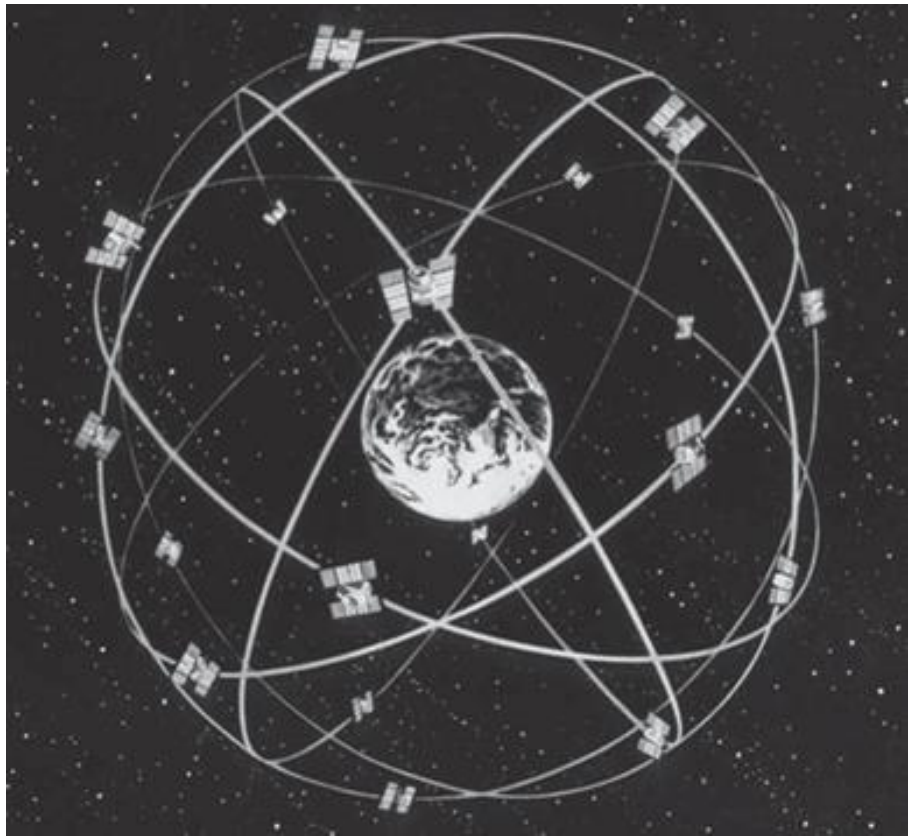


GPS

- Two Decades of Development and Evaluation of GPS… (1999)
- GPS Future and Evolution
  - The GPS is a space-based global navigation satellite system (GNSS) that provides reliable positioning, navigation, and timing services to civilian and military users on a continuous worldwide basis. GPS is a U.S.-owned utility, developed by the U.S. Air Force starting with the program in 1978.
  - The U.S. actively engages in bi-lateral cooperation: Europe, Japan, India, Russia and multi-lateral cooperation: International Committee on GNSS (ICG), Asia Pacific Economic Cooperation (APEC), International Civil Aviation Organization (ICAO), International Maritime Organization (IMO), International Telecommunication Union (ITU) International Civil Aviation Organization (ICAO), International Maritime Organization (IMO), International Telecommunication Union (ITU).

GPS

- The operational GPS satellite constellation consists of 24 NAVSTAR satellites arranged in six 55° planes around the Earth so that a minimum of four satellites would always be in view above the horizon.ce segment
- GPS satellites fly in medium Earth orbit (MEO) at an altitude of approximately 20,200 km (12,550 miles). Each satellite circles the Earth twice a day.



Space Segment Futures

LEGACY SATELLITES		MODERNIZED SATELLITES		
GPS IIA satellite	GPS IIR satellite	GPS IIR-M satellite	GPS IIF satellite	GPS III satellite
BLOCK IIA	**BLOCK IIR**	**BLOCK IIR-M**	**BLOCK IIF**	**GPS III/IIIF**
0 operational	8 operational	7 operational	12 operational	4 operational
▪ Coarse Acquisition (C/A) code on L1 frequency for civil users ▪ Precise P(Y) code on L1 & L2 frequencies for military users ▪ 7.5-year design lifespan ▪ Launched in 1990-1997 ▪ Last one decommissioned in 2019	▪ C/A code on L1 ▪ P(Y) code on L1 & L2 ▪ On-board clock monitoring ▪ 7.5-year design lifespan ▪ Launched in 1997-2004	▪ All legacy signals ▪ 2nd civil signal on L2 (L2C) *LEARN MORE* ➡ ▪ New military M code signals for enhanced jam resistance ▪ Flexible power levels for military signals ▪ 7.5-year design lifespan ▪ Launched in 2005-2009	▪ All Block IIR-M signals ▪ 3rd civil signal on L5 frequency (L5) *LEARN MORE* ➡ ▪ Advanced atomic clocks ▪ Improved accuracy, signal strength, and quality ▪ 12-year design lifespan ▪ Launched in 2010-2016	▪ All Block IIF signals ▪ 4th civil signal on L1 (L1C) *LEARN MORE* ➡ ▪ Enhanced signal reliability, accuracy, and integrity ▪ No Selective Availability *LEARN MORE* ➡ ▪ 15-year design lifespan ▪ IIIF: laser reflectors; search & rescue payload ▪ First launch in 2018

Who is Brad Parkinson?

- **The Origins of GPS, and the Pioneers Who Launched the System** May 1, 2010
- **GPS pioneers honored with Queen's award at Buckingham Palace** **Dec 3 2019**
  - Bradford Parkinson said: "Today marks a landmark moment in all of our lives—there is no prize for engineering greater than this, it is an honor. This recognition reflects the responsibility incumbent upon those developing technology today to strive to do so for the good of humanity. Day-after-day, we are astounded at the new ways in which people across the world use GPS. It is a 'System for Humanity' in each and every sense."
- My father in-law's classmate and companymate at the Naval Academy
  - Brad lived across the hall from me at USNA from 1953 to graduation in 1957. While in SLO for David's graduation Marilyn and I visited with Brad at his palatial home outside SLO. One of his sons is sheriff of the territory.

What’s on your mind for next week?

Our brains on technology

Our brains on technology

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7366948/#:~:text=Potential%20harmful%20effects%20of%20extensive,brain%20development%2C%20and%20disrupted%20sleep.
- https://wexnermedical.osu.edu/blog/how-internet-affects-your-brain
- https://www.scientificamerican.com/article/are-digital-devices-altering-our-brains/

Our brains on technology

- Some say our gadgets and computers can help improve intelligence. Others say they make us stupid and violent. Which is it?
  - **Research shows that by constantly distracting us**, the Internet affects cognitive performance but does not radically alter our brains.
  - **The findings also suggest that although video games** and brain training influence aggression and cognitive performance, respectively, the extent of that influence is much less than many would think.
  - **The risks of digital devices might be minimized** by educating people in ways to enhance concentration, self-control and critical-thinking skills.

Our brains on technology

- Discussion:
  - Are we becoming ‘stupid’?
  - Have we become (better) multitaskers?
  - What about our ‘attention span’?
  - Do video games increase aggression?
  - Is gaming better for our brains?

  Fact: young people must be taught to develop their concentration, self-control and critical-thinking skills!

Our brains on technology

- More on this topic can be found in this series of book reviews I taught in 2017:
  - Born Digital by Urs Gasser & John Palfrey
  - Alone Together by Sherry Turkle
  - Reclaiming Conversation by Sherry Turkle
  - The Shallows by Nicholas Carr
  - The Glass Cage by Nicholas Carr
  - What Technology Wants by Kevin Kelly
  - The Inevitable by Kevin Kelly
  - Irresistible by Adam Alter

Extra Credit

Some slides from my 2017 class

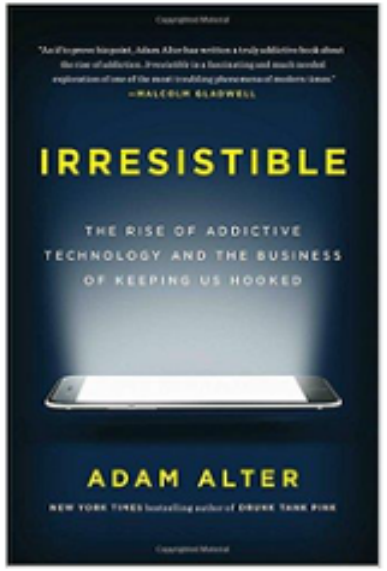
Tech Talks: Tech for Seniors

Addiction by Adam Alter

Center for Learning in Retirement - Fall 2017

Glen Maxson

seniortechadvisor.com



Irresistible:
The Rise of Addictive Technology and the Business of Keeping Us Hooked

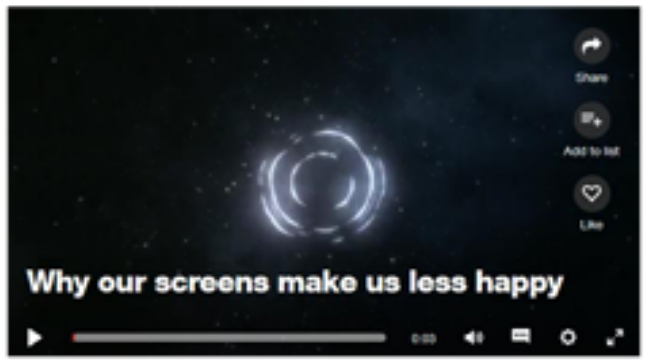
Review of a book by Adam Alter

Introduction

Adam Alter is an Associate Professor of Marketing at New York University's Stern School of Business, with an affiliated appointment in the New York University Psychology Department.

Adam is the *New York Times* bestselling author of two books: *Irresistible* (March, 2017), which considers why so many people today are addicted to so many behaviors, from incessant smart phone and internet use to video game playing and online shopping.

2017 TED Talk



What are our screens and devices doing to us? Psychologist Adam Alter studies how much time screens steal from us and how they're getting away with it. He shares why all those hours you spend staring at your smartphone, tablet or computer might be making you miserable -- and what you can do about it.

NPR Interview (Mar. 13, 2017)

'Irresistible' By Design: It's No Accident You Can't Stop Looking At The Screen (30:20)

Adam's definition of "addiction"?

It is something you enjoy doing in the short term, that undermines your well-being in the long term — but that you do compulsively anyway.

Play Intro

The Addicted Brain (Sept. 17 National Geography)

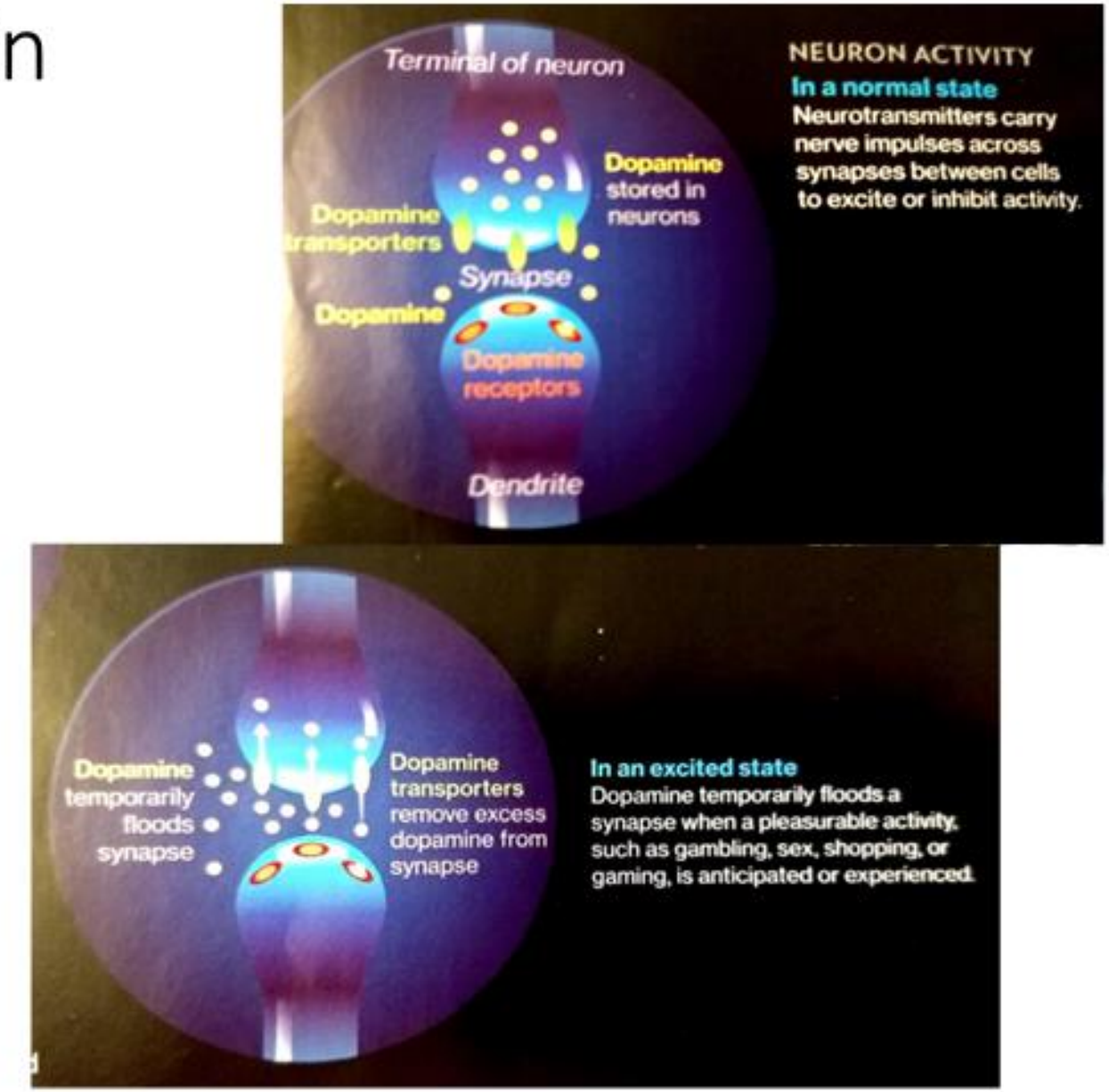
p. 41 – In the Grip of Gaming

In Seoul, e-stadiums and game parlors charge about a dollar an hour, and some venues are open around the clock. Soon after South Korea made super-high-speed Internet cheap and widely available, it became clear that some people were ruining their lives through obsessive game playing. The government now pays for treatment. The American Psychiatric Association hasn't recognized compulsive gaming as an addiction, but it lists Internet game disorder as 'requiring more study'.

Hijacking the Brain (continued)

A NATURAL HIGH

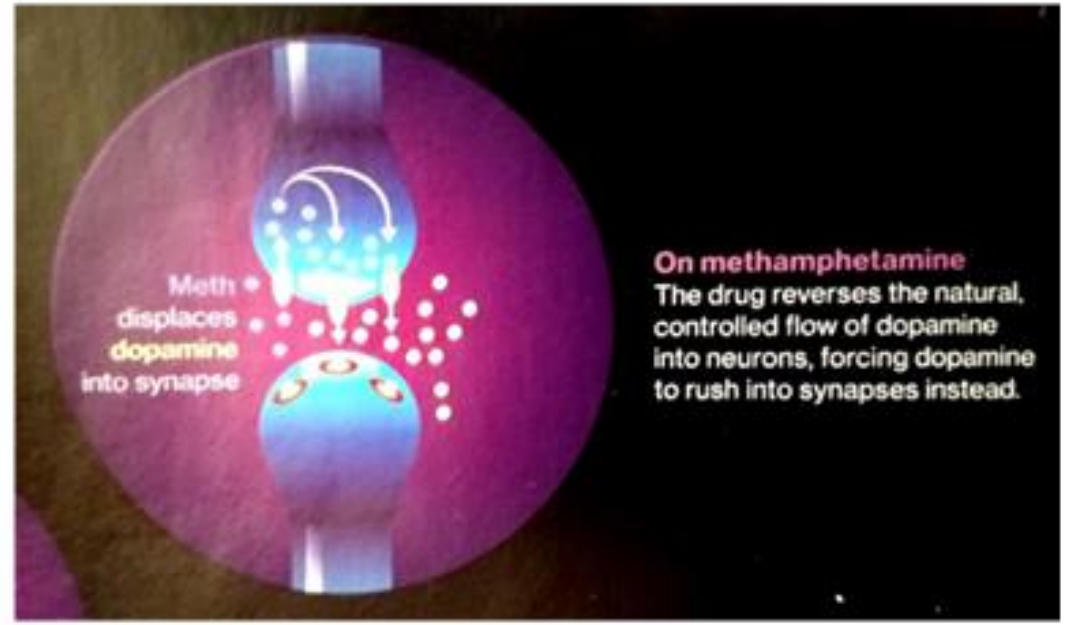
Our brains evolved a dopamine-based reward system to encourage behaviors that help us survive, such as eating, procreating, and interacting socially.



Hijacking the Brain (continued)

A CHEMICAL RUSH

Different drugs interact with the reward system in unique ways to keep synapses artificially flooded with dopamine. That dopamine rush can rewire your brain to want more drugs, leading to addiction.



Common ‘behavioral addictions’:

- Exercise
- Video games
- Gambling
- Work
- E-mail (p 109)
- Social media
- Binge watching
- Hoarding
- …

What do these have in common?

- Behavioral addiction is rooted in environment + circumstance
- Might fulfill a psychological need, obsession, compulsion
- May be detrimental to work, health, hygiene, social interaction…
- Often becomes something we ‘want’ versus something we ‘like’

What makes tech so ‘irresistible’?

By design,

- Goal setting, perfectionism – time and numbers (e.g. FitBit)
- Classic reinforcement – provide small doses of positive feedback (work)
- Uncertainty - Facebook, Instagram… (social media)
- ‘Loss as motivation’ – the gambler’s paradox (slots)
- Mobile access – iPad and iPhone enabled (mobile devices)
- Ludic loops – complete one challenging element, then the next… (video games)
- ‘Flow’ - proximal (skill) development – skill vs. challenge (video games)
- Zeigarnik effect – incomplete experiences (e.g. cliff-hangers) (TV shows)
- MUDs & MMOs - immersion, achievement, social (connection) (video games)
- Absence of Stopping rules (all)

Bottomline: Every technique in the book is used to get and keep us hooked!

GDPR vs privacy US laws

- https://www.ispartnersllc.com/blog/us-nationwide-data-privacy-law-gdpr/
- https://edaa.eu/a-legislative-comparison-us-vs-eu-on-data-privacy/
- https://www.forbes.com/sites/forbestechcouncil/2020/07/29/the-privacy-mindset-of-the-eu-vs-the-us/?sh=57bff0597d01

The Privacy Mindset Of The EU Vs. The US

- The norm in the U.S. that online behavior gets tracked and used for a slew of subsequent manipulation. U.S. legislation isn't even close to providing adequate protection of consumer privacy interests.
- Americans choose to believe that their online behavior being tracked happens in their best interests or is a price to pay for getting free or discounted products.
- GDPR was adopted on April 14, 2016, and before it became enforceable on May 25, 2018, the U.S. Congress enacted the Clarifying Lawful Overseas Use of Data (CLOUD) Act on March 23, 2018. Rather than being compatible with the GDPR, the U.S. CLOUD Act overrules it.

The Privacy Mindset Of The EU Vs. The US

- Federal law requires U.S.-based software companies and IT service providers to ensure that authorities can have access to all stored data, including data stored on foreign servers. Furthermore, it guards U.S. service providers from having to tell customers whether authorities have requested their data.
- One lobbying group that represents internet companies is striving for a federal privacy law that would preempt more state regulations like the California Consumer Privacy Act (CCPA), which actually makes real progress. Its ideal federal privacy law would undermine the CCPA to essentially let companies return to business as normal and also make it impossible for other states to set the bar even higher.

What is GDPR, the EU's new data protection law?

- In May 2018, the EU implemented the General Data Protection Regulation (GDPR) which became the new legal backbone on data protection and privacy in the EU.
  - It imposes obligations onto organizations anywhere, so long as they target or collect data related to people in the EU.
    - **The GDPR applies to you even if you're not in the EU**
    - **Fines for violating the GDPR are very high**

What is GDPR, the EU's new data protection law?

- If you process data, you have to do so according to seven protection and accountability principles outlined in Article 5.1-2:
  1. **Lawfulness, fairness and transparency** — Processing must be lawful, fair, and transparent to the data subject.
  2. **Purpose limitation** — You must process data for the legitimate purposes specified explicitly to the data subject when you collected it.
  3. **Data minimization** — You should collect and process only as much data as absolutely necessary for the purposes specified.
  4. **Accuracy** — You must keep personal data accurate and up to date.
  5. **Storage limitation** — You may only store personally identifying data for as long as necessary for the specified purpose.
  6. **Integrity and confidentiality** — Processing must be done in such a way as to ensure appropriate security, integrity, and confidentiality (e.g. by using encryption).
  7. **Accountability** — The data controller is responsible for being able to demonstrate GDPR compliance with all of these principles.

What is GDPR, the EU's new data protection law?

- GDPR recognizes a litany of new **privacy rights for data subjects**, which aim to give individuals more control over the data they loan to organizations. Data subjects' privacy rights:
  1. The right to be informed
  2. The right of access
  3. The right to rectification
  4. The right to erasure
  5. The right to restrict processing
  6. The right to data portability
  7. The right to object
  8. Rights in relation to automated decision making and profiling.