USFG/NATO Artificial Intelligence, Cybersecurity, and Biotechnology, Innovation and Security

Session 206: Advanced CX Debate: The Economics and Security and Emerging Technologies: Working with NATO on A.I, biotechnology and cybersecurity. Economists are skeptical of centralized bureaucracies managing new technologies. Should the USFB work with NATO? Greg Rehmke, Economic Thinking. **Room COBE 111**

BEFORE WE GET STARTED

Remember to register your attendance and complete session evaluations.

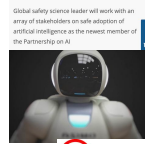Session numbers are in your program.

Session 206

Attendance — **Online Handouts** — **Session Evaluations**

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economic**thinking**
Understanding and Creating Prosperity

Innovation as Adaptation: NATO and Emerging Technologies
JUNE 11, 2021

NORTH ATLANTIC TREATY ORGANIZATION

Emerging and disruptive technologies
Last updated: 17 Oct. 2022 00:00

UL Joins Leading Body on Artificial Intelligence
Global safety science leader will work with an array of stakeholders on safe adoption of artificial intelligence as the newest member of the Partnership on AI

Underwriters Laboratories

USFG/NATO Artificial Intelligence, Cybersecurity, and Biotechnology, Innovation and Security

Resolved: The United States federal government should substantially increase its security cooperation with the North Atlantic Treaty Organization in one or more of the following areas: artificial intelligence, biotechnology, cybersecurity.

Session 305: **Advanced CX Debate: The Economics and Security and Emerging Technologies: Working with NATO on A.I, biotechnology and cybersecurity.** Economists are skeptical of centralized bureaucracies managing new technologies. Should the USFB work with NATO? Greg Rehmke, Economic Thinking. **ROOM UTC 4.110**

Gregory Rehmke · economicthinking.org/category/artificial-intelligence/ · grehmke@gmail.com

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INSIGHTS GMF German Marshall Fund

Innovation as Adaptation: NATO and Emerging Technologies

JUNE 11, 2021
www.gmfus.org/news/innovation-adaptation-nato-and-emerging-technologies

the Case for **KILLER ROBOTS**
Why America's Military Needs to Continue Development of Lethal AI
ROBERT J. MARKS

Underwriters Laboratories
UL.COM
UL Joins Leading Body on Artificial Intelligence
UL will work with an array of stakeholders on the safe
Regulate or Certify Emerging A.I. Technologies?
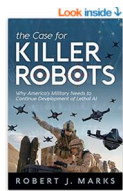
PRIVATE AI
ANDREW TRASK
Watch on YouTube
Artificial Intelligence, Public Trust, and Public Health

www.facebook.com/GregRehmkeAI
ECONOMIC FREEDOM & ARTIFICIAL INTELLIGENCE
GAMING AI Human Compatible A THOUSAND BRAINS THE AI-FIRST COMPANY
Economic Thinking A.I.
@GregRehmkeAI · Education Website

THE AI DELUSION
ARTIFICIAL INTELLIGENCE
JUNE 26, 2021
A.I. Progress and Delusion

economicthinking.org/category/artificial-intelligence/

INSIGHTS
Innovation as Adaptation: NATO and Emerging Technologies
JUNE 11, 2021
www.gmfus.org/news/innovation-adaptation-nato-and-emerging-technologies

❈ *However, NATO and the transatlantic allies are neither the only nor the most agile actors investing in emerging and disruptive technologies. China and Russia…invest substantially [and accelerated] adoption of these technologies in military applications.*

❈ *To maintain its strategic advantage against China and Russia, NATO needs to become an agent of innovation and be more agile and strategic in supporting allies to jointly exploit new technologies for deterrence, defense, and resilience purposes.*

❈ *NATO has prioritized EDTs and signaled it has joined "the technological adoption race" against China and Russia.*

❈ *Much work remains to be done. Allies remain divided on the ethical and legal specifics of the military use of EDTs and by their national-industrial preferences.*

Emerging and disruptive technologies

Last updated: 17 Oct. 2022 09:08

Technologies such as big data, artificial intelligence (AI), autonomous systems and quantum technologies are changing the world, and the way NATO operates. These and other emerging and disruptive technologies (EDTs) present both risks and opportunities for NATO and Allies. That's why the Alliance is working with public and private sector partners, academia and civil society to develop and adopt new technologies, establish international principles of responsible use and maintain NATO's technological edge.

…the Alliance is working with public and private sector partners, academia and civil society to develop and adopt new technologies, establish international principles of responsible use and maintain NATO's technological edge.

www.nato.int/cps/en/natohq/topics_184303.htm

NATO REVIEW

An Artificial Intelligence Strategy for NATO

Zoe Stanley-Lockman, Edward Hunter Christie   25 October 2021

✳ **Lawfulness**: AI applications will be developed and used in accordance with national and international law, including international humanitarian law and human rights law, as applicable.

✳ R**esponsibility and Accountability:** AI applications will be developed and used with appropriate levels of judgment and care; clear human responsibility shall apply in order to ensure accountability.

✳ **Explainability and Traceability:** AI applications will be appropriately understandable and transparent, including through the use of review methodologies, sources, and procedures. This includes verification, assessment and validation mechanisms at either a NATO and/or national level.

✳ **Reliability**: AI applications will have explicit, well-defined use cases. The safety, security, and robustness of such capabilities will be subject to testing and assurance within those use cases across their entire life cycle, including through established NATO and/or national certification procedures.

✳ **Governability:** AI applications will be developed and used according to their intended functions and will allow for: appropriate human-machine interaction; the ability to detect and avoid unintended consequences; and the ability to take steps, such as disengagement or deactivation of systems, when such systems demonstrate unintended behaviour.

✳**Bias Mitigation:** Proactive steps will be taken to minimise any unintended bias in the development and use of AI applications and in data sets.

Allies and NATO commit to ensuring that the AI applications they develop and consider for deployment will be in accordance with the six principles explained above. Pictured: Allied Defence Ministers meeting at NATO Headquarters on 21-22 October 2021. © NATO

www.nato.int/docu/review/articles/2021/10/25/an-artificial-intelligence-strategy-for-nato/index.html

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**CARNEGIE
ENDOWMENT FOR
INTERNATIONAL PEACE**

Europe and AI: Leading, Lagging Behind, or Carving Its Own Way?

ERIK BRATTBERG, RALUCA CSERNATONI, VENESA RUGOVA

JULY 09, 2020
PAPER

✳ align the national AI strategies of EU member states;
✳ safeguard dual-use technologies;
✳ ensure close EU-UK cooperation on AI;
✳ enhance transatlantic dialogue on AI;
✳ engage global stakeholders on ethical AI; and
✳ consider AI a facet of European strategic autonomy.

- *Central to the EU's efforts is the notion of AI that is "made in Europe," that pays attention to ethical and human-centric considerations, and that is in line with core human rights values and democratic principles.*

- *Given the need to address the societal, ethical, and regulatory challenges posed by AI, the EU's stated added value is in leveraging its robust regulatory and market power—the so-called "Brussels effect"—into a competitive edge under the banner of "trustworthy AI."*

carnegieendowment.org/2020/07/09/europe-and-ai-leading-lagging-behind-or-carving-its-own-way-pub-82236

National DEFENSE

Military to Leverage New Biotech Fields to Gain an Edge

7/24/2020

By Mandy Mayfield

✳ Agencies throughout the Defense Department are investing in biotechnologies and working initiatives to harness nature's processes to better support warfighters.

✳ Biotech is an engineering discipline that uses living systems to create a wide range of products…"We can use that technology to produce an enormous range of things from food and medicines to textiles and fuels,"…

✳ It will have a large impact on the defense sector, Rozo said during the Biotechnology for Materiel and Defense Symposium. "The same core competencies that can unlock products and capabilities [have] the potential to transform military systems and mission spaces."

www.nationaldefensemagazine.org/articles/2020/7/24/military-to-leverage-new-biotech-fields-to-gain-an-edge

Slide 1

Study Predicts BioTech's Long–Term Impact on Defense

8/1/2022

By Diane DiEuliis, Peter Emanuel and Brian Feeney

❋ *As near-peer nations enter the biological revolution, they will challenge U.S. dominance in the global bioeconomy. This will be a type of gray warfare — a sustained low intensity economic conflict where the interests of multi-national corporations are intertwined with regional politics and the strategic rivalries of global powers.*

Why "gray warfare"?

❋ *Over the next 35 years, bio-products will gradually displace petrochemical production as the dominant means of producing industrial chemical feed stocks.*

This depends on prices.

❋ *As bioproduction becomes more cost-competitive, adoption will follow, supported by such government programs as the Department of Agriculture's BioPreferred Program, which helps consumers identify products with biobased substances.*

❋ *…This global transformation will profoundly impact allied defense supply chains. The study team recommends that the department pursue bilateral and multilateral collaborations with its allies and friendly nations to ramp up synthetic biology and biomanufacturing to an industrial scale. These biologically derived materials will transform the kinds of defense systems the nation will be able to create by the mid-21st century.*

It is highly unlikely that USDA's *BioPreferred Program* will matter.

www.nationaldefensemagazine.org/articles/2022/8/1/study-predicts-biotechs-long-term-impact-on-defense

Slide 2

Dr. George Church

with host Rhonda Patrick, Ph.D.

Episode #77

Watch on YouTube

www.foundmyfitness.com/episodes/george-church

POPULAR SCIENCE

The Church Of George Church

From reviving extinct species to hunting for dark matter, can a single scientist transform biology--and our lives?

BY JENEEN INTERLANDI | PUBLISHED MAY 27, 2015 5:00 PM

www.popsci.com/church-george-church/

Slide 3

Biotechnology

Rewriting Genomes

- Why multiplex editing will change the world
- How removing endogenous retroviruses from pig genome may allow pig organs to make up the shortfall of human organs for transplant. 1
- How visionary projects such as multi-virus resistance and ecosystem diversity will require multiplex genome editing. 1…
- How gene-editing could be used to eliminate zoonotic viruses that spill over from livestock.
- How germline editing pigs against African swine fever virus is the first example of using CRISPR to eliminate a mammalian virus in the environment.

www.foundmyfitness.com/episodes/george-church

Slide 4

Better Technology
Faster, Smaller, Safer, Smarter

- ❋ *Economics is about tradeoffs…*
- ❋ Tools leverage labor and increase human productivity.
- ❋ As improved tools—smarter software and machines—raise productivity, wages increase.
- ❋ A.I. tech. allows fewer people to produce more across the economy
- ❋ *Farming, mining, manufacturing, **military**, **defense**, education, programming, medical, elder care…*

ECONOMIC FREEDOM & ARTIFICIAL INTELLIGENCE

the Case for KILLER ROBOTS
Why America's Military Needs to Continue Development of Lethal AI
ROBERT J. MARKS

economicthinking.org/category/artificial-intelligence/

COSM
TECHNOLOGY SUMMIT

THIEL MONTAÑEZ SCHMIDT GEORGE GILDER COMELLO HERSKOWITZ

THE FUTURE MEETS HERE
NOV 9-11, 2022 COSM.TECH BELLEVUE, WA

AMISTAD

George Montañez
Director of Amistad Lab, Assistant professor of Computer Science at Harvey Mudd College

Nicole Herskowitz
Vice President, Microsoft

www.cs.hmc.edu/~montanez/amistad.html

ICAART 2020
Valletta, Malta

arXiv > cs > arXiv:1907.06010

Computer Science > Machine Learning
[Submitted on 13 Jul 2019]

The Futility of Bias-Free Learning and Search

George D. Montañez, Jonathan Hayase, Julius Lauw, Dominique Macias, Akshay Trikha, Julia Vendemiatti

Building on the view of machine learning as search, we demonstrate the necessity of bias in learning, quantifying the role of bias (measured relative to a collection of possible datasets, or more generally, information resources) in increasing the probability of success. For a given degree of bias towards a fixed target, we show that the proportion of favorable information resources is strictly bounded from above. Furthermore, we demonstrate that bias is a conserved quantity, such that no algorithm can be favorably biased towards many distinct targets simultaneously. Thus bias encodes trade-offs.

(Inductive) Bias is Needed

- We can never fully eliminate the need for inductive bias.
  - Mitchell (1980): "The Need for Biases in Learning Generalizations"
  - Schaffer (1994): "A Conservation Law for Generalization Performance"
  - Wolpert (2001): "The Supervised Learning No-Free-Lunch Theorems"
  - Montañez et al. (2019): "The Futility of Bias-Free Learning and Search"

ICAART 2020 Best Paper - "The Bias-Expressivity Trade-off" George D. Montañez

youtu.be/mwEMPT6uIKY

Technology Trade Offs
Faster, Smaller, Safer, Smarter

✳ Smarter technologies: smartphones, smart cars, smart vacuum cleaners…

✳ A.I. robots programmed to learn and adapt.

✳ Smarter tanks, ships, robots for: warfare…

✳ Trade offs: tasks/jobs/mistakes by A.I. tech replace risky tasks/jobs/mistakes by people.

✳ But w/ military A.I. will putting robots rather than soldiers as risk promote use?

✳ Purely defensive A.I. military technologies?

ECONOMIC FREEDOM & ARTIFICIAL INTELLIGENCE

Vox
Robots were supposed to take our jobs. Instead, they're making them worse.
The robot apocalypse is already here, it just looks different than you thought.

Technology Trade Offs
Faster, Smaller, Safer, Smarter

✳ A.I. and cyber tech for surveillance. Alternate uses…

✳ Sharing with NATO partners means authoritarian leaders (Hungary and Turkey) will have access.

✳ French government using A.I. to find…

✳ Biotech, GMO foods, but alternate ways for food…

ECONOMIC FREEDOM & ARTIFICIAL INTELLIGENCE

Does healthy soil mean healthy humans?

https://youtu.be/YLZnSSgIKfg

Innovation in practice – How does NATO foster EDT development and adoption?
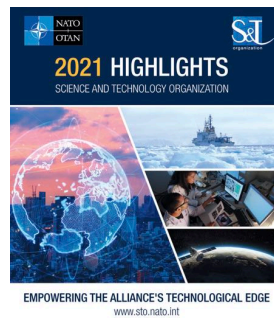
- Defence Innovation Accelerator for the North Atlantic (DIANA)
- NATO Innovation Fund
- NATO Advisory Group on Emerging and Disruptive Technologies
- NATO Innovation Board
- Other NATO innovation bodies

Emerging and disruptive technologies

Last updated: 17 Oct. 2022 09:08

www.nato.int/cps/en/natohq/topics_184303.htm

NATO OTAN

2021 HIGHLIGHTS
SCIENCE AND TECHNOLOGY ORGANIZATION

EMPOWERING THE ALLIANCE'S TECHNOLOGICAL EDGE
www.sto.nato.int

NATO members ☐ NATO members since 2004

Belgium (1)	Germany (8)	Luxembourg (15)	Slovakia (21)
Bulgaria (2)	Greece (9)	Netherlands (16)	Slovenia (22)
Canada (3)	Hungary (10)	Norway (17)	Spain (23)
Czech Republic (4)	Iceland (11)	Poland (18)	Turkey (24)
Denmark (5)	Italy (12)	Portugal (19)	United Kingdom (25)
Estonia (6)	Latvia (13)	Romania (20)	United States (26)
France (7)	Lithuania (14)		

www.nato.int/nato_static_fl2014/assets/pdf/2022/4/pdf/2021-NATO-STO-Highlights-web.pdf

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Education and Security

NATO OTAN **e-generation**

Updated: 23-Oct-2006 e-generation

Education and Security

DISCOVER NATO
Discover NATO through colours, impressions, thoughts and movement
SWF/1965kb

PAKISTAN RELIEF OPERATION
A special exhibition, highlighting NATO's relief operation in Pakistan.
More...

A VIRTUAL VISIT TO THE NORTH ATLANTIC COUNCIL
Take a look from the Chairman's seat. (.mov/442Kb) Step into the middle of the Council (.mov/591Kb)
For more information & necessary software

En Français

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- Model NATO
- Videos
- Looking back

- E-PUBLICATIONS
- MAPS
- POSTERS
- GAMES
- GOODIES

NATO Today

~ **NATO's Mission Creep**

~ **Fight Terrorism (around world)**

~ **"Security Through Science"**

~ **Youth camps for Danish students**

~ **Catch Pirates** PIRATES of the North Atlantic DEAD MA...

NATO Landscaping...

"The purpose and scope of the landscape sciences pilot study is to establish a working group representative of NATO Member and Partner nations to exchange information about landscape science approaches useful for environmental assessment and to transfer landscape assessment technologies among the study group participants for use in environmental protection and preservation programmes. ..."

NATO OTAN
Science for Peace and Security
North Atlantic Treaty Organisation
[HOME] About SPS Funding opportunities Calendar Publications Grantees Contact us
Page Updated: 25-Sep-2006
SPS Homepage > Studies & Projects

Use of Landscape Sciences for Environmental Assessment

Pilot Study

Objective

The purpose and scope of the landscape sciences pilot study is to establish a working group representative of NATO Member and Partner nations to exchange information about landscape science approaches useful for environmental assessment and to transfer landscape assessment technologies for use in environmental protection and preservation

Pilot countries
- United States
- Germany

Participating Countries
- Australia
- Austria
- Bulgaria
- Finland
- Georgia

(Landscaping is nice, but not security or defense related. How much does NATO spend on environmental issues?)

NATO OTAN NORTH ATLANTIC TREATY ORGANIZATION

Inclusion and Participation are Not Enough: Reshaping Institutions Through WPS

By Lauren Bean Buitta and Erin Connolly*

16 Nov. 2020 · | Last updated: 26 Nov. 2020 10:57

English French

✳ *The Women, Peace, and Security (WPS) agenda provides an opportunity to recalibrate institutions that are failing to conform and whose inception was informed by the security ideals of a homogenous group. The Alliance must reshape its institutional ideals to reflect what the world is finally realizing: women's inclusion and participation are not enough. Systemic innovation is required. ...*

✳ *In the next decade, WPS can be more than an agenda; it can become the architecture for new security and defence norms, strategies, and institutions that are needed to confront more diffusive, and sometimes unanticipated, global security threats. Just as male notions of protecting "bodies, borders, and boundaries"3 have defined the last century of security institutions, so too can women's security notions define a new path forward for the next 100 years.*

www.nato.int/cps/en/natohq/news_179494.htm

Certified Safe A.I.: UL Approved

USFG reform/regulation vs. NGO certification

✳ Regulate or Certify A.I. products and services as safe (and fair)?

✳ Separate from for-profit companies are Non-Government Organizations (NGOs): clubs, charities, churches, universities, foundations, and associations

✳ Plus technology standards groups for tech industry.

✳ *What Does It Mean to Certify an AI Product as Safe?*, (Dataversity, July 16, 2018), James Kobielus says fear about A.I. technologies is similar to past fears of electricity when first developed and introduced

ECONOMIC FREEDOM & ARTIFICIAL INTELLIGENCE

UL Underwriters

SCHWARZENEGGER
THE TERMINATOR
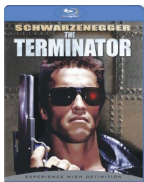
A.I. or Machine Learning?

- *Artificial-intelligence systems are nowhere near advanced enough to replace humans in many tasks involving reasoning, real-world knowledge, and social interaction.*

- *They are showing human-level competence in low-level pattern recognition skills,*

- *but at the cognitive level they are merely imitating human intelligence, not engaging deeply and creatively, says Michael I. Jordan, a leading researcher in AI and machine learning.*

IEEE Spectrum

Stop Calling Everything AI, Machine-Learning Pioneer Says ›
Michael I. Jordan explains why today's artificial-intelligence systems aren't actually intelligent

BY KATHY PRETZ
31 MAR 2021 | 6 MIN READ |

Artificial Intelligence—The Revolution Hasn't Happened Yet

by Michael I. Jordan

Published on Jul 01, 2019

hdsr.mitpress.mit.edu/pub/wot7mkc1/release/9

APR 7, 2021

Machine-Learning Pioneer Says Stop Calling Everything AI

#AI #ML #ArtificialIntelligence #machinelearning

OLIVER FREEMAN | 3 MIN

aimagazine.com/machine-learning/machine-learning-pioneer-says-stop-calling-everything-ai

Michael I. Jordan: Machine Learning, Recommender Systems, and Future of AI | Lex Fridman Podcast #74

https://youtu.be/EYIKy_FM9x0

The Economics of U.S.
Foreign Policy
Reforming U.S. Military Presence/Commitments
Resolved: The United States Federal Government should substantially reform its foreign military presence and/or foreign military commitments.

Economic Thinking Foreign Policy Study Guide • June 2012

American Foreign Policy: Have Gun, Will Travel
by Ivan Eland

THE CHALLENGE OF LIBERTY

"A devastating indictment of American imperialism."
—ANDREW J. BACEVICH

IN SEARCH OF MONSTERS TO DESTROY
The Folly of American Empire and the Paths to Peace
CHRISTOPHER J. COYNE

INDEPENDENT INSTITUTE

www.independent.org/store/book.asp?id=140#t-2

WHY WE FIGHT

Why We Fight
2006 | PG-13 | CC
★★★★½ 368
Prime Video
From $2.99 to rent
From $12.99 to buy

UL Joins Leading Body on Artificial Intelligence

Global safety science leader will work with an array of stakeholders on safe adoption of artificial intelligence as the newest member of the Partnership on AI

ERIC HOLLOWAY IN ARTIFICIAL INTELLIGENCE, LAW, PHILOSOPHY OF MIND

CAN A NEW AI DEBATING PROGRAM WIN ALL THE DEBATES?

While billed as an autonomous debating system, Project Debater features very little autonomy

BY ERIC HOLLOWAY

UL Underwriters Laboratories
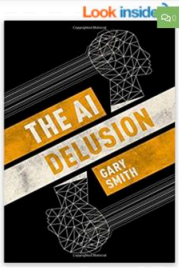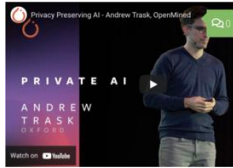
ARTIFICIAL INTELLIGENCE
JUNE 26, 2021

A.I. Progress and
Delusion

Artificial Intelligence,
Public Trust, and
Public Health

Stoa Notes:
Reforming Use of AI
Technology