

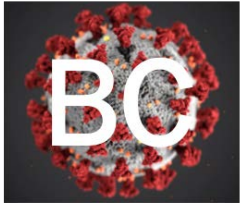


Peace Engineering – Ingeniería para la Paz

Ramiro Jordan – September 1, 2020

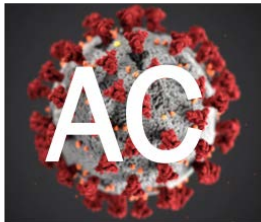


AGENDA



- New Mexico
- Why Peace Engineering?
- Circular Economy and Challenges

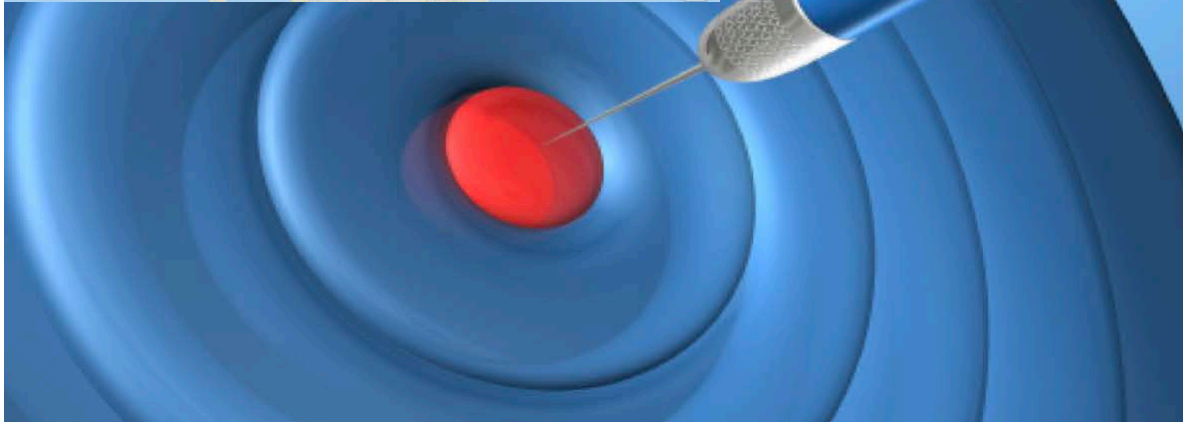
Nov. 2018 - Today



- Challenges
- Symmetry of information
- Micro to macro models
- Unintended consequences and networks
- Flatten the climate change curve
- We need you!



Why Peace Engineering?



 **First Global Peace Engineering Conference**

 **WEF-GEDC 2018**
New Mexico, USA

November 12-16, 2019
Albuquerque, NM, USA



SAVE THE DATE
PEACE ENGINEERING
WEF-GEDC 2018
New Mexico, USA
November 12-16, 2019
www.wef-gedc.org | Peace@wef-gedc.org



ABOUT NEW MEXICO



Los Alamos

Richard Feynman

Altair 8800

Ed Roberts

Microsoft

Gates & Allen

MATLAB

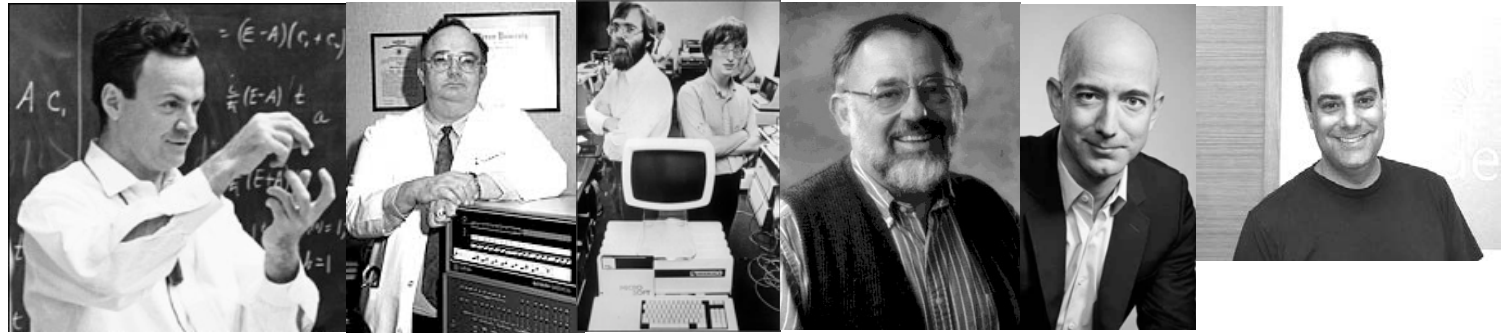
Cleve Moler

Amazon

Jeff Bezos

Stackoverflow

Joel Spolsky



Birth of
Big Science

- ...the cradle of modern computation
- ... the birthplace of the microcomputer
- ... the birthplace of modern software
- ... the birthplace of mathematical software
- ... the first steps in e-commerce

... birthplace of **StackOverflow, Khoros, ISTE, GINET** and other tech companies



About New Mexico



A Brief
History of
Humankind


Sapiens

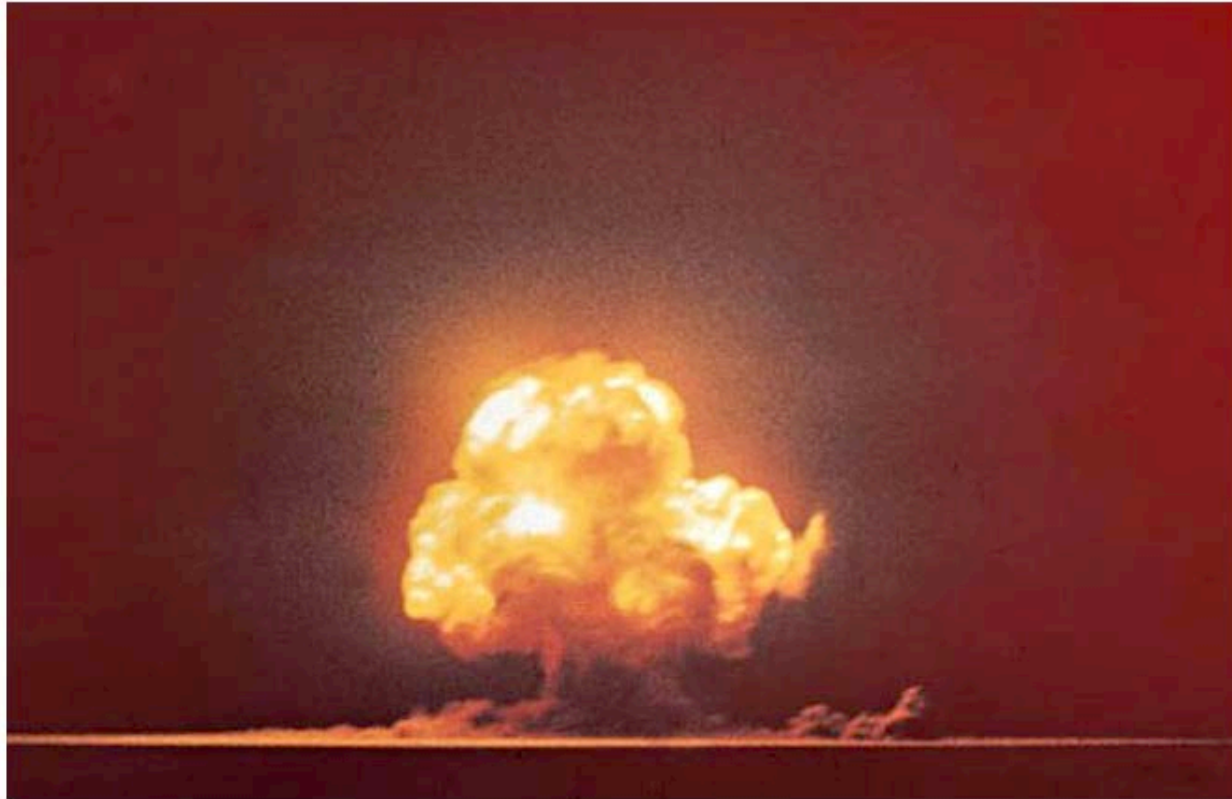
Yuval Noah
Harari

2014



But the single most remarkable and defining moment of the past 500 years came at 05:29:45 on 16 July 1945. At that precise second, American scientists detonated the first atomic bomb at Alamogordo, New Mexico. From that point onward, humankind had the capability not only to change the course of history, but to end it.

About New Mexico



This is the only color photo that shows the detonation of the first atomic bomb July 16, 1945, at Trinity Site. (Courtesy LANL)

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Why Peace Engineering?



First Global Peace Engineering Conference



WEEF - GEDC
2018
New Mexico, USA

November 12-16, 2019
Albuquerque, NM, USA

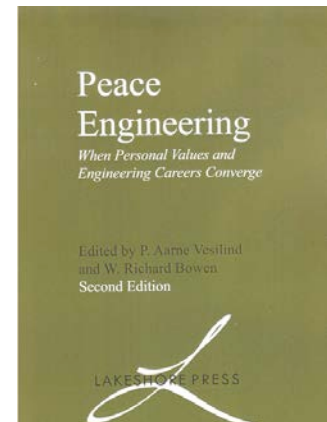




Why Peace Engineering?

First symposium in Nov. 2003.

Compilation of papers Edited by P. Aarne Veselind and W. Richard Bowen.



Peace Engineering by Professor W. Richard Bowen, FREng



Peace is characterised by relationships between individuals, and social groupings of all sizes, based on honesty, fairness, openness and goodwill. Peace provides the conditions for real human flourishing. It is much more than the absence of conflict, much more than the avoidance of war. Crucially, peace is an *activity* that requires continuous commitment and imaginative input.

Many more contributions!



Why Peace Engineering? A New Engineering Mindset

Peace Engineering 2018

Peace as a profit center

Peace as a profitable business

Trans-disciplinary

Sustainability

Accountability/Transparency

Global Citizen/Engineer

Symmetry information/knowledge

Peacekeeping

Peacemaking

Peacebuilding

System level thinking

Natural Ecosystems™

Engineering Peace



Diplomacy
Peace Technology
Negative vs. Positive Peace
Investing in Peace for ROI
Peace Metrics
Data Analytics



Definimos **Ingeniería para la Paz** (Peace Engineering) como la aplicación intencional del pensamiento sistémico de los principios de la ciencia, tecnología y la ingeniería para promover y apoyar directamente las condiciones para la paz. **Peace Engineering trabaja directamente hacia un mundo donde la prosperidad, la sostenibilidad, la equidad social, el espíritu empresarial, la transparencia, la participación de la comunidad, la ética y una cultura de calidad prosperen.** Peace Engineering es una nueva mentalidad disruptiva en todas las disciplinas existentes y las nuevas a crear para enfrentar los desafíos globales.

En el núcleo de Peace Engineering se encuentra el futuro sostenible de nuestro planeta, que está llamando a los líderes a actuar en concierto desde con una mentalidad sistémica. Debemos cultivar juntos el desarrollo de líderes para continuar impulsando el cambio.

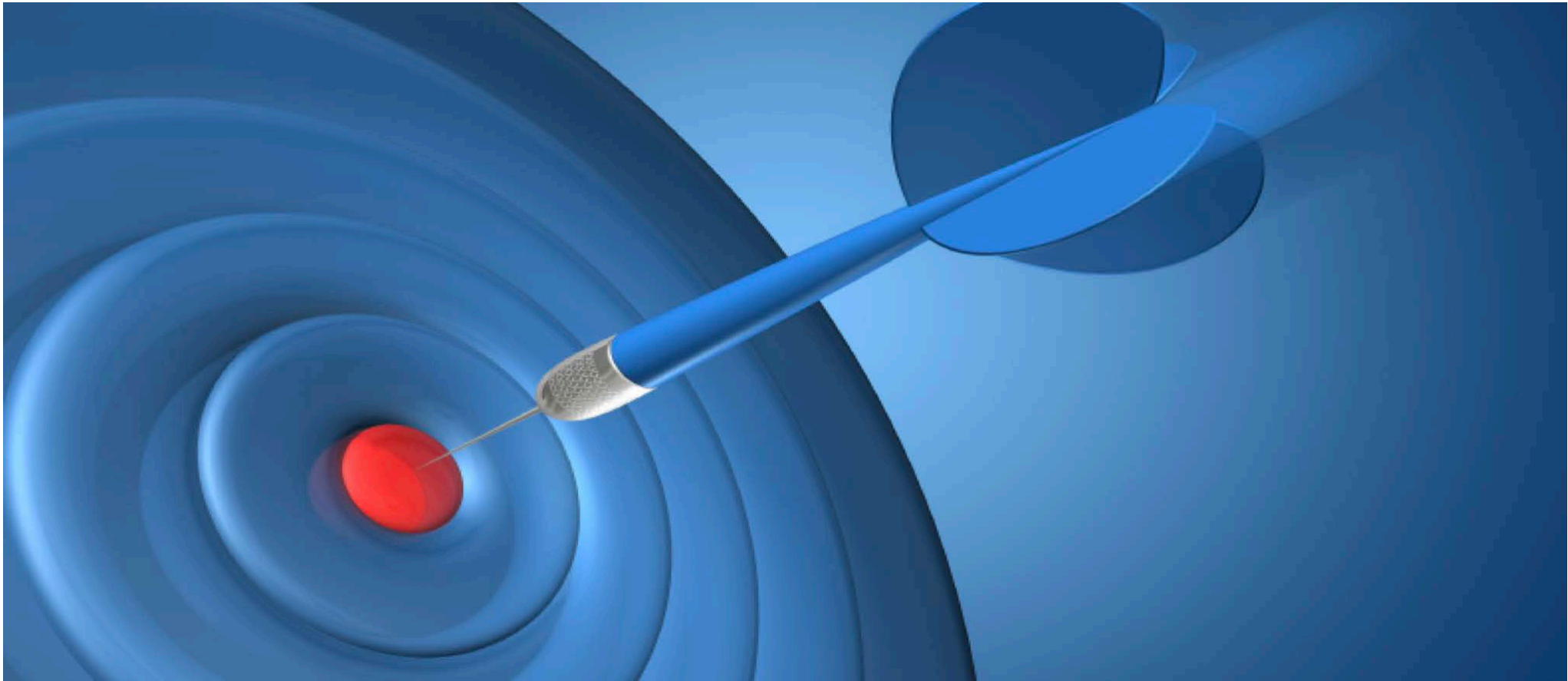


Why are we doing this?

- Need a new mindset to address global challenges:
 - UN 17 SDGs, NAE Challenges – one planet, one environment, one chance.
 - New mindset across all disciplines and new ones: Humanitarian engineering, societal engineering, ...
 - Industry 4.0, 5.0
- Use the language of Science and Technology language to integrate and collaborate globally, create/enhance trust.
- Need to educate new leaders/champions as global citizens.
- Asymmetry in knowledge and information!!!!!! ☀️



Circular Economy





Challenges



Are we aware?
Are we educating?
Are we learning?

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE

1

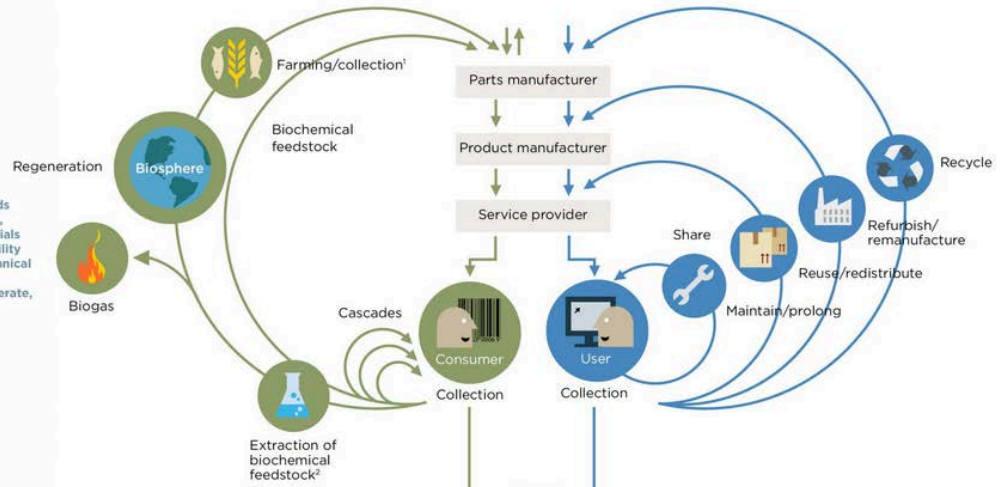
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
ReSOLVE levers: regenerate, virtualise, exchange



PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
ReSOLVE levers: regenerate, share, optimise, loop



PRINCIPLE

3

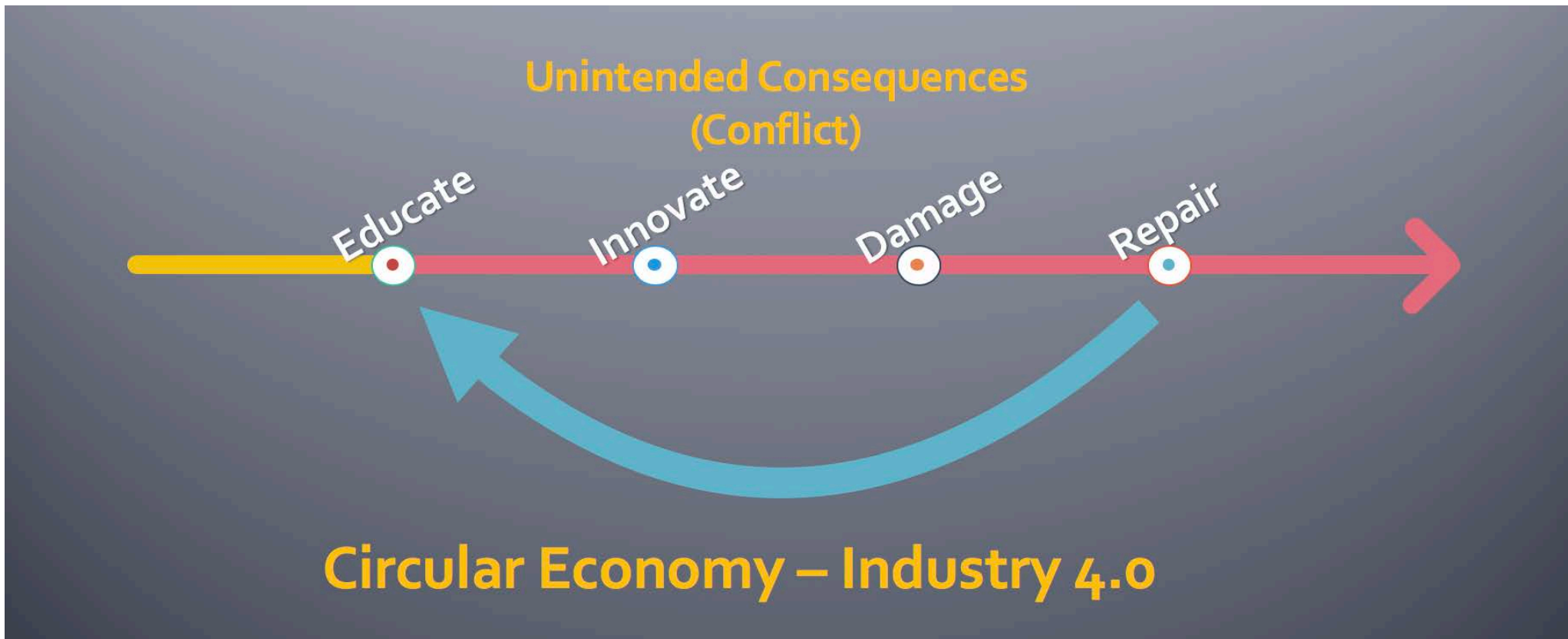
Foster system effectiveness by revealing and designing out negative externalities
All ReSOLVE levers

Minimise systematic leakage and negative externalities

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input
Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).



Peace Engineering New Mindset

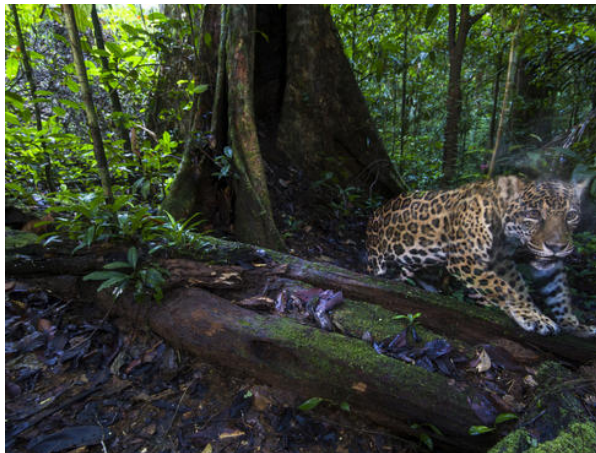




Industry 4.0 – Circular Economy?



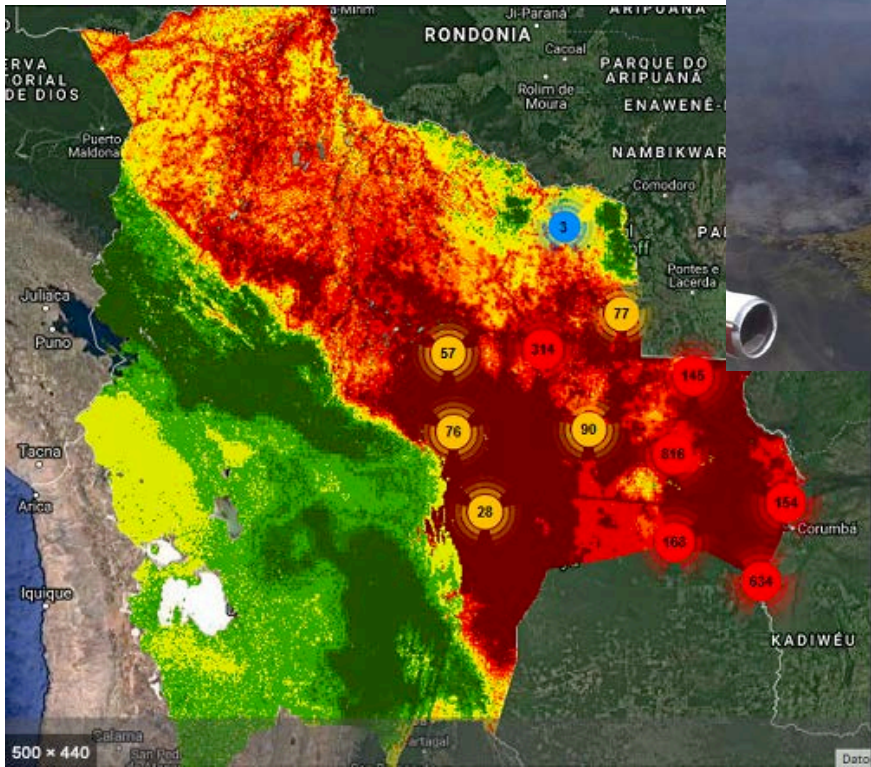
Animals,
plants,
indigenous
people,
other?



Industry 4.0 – Circular Economy?



Animals, plants,
indigenous people?



Chiquitania - Bolivia



Borders?

Amazonas - Brazil

Climate Change – Circular Economy



<https://www.youtube.com/watch?v=JT73puKg8cc>

Climate Change – Circular Economy



Students in front of the Norwegian Parliament building to demand government action to limit climate change, as part of the global movement inspired by Swedish student Greta Thunberg. - Copyright REUTERS/Nerijus Adomaitis

Climate Change – Circular Economy



News Alert Sep 16, 8:01 AM

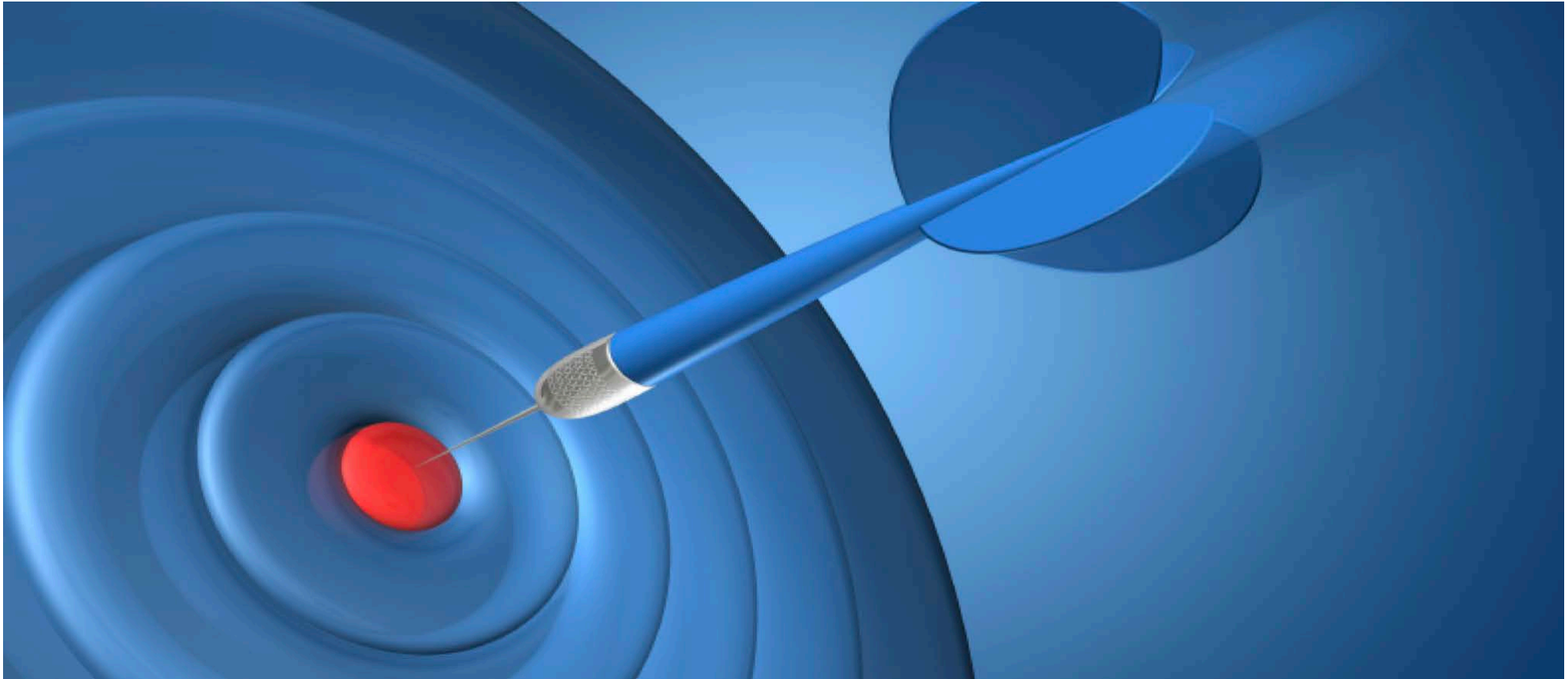
Most American teens are frightened by climate change and about 1 in 4 are taking action, Post-Kaiser poll finds



Gen Z!!!!!!



Global Challenges





Challenges



AI – Privacy – Biases - Cambridge Analytica



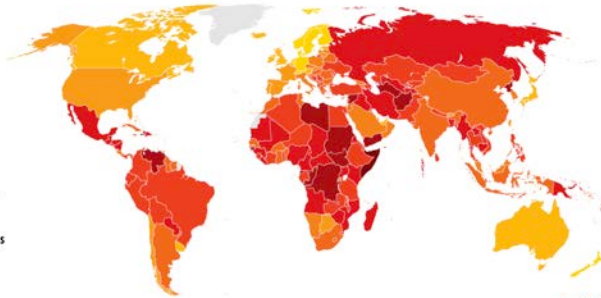
Haves vs. have-nots



TRANSPARENCY INTERNATIONAL
the global coalition against corruption

CORRUPTION PERCEPTIONS INDEX 2019

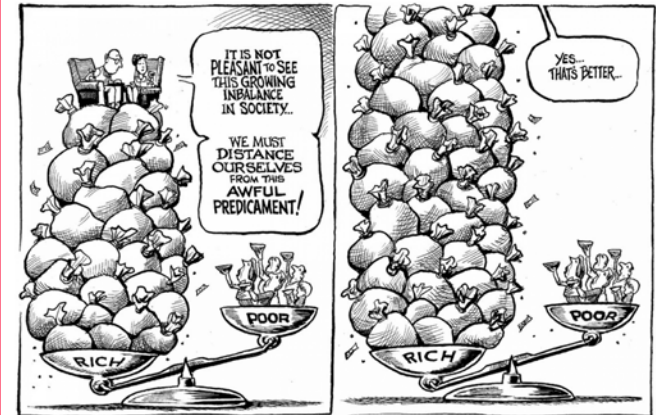
The perceived levels of public sector corruption in 180 countries/territories around the world.



#cpi2019
www.transparency.org/cpi

This work from Transparency International (TI) is licensed under CC BY-ND 4.0

Transparency - Justice





Challenges



population < 1%
control > 50% of
GDP

CHILE

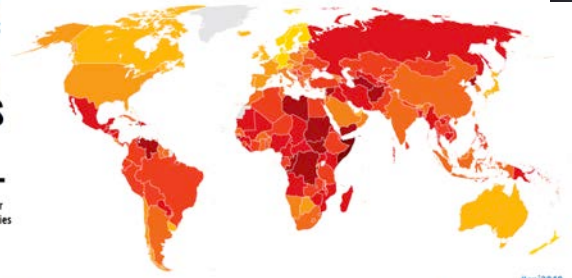


Challenges



CORRUPTION PERCEPTIONS INDEX 2019

The perceived levels of public sector corruption in 180 countries/territories around the world.



#cpi2019
www.transparency.org/cpi

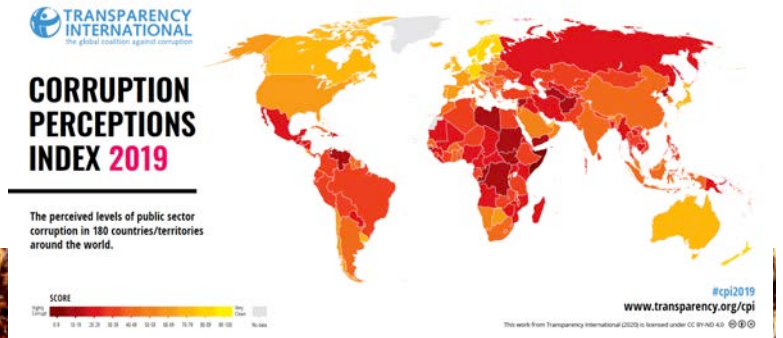


Elections fraud





Challenges



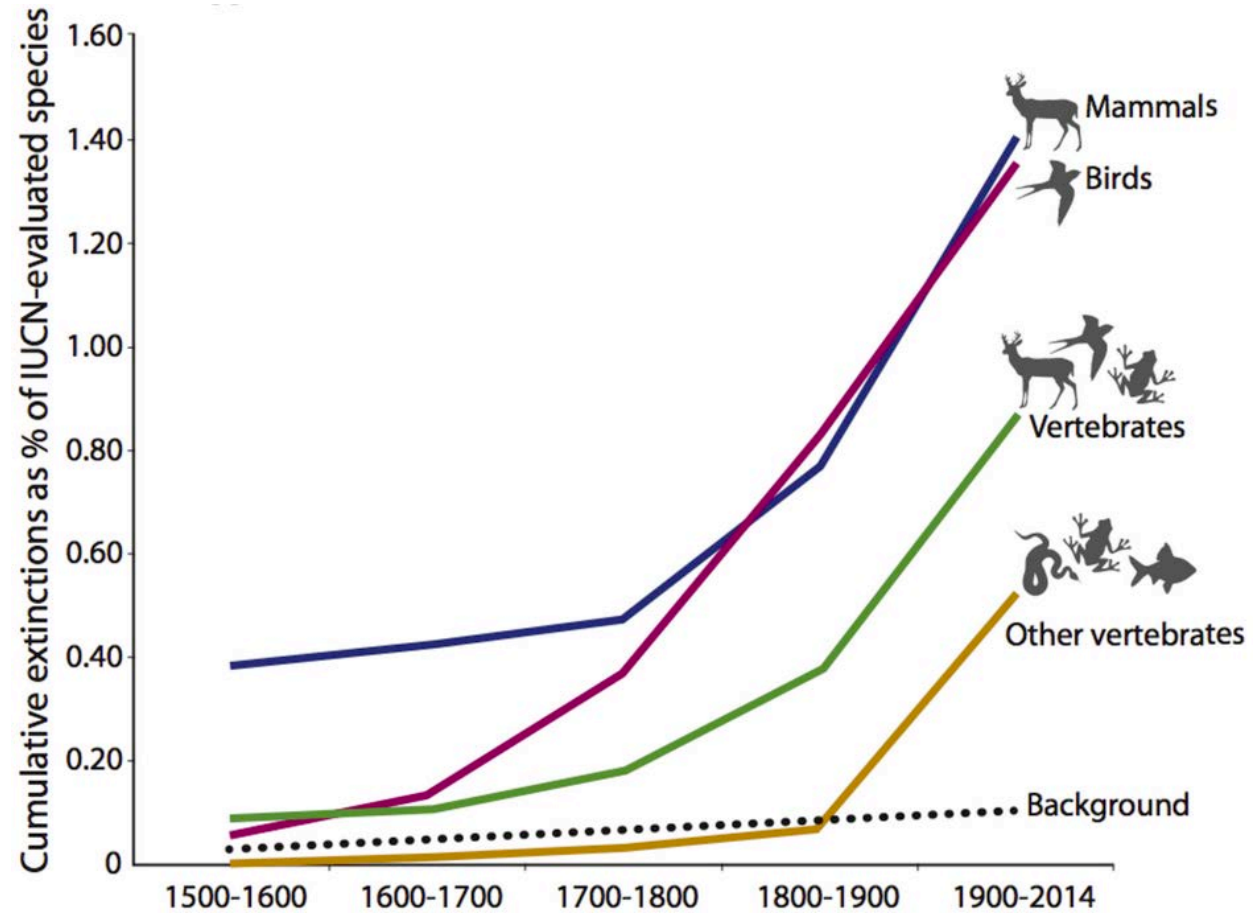
Lebanese protesters block a main road near Beirut amidst ongoing protests, on October 18, 2019. Credit: AFP

Lebanon

Challenges



Rate of Extinction of Species





Challenges

Borders?

Social Responsibility

Aporophobia



Racism

Accountability

Globish



Challenges



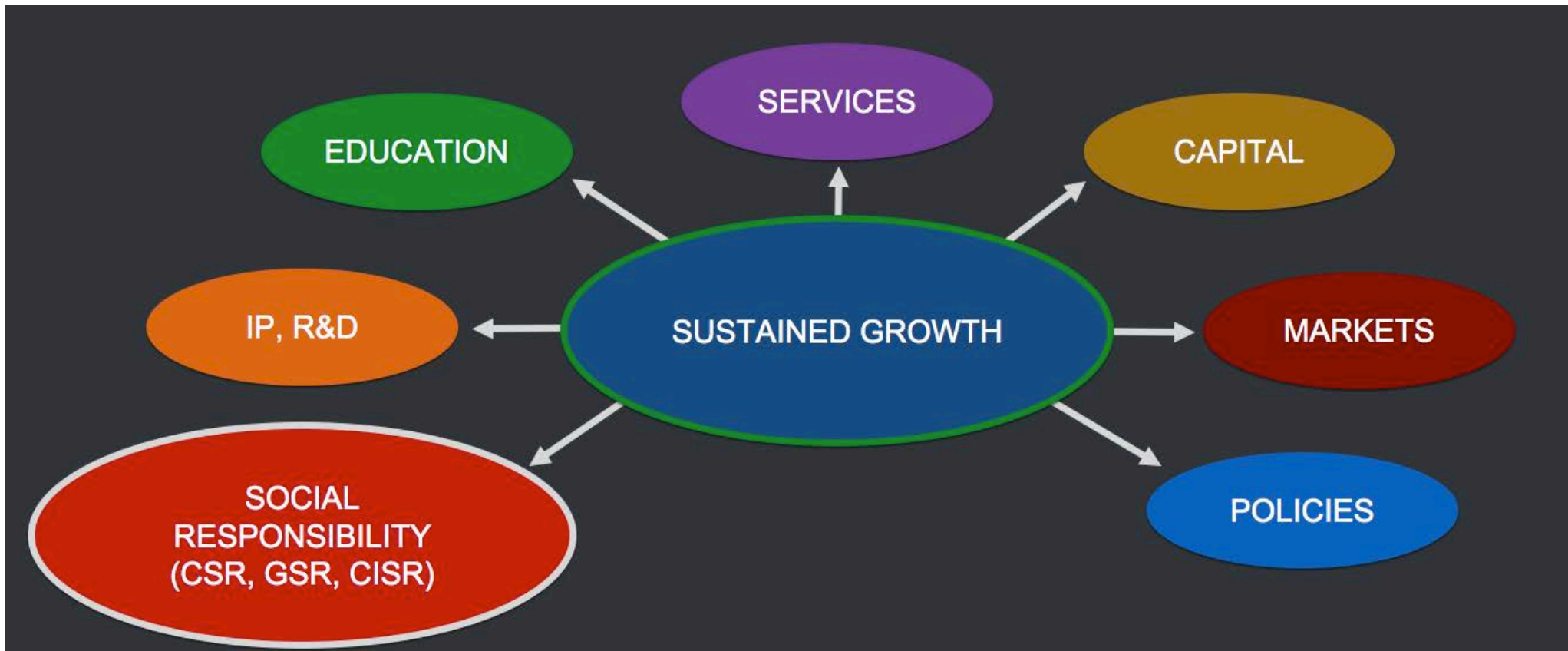
SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD

Make solar energy economical	Provide energy from fusion	Develop carbon sequestration methods
Manage the nitrogen cycle	Provide access to clean water	Restore and improve urban infrastructure
Advance health informatics	Engineer better medicines	Reverse-engineer the brain
Prevent nuclear terror	Secure cyberspace	Enhance virtual reality
Advance personalized learning	Engineer the tools of scientific discovery	GRAND CHALLENGES FOR ENGINEERING

1 NO POVERTY 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 	11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION 	14 LIFE BELOW WATER 	15 LIFE ON LAND 	16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	17 PARTNERSHIPS FOR THE GOALS 	

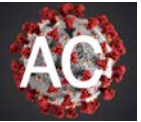


Challenges



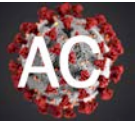


Challenges





Challenges

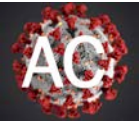


What is around the corner?

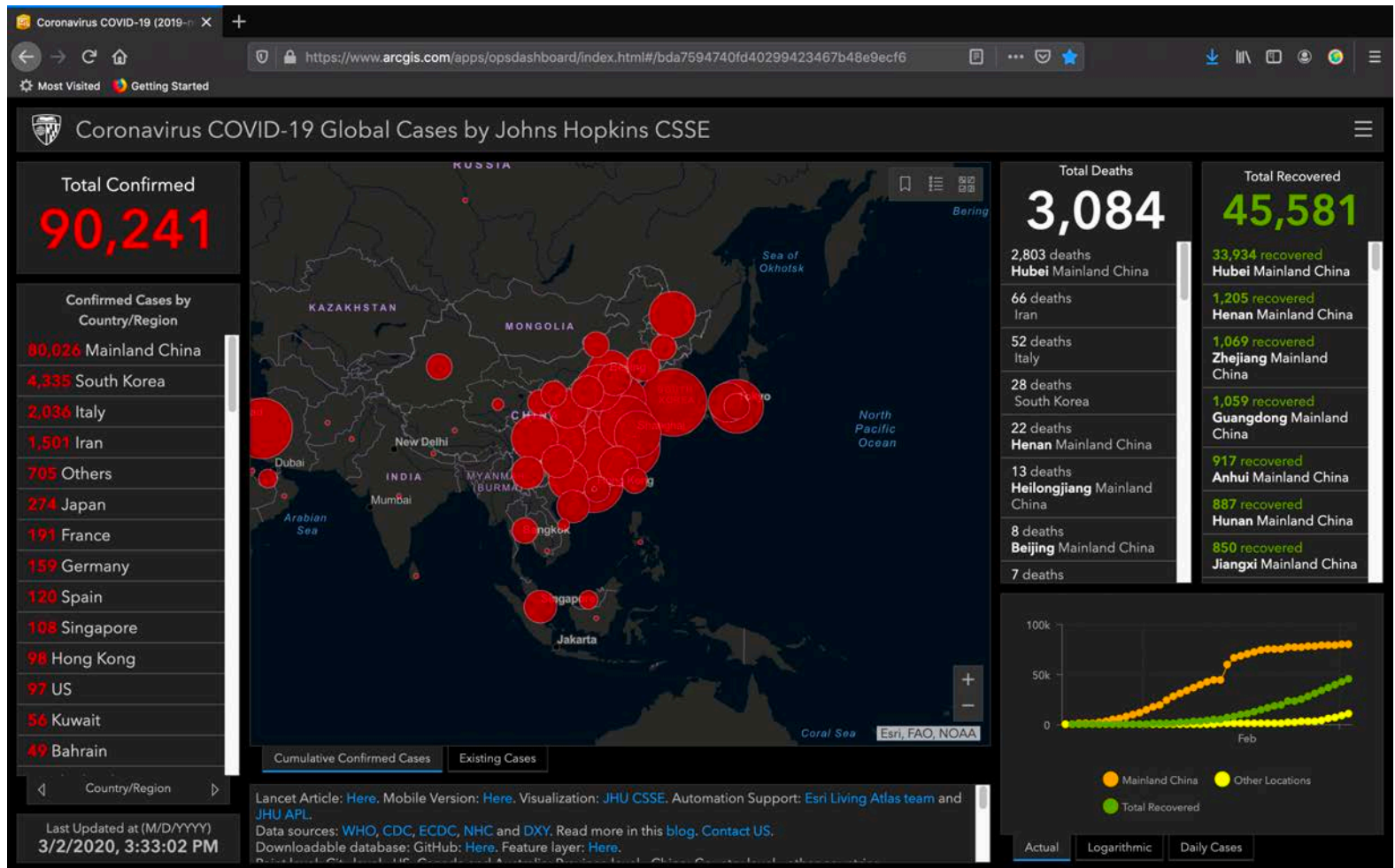




Challenges

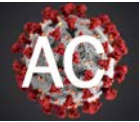


COVID-19
March 2, 2020

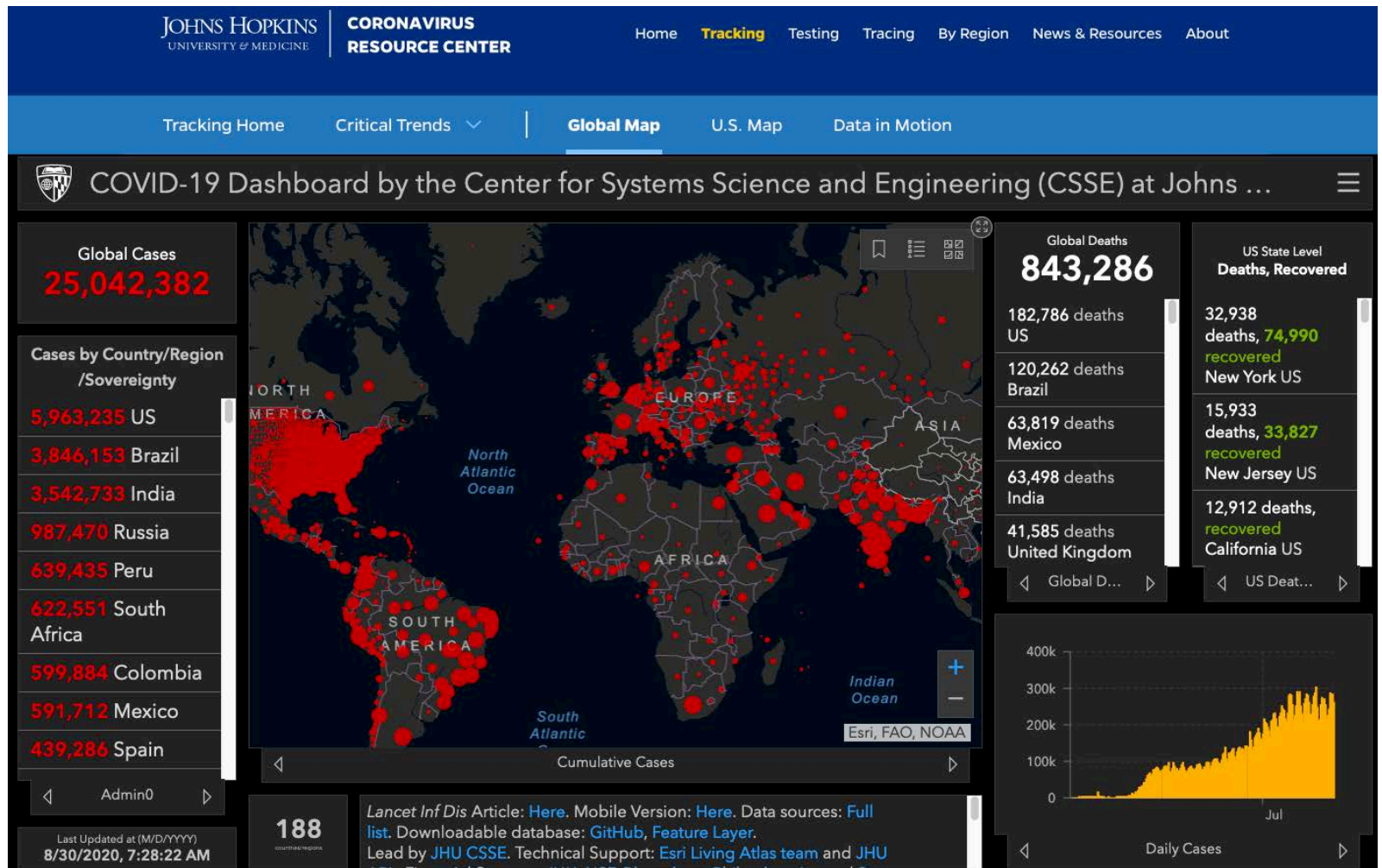




Challenges



COVID-19
Aug 30, 2020





Challenges



We are flying as we are building

Symmetry of information

Education,
politics and
every other
area,
discipline...

Open Science

Transparency



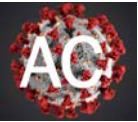
Change: we need champions not leaders, take ownership!



Challenges

The Washington Post

Democracy Dies in Darkness



The Battle of Lafayette Square and the undermining of American democracy



President Trump walks through Lafayette Square to visit St. John's Episcopal Church on Monday. Chairman of the Joint Chiefs of Staff Gen. Mark A. Milley, in fatigues, follows with other officials. (Tom Brenner/Reuters)

IN THE HOUSE OF REPRESENTATIVES
 December 18, 2019
 Mr. NADLER submitted the following resolution, which was referred to the Committee on the Judiciary

RESOLUTION

Impeaching Donald John Trump, President of the United States, for high crimes and misdemeanors.

1 *Resolved*, That Donald J. Trump, President of the
 2 United States, is impeached for high crimes and mis-
 3 demeanors and that the following articles of impeachment



(Amanda Voisard for The Washington Post)

Articles of Impeachment Against Donald John Trump

{House Resolution 755, One Hundred Sixteenth Congress, First Session}

CONGRESS OF THE UNITED STATES OF AMERICA,
 IN THE HOUSE OF REPRESENTATIVES,
 December 18, 2019.

Opinion

Salman Rushdie: I've seen dictators rise and fall. Beware, America.



Challenges

June 12, 2020



Battle over Confederate statues resumes in America's enduring Civil War

The grass-roots response to George Floyd's death in police custody took less than two weeks to morph from protests and demands for police reform into a concerted attack on symbols of the Confederacy.

Biden is invisible. Trump is running against himself.

By Hugh Hewitt



Trump might go down in history as the last president of the Confederacy

By Eugene Robinson



Gen. Milley's apology shows respect for the principles Trump tramples on

Editorial Board





Challenges

August 2020



Fact Checker Analysis

Trump's speech was a tidal wave of false claims

By Glenn Kessler, Salvador Rizzo and Meg Kelly

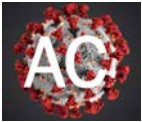
The Take Analysis

Trump, Biden look to brutal fall campaign

By Dan Balz



Challenges

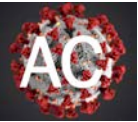


Symmetry of information

Need to *measure/analyze/design/implement* the SDGs with science and engineering from the micro to macro levels

Peace Engineering is a new disruptive mindset needed to address global challenges (have no borders)



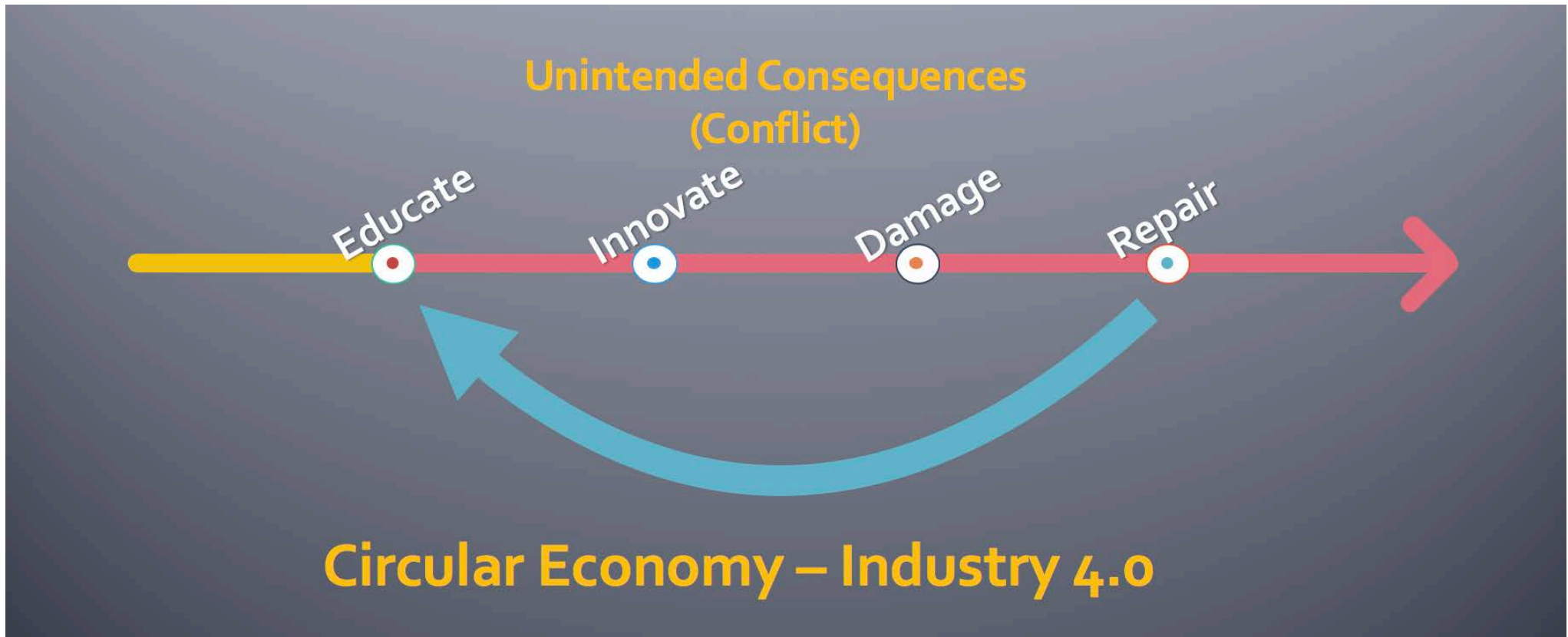


WHAT DOES **PEACE ENGINEERING** MEAN TO YOU?

WEEF - GEDC
2018
New Mexico, USA

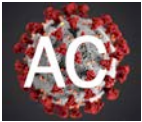


Peace Engineering New Mindset





A simple exercise



A BUYER'S GUIDE TO THE SUSTAINABILITY OF AT-HOME TISSUE PRODUCTS

A BUYER'S GUIDE TO THE SUSTAINABILITY OF AT-HOME TISSUE PRODUCTS

TOILET PAPER							
BRAND	COMPANY	TOTAL % RECYCLED	% POST-CONSUMER RECYCLED	% VIRGIN FIBER	BLEACHING PROCESS	VIRGIN FIBER IS FSC CERTIFIED? ^a	SCORE/GRADE
Green Forest	Green Forest	100	>90	0	PCF ^b	N/A	285/A
365 Everyday Value, 100% Recycled	Whole Foods Market	100	80	0	PCF	N/A	270/A
Earth First	Royal Paper	100	80	0	PCF	N/A	270/A
Natural Value	Natural Value	100	80	0	PCF	N/A	270/A
Seventh Generation	Seventh Generation	100	>80	0	PCF	N/A	270/A
Trader Joe's Bath Tissue	Trader Joe's	100	80	0	PCF	N/A	270/A
Marcals 1000 ^c	Marcals	100	60	0	PCF	N/A	240/B
Marcals Small Steps	Marcals	100	60	0	PCF	N/A	240/B
365 Everyday Value, Sustainably Soft	Whole Foods Market	0	0	100	TCF ^d	Mix	100/D
Cottonelle Ultra	Kimberly-Clark	0	0	100	ECF ^e	Yes	100/D
Scott 1000	Kimberly-Clark	0	0	100	ECF	Yes	100/D
Scott ComfortPlus	Kimberly-Clark	0	0	100	ECF	Yes	100/D
Trader Joe's Super Soft Bath Tissue	Trader Joe's	0	0	100	TCF	Mix	100/D
Charmin Ultra ^f	Procter & Gamble	0	0	100	ECF	Mix	50/F
Kirkland	Costco	0	0	100	ECF	Mix	50/F
Angel Soft	Georgia-Pacific	0	0	100	ECF	No	0/F
Quilted Northern	Georgia-Pacific	0	0	100	ECF	No	0/F
Up & Up Soft & Strong	Target	0	0	100	ECF	No	0/F

TOILET PAPER	
BRAND	GRADE
Green Forest	A
365 Everyday Value, 100% Recycled	A
Earth First	A
Natural Value	A
Seventh Generation	A
Trader Joe's Bath Tissue	A
Marcals 1000 ^a	B
Marcals Small Steps	B
365 Everyday Value, Sustainably Soft	D
Cottonelle Ultra	D
Scott 1000	D
Scott ComfortPlus	D
Trader Joe's Super Soft Bath Tissue	D
Charmin Ultra ^b	F
Kirkland	F
Angel Soft	F
Quilted Northern	F
Up & Up Soft & Strong	F

PAPER TOWELS	
BRAND	GRADE
Green Forest	A
365 Everyday Value	A
Earth First	A
Natural Value	A
Seventh Generation	A
Trader Joe's	A
Marcals	B
Marcals Small Steps	B
Viva	D
Bounty	F
Brawny	F
Sparkle	F
Up & Up	F
Kirkland	F

FACIAL TISSUE	
BRAND	GRADE
Green Forest	A
365 Everyday Value, 100% Recycled	A
Natural Value	A
Trader Joe's	A
Fluff Out	B
Marcals Small Steps	B
Seventh Generation	B
365 Everyday Value, Sustainably Soft	D
Kleenex Everyday	D
Kirkland	D
Puffs Ultra Soft	F
Up & Up Soft	F

^a Some products receive FSC certification for their recycled content. However, to avoid double-counting recycling and FSC certification, FSC certification is not applied as a grading metric for products that do not contain virgin fiber. For more information, see the Appendix.

^b Processed chlorine free

^c Due to a fire at their New Jersey paper plant in January 2019, Marcals is suspending manufacture of their at-home products, including all Marcals products listed in this report. However, they could become available again in the future.

^d Elemental chlorine free

^e Totally chlorine free

^f This entry applies to both Charmin Ultra Soft and Charmin Ultra Strong.

^a Due to a fire at their New Jersey paper plant in January 2019, Marcals is suspending manufacture of their at-home products, including all Marcals products listed in this report. However, they could become available again in the future.

^b This entry applies to both Charmin Ultra Soft and Charmin Ultra Strong.

<https://www.nrdc.org/>



A simple exercise



News analysis

THE AMERICAS

How big beef and soya firms can stop deforestation

They don't chop down Amazonian trees, but their suppliers do



Related

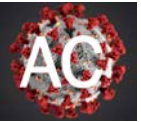
→ From the archive (2019): Deathwatch for the Amazon

Foodstuff	Quantity	Water consumption, litres
Chocolate	1 kg	17,196
Beef	1 kg	15,415
Sheep Meat	1 kg	10,412
Pork	1 kg	5,988
Butter	1 kg	5,553
Chicken meat	1 kg	4,325
Cheese	1 kg	3,178
Olives	1 kg	3,025
Rice	1 kg	2,497
Cotton	1 @ 250g	2,495
Pasta (dry)	1 kg	1,849
Bread	1 kg	1,608
Pizza	1 unit	1,239
Apple	1 kg	822
Banana	1 kg	790
Potatoes	1 kg	287
Milk	1 x 250ml glass	255
Cabbage	1 kg	237
Tomato	1 kg	214
Egg	1	196
Wine	1 x 250ml glass	109
Beer	1 x 250ml glass	74
Tea	1 x 250 ml cup	27

https://www.nature.com/scitable/blog/eyes-on-environment/water_world/



How about these other areas

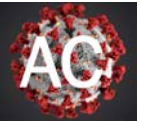


- Ethanol
- Electric cars
- Electronics (cellphones, other)
- Batteries
- Facebook – Cambridge Analytica
- Blockchain
- Petroleum, Mining
- Water, Air
- Plastic
- Food waste
- Risk assessment for pollutants (humans/environment)
- Social networks

Explore the
unintended
consequences



How about these other areas

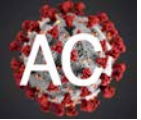


- Furniture industry
- Clothing industry
- Amazon, FedEx, UPS
- Telecom industry
- Shipping
- Cattle industry
- Farming industry
- Fishing industry
- Weapons industry (military industrial complex)
- Pharmaceutical/Chemical industry
- Other ...

Explore the
unintended
consequences

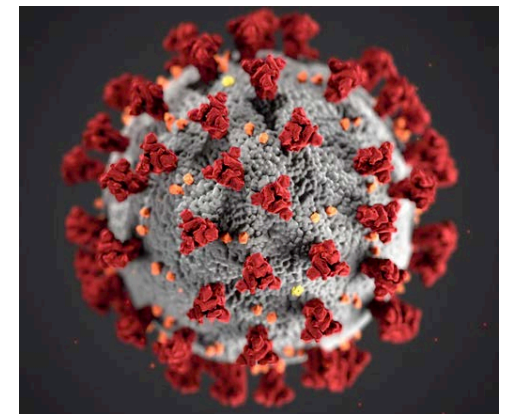


How about these networks

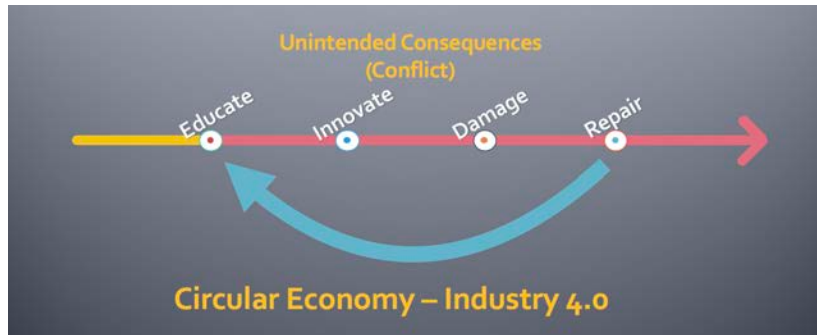


- Healthcare
- Water
- Electrical grid
- Telecom
- Pharmaceutical/Chemical industry
- Transportation
- Food security
- Air quality
- Farming, Fishing, cattle
- Security
- Policy

Explore the
unintended
consequences



Peace Engineering New Mindset

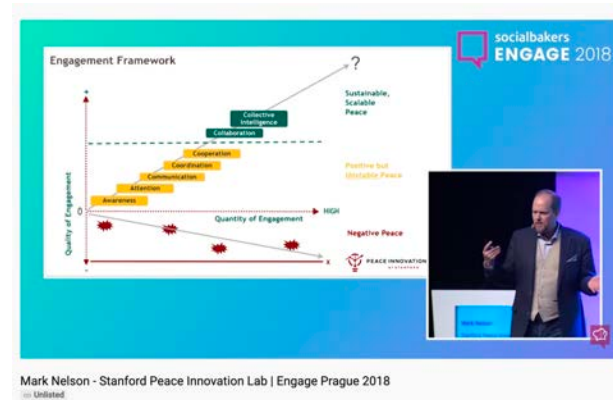


Can we measure Peace?

Metrics, data models, analytics, prediction, emergence engineering, respectful design, systems and complex systems – empathy, anger, trust, conflict, rejection, ...

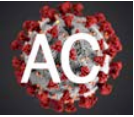


Peace Tech!!!!



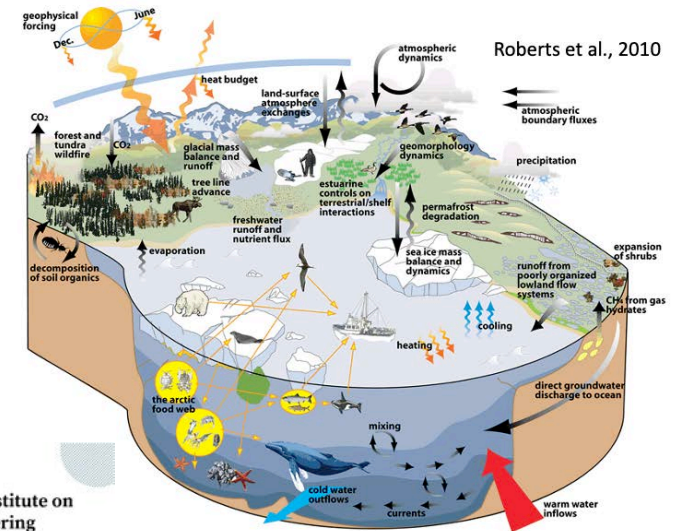


Peace Engineering New Mindset



The Arctic as a social-environmental system

122/268: Engaging Stakeholders: Peace Engineering in the Arctic
Stakeholder Sessions 1-B and 2-B
23 July 2020



Peace Engineering

Dr. Bernard Amadei
Professor of Civil Engineering
University of Colorado at Boulder
Founder, Engineers without Borders-USA
Dr. Ramiro Jordan,
Associate Dean of Engineering
University of New Mexico
President, International Federation of Engineering
Education Societies

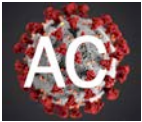


Hague Summer Institute on
Peace Engineering

First Annual
Hague Summer Institute on Peace Engineering
The Hague, Netherlands | August 23-25



Peace Engineering



Peace Engineering



At ECHO, our mission is to democratize medical knowledge and get best practice care to underserved people all over the world.

Our goal is to touch the lives of 1 billion people by 2025.

Supported by New Mexico Department of Health, Agency for Health Research and Quality, New Mexico Legislature, the Robert Wood Johnson Foundation, the GE Foundation, Helmsley Charitable Trust, Merck Foundation, BMS foundation, NM Medicaid



Sanjeev Arora, MD, MACP

Distinguished and Regent's Professor of Medicine (Gastroenterology/Hepatology)
Director of Project ECHO®

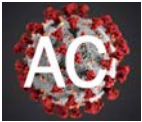
All Teach – All Learn



**simple, scalable, highly effective,
low-cost**



Peace Engineering



Nov. 2018, ABQ, NM – Organized the 1st Global Peace Engineering Conference

Peace Engineering Minor - Regular semester courses: 15 weeks,

3 hours/week, 45 hours/semester – **Linked to UNM-EPICS**

- **PENG Honors** Minor Required Courses (9 credits)
 - ENGR 220 – Honors - Engineering, Business, Sustainability, Ethics and Society
 - Research project
 - 3 weeks per topics; 5 to 6 topics – topics are flexible
 - Invited lecturers - Drexel, UC-Boulder, Stanford, Purdue, GT, USC, other
 - ENGR 3XX – **Honors** – Design Thinking, Project Management, Metrics, Data Models, Analytics
 - Becomes ENGR 419 (ECE 419) – Senior Design I – Sponsored project
 - 3 weeks per topics; 5 to 6 topics – topics are flexible
 - Invited lecturers - Drexel, UC-Boulder, Stanford, Purdue, GT, USC, other
- ENGR 420 – **Honors** – Senior Design II – Sponsored project
- **PENG Honors** Minor Elective Courses (6 credits)
 - 6 credits from UNM Core or other - 300 or 400 levels



WHY Lab – Peace Labs



Peace Engineering New Mindset



The Economist

Today Weekly edition Menu



Andrea Ucini

Leaders

May 21st 2020 edition >

A new opportunity to tackle climate change

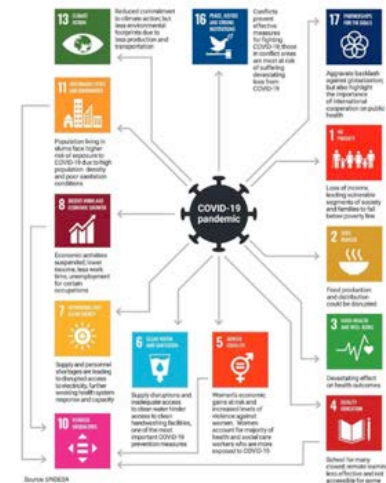
Countries should seize the moment to flatten the climate curve

OVERARCHING GOAL -DRAFT June 9, 2020

Redefining the 17 United Nations Sustainable Development Goals from an Engineering Perspective – Post COVID-19

TOPICS for Lectures

- Peace Engineering
- Systems thinking
- Digital twins
- Design thinking
- Complex systems
- Ethics
- Sustainability
- Finance
- Accounting
- Accountability
- Project management
- Metrics
- Indicators
- Data models
- Analytics
- Data science
- Micro-credentials
- Stackable degrees
- Conflict resolution
- Nonviolent communications
- Unintended/intended consequences
- Transparency
- Project scoping
- Communication and social skills
- Context awareness
- Situational awareness
- Trust
- Empathy
- Diversity
- Equality
- Surveys
- Open science
- Repositories – TRUST standard
- Ecosystems
- Policy
- Racism
- Other



One topic per class per semester

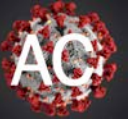


Challenges

Got to keep our eye on the ball!!!!
No time to loose, it is no game!!!!
Take ownership!!!!

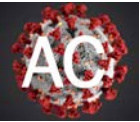
Peace Engineering is a new disruptive mindset needed to address global challenges (have no borders)

Symmetry of information
Open Science and Repositories
Transparency

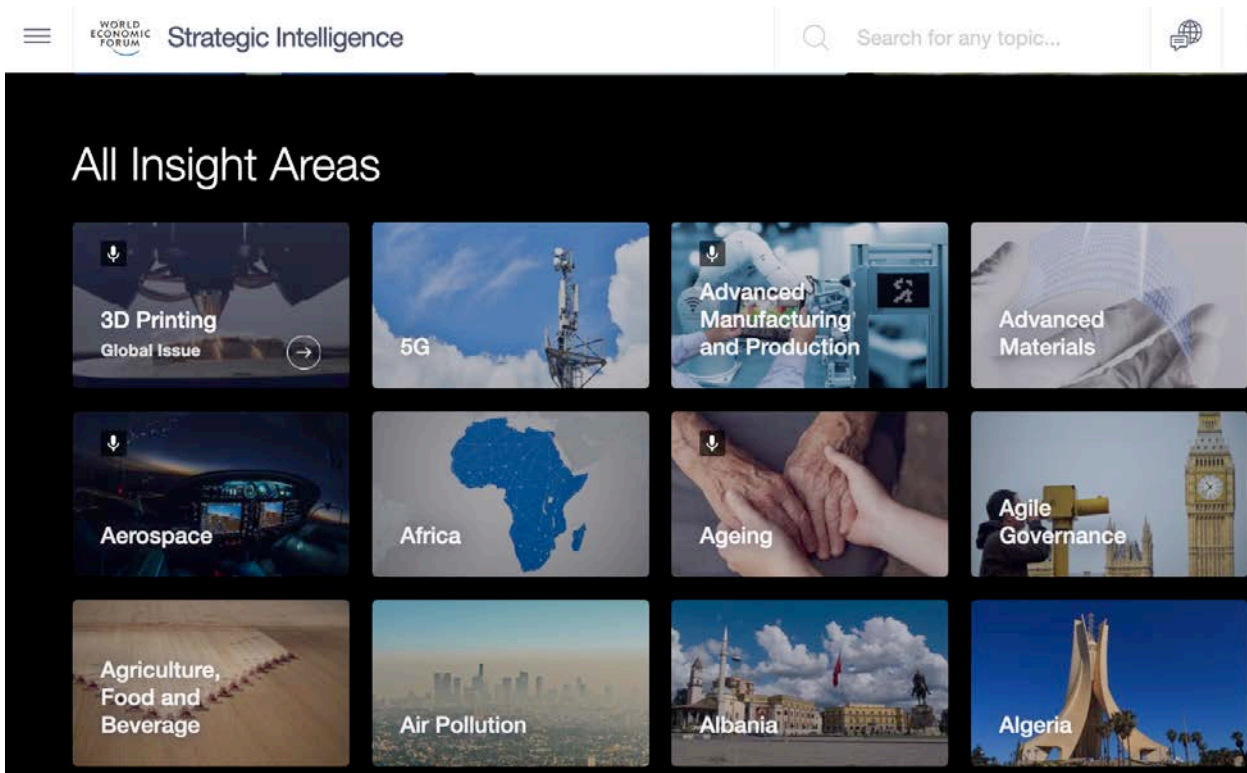




Nueva mentalidad disruptiva



Cual es el proyecto país, académico, otros?



<https://intelligence.weforum.org/>





Transforming Engineers for a Sustainable Global Future. Imagine. Design. Create.

Building a better world through Peace Engineering





PEACE INNOVATION LAB
STANFORD



Gracias
Obrigado
Thank you
Merci



istec Ibero-American Science & Technology
Education Consortium

