

COGNITIVE WARFARE & MENTAL CATEGORIES: PREPARING THE MASSES TO BE FREAKED, GEEKED, & TWEAKED

PROTEUS

NEW CONCEPTS FOR A NEW AGE

Daniel Broudy

Study Group on Technology and Power

What is man that You are mindful of him, the son of man that You care for him?

—Psalm 8:7

TECHNOLOGY

Everything We Know About Facebook's Secret Mood-Manipulation Experiment

It was probably legal. But was it ethical?

By Robinson Meyer





Who we are ▾

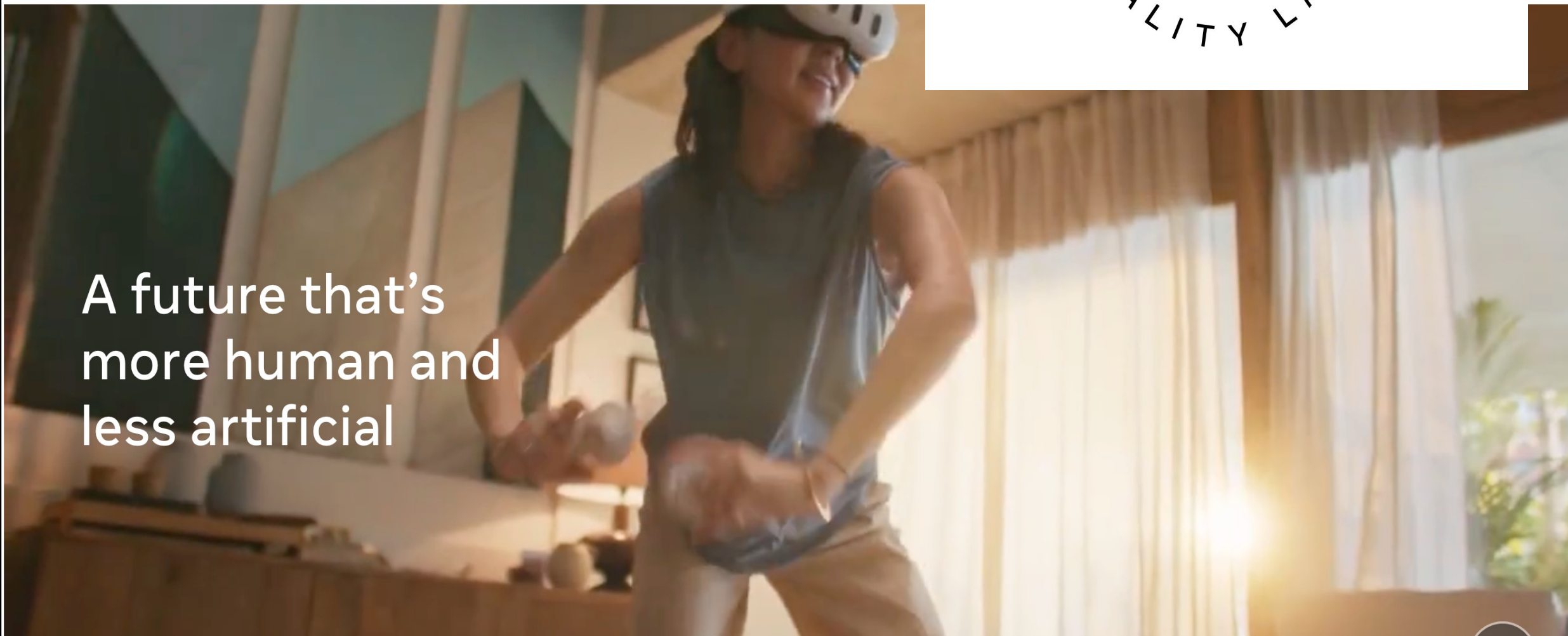
Our technologies ▾

The metaverse

Meta and you ▾



A future that's
more human and
less artificial





NONCONSCIOUS SOCIAL INFORMATION PROCESSING

PAWEL LEWICKI



Ministry
of Truth



“[Trump] could have undermined the messaging so much that he can actually control exactly what people think.

And that, . . . is our job.”

POLL: 79% WANT CONGRESS TO COMPROMISE

LIVE
 **MSNBC**

cheese

George Lakoff

Women,
Fire, and
Dangerous
Things

*What Categories Reveal
about the Mind*



M E T A P H O R S
W E L I V E B Y

GEORGE LAKOFF
AND MARK JOHNSON

WITH A NEW AFTERWORD

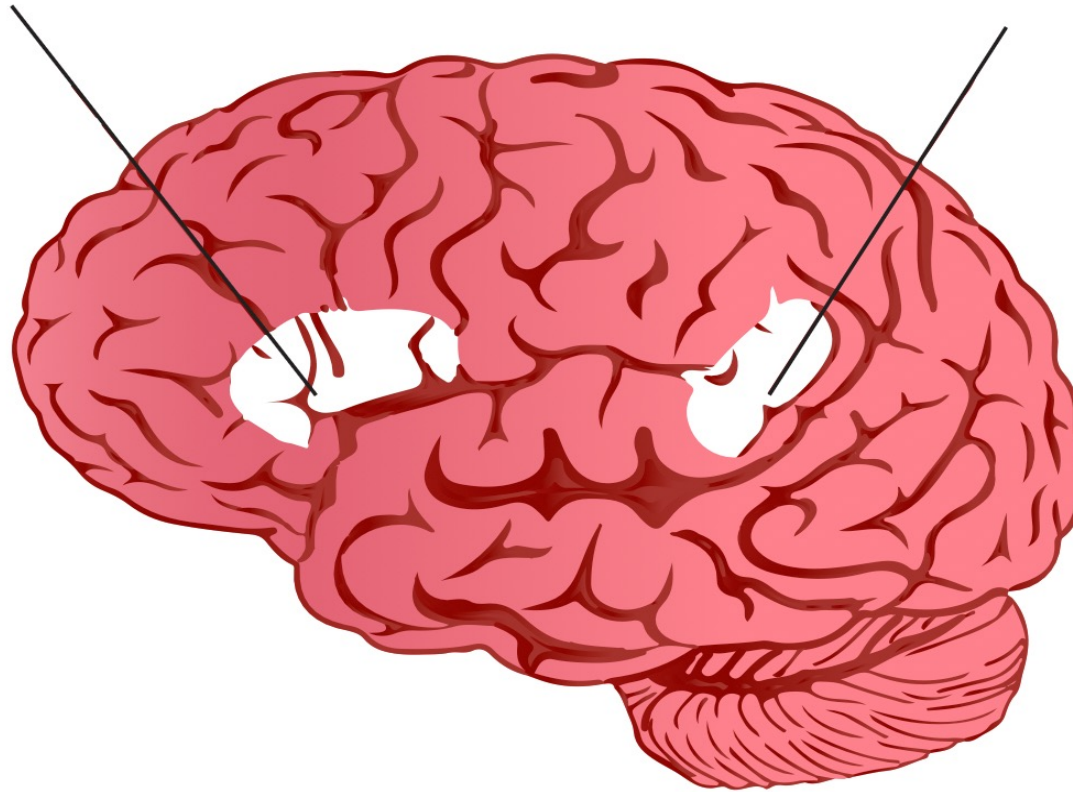
Human brain

Broca

Wernicke

Broca's area related to production of language, to the expression and comprehension of syntactic structures

Wernicke's associated with language comprehension and lexical selection processing. Key region governing higher intellectual functions.



Left Side View

Front

Back



LOCK STEP

A world of tighter top-down government control and more authoritarian leadership, with limited innovation and growing citizen pushback

In 2012, the pandemic that the world had been anticipating for years finally hit. Unlike 2009's H1N1, this new influenza strain—originating from wild geese—was extremely virulent and deadly. Even the most pandemic-prepared nations were quickly overwhelmed when the virus streaked around the world, infecting nearly 20 percent of the global population and killing 8 million in just seven months, the majority of them healthy young adults. The pandemic also had a deadly effect on economies: international mobility of both people and goods screeched to a halt, debilitating industries like tourism and breaking global supply chains. Even locally, normally bustling shops and office buildings sat empty for months, devoid of both employees and customers.

The pandemic blanketed the planet—though disproportionate numbers died in Africa, Southeast Asia, and Central America, where the virus spread like wildfire in the absence of official containment protocols. But even in developed countries, containment was a challenge. The United States's initial policy of "strongly discouraging" citizens from flying proved deadly in its leniency, accelerating the spread of the virus not just within the U.S. but across borders. However, a few countries did fare better—China in particular. The Chinese government's quick imposition and enforcement of mandatory quarantine for all citizens, as well as its instant and near-hermetic sealing off of all borders, saved millions of lives, stopping the spread of the virus far earlier than in other countries and enabling a swifter post-pandemic recovery.



[Economics & Finance](#)[Energy](#)[Foreign Policy](#)[Domestic Policy](#)[Health & Science](#)[All Publications »](#)

Center for Health Policy | Policy Brief

From Neuroweapons to ‘Neuroshields’: Safeguarding Brain Capital for National Security

August 10, 2023 | Harris A. Eyre, William Hynes, Geoffrey F. L. Ling, Jo-An Occhipinti, Rym Ayadi, Michael D. Matthews, Ryan Abbott, Patrick Love



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[Introduction](#) >

[Protecting Brain Capital Against the Use of Neuroweapons](#) >

<<

Introduction

Economic security has become a top priority for the West following the disruptions caused by COVID-19, the Ukraine War, and the growing threat of near-peer competitors. In a recent report, “[From Markets to Minds: The Role of Brain Capital in Economic Security](#),” we explained how investing in brain capital (i.e., an individual’s cognitive, emotional, and social brain resources) could help build more resilient economies. In this paper, we emphasize the importance of brain



A black and white photograph showing an elderly man in a dark suit leaning forward, holding a cane, and reaching out towards a young child. The child is wearing a light-colored dress and a wide-brimmed hat. In the background, a crowd of people is visible, including a woman in a patterned dress and a man in a white shirt with a dark tie. The scene appears to be outdoors on a cobblestone path.

Early Efforts to Shape Public Perception

P

ropaganda

Edward Bernays

With an Introduction by Mark Crispin Miller

Only through the active energy of the intelligent few can the public at large become aware of and act upon new ideas.

Propaganda bears the same relation to education as to business or politics. It may be abused. It may be used to over-advertise an institution and to create in the public mind artificial values. There can be no absolute guarantee against its misuse.

A presidential candidate may be "drafted" in response to "overwhelming popular demand," but it is well known that his name may be decided upon by half a dozen men sitting around a table in a hotel room.

Governments, whether they are monarchical, constitutional, democratic or communist, depend upon acquiescent public opinion for the success of their efforts and, in fact, government is government only by virtue of public acquiescence.

As civilization has become more complex, and as the need for invisible government has been increasingly demonstrated, the technical means have been invented and developed by which opinion may be regimented.

Nowadays the successors of the rulers, those whose position or ability gives them power, can no longer do what they want without the approval of the masses, they find in propaganda a tool which is increasingly powerful in gaining that approval.

Democracy is administered by the intelligent minority who know how to regiment and guide the masses.

An entire party, a platform, an international policy is sold to the public, or is not sold, on the basis of the intangible element of personality.

"Bernays's honest and practical manual provides much insight into some of the most powerful and influential institutions of contemporary industrial-state capitalist democracies."

—Noam Chomsky

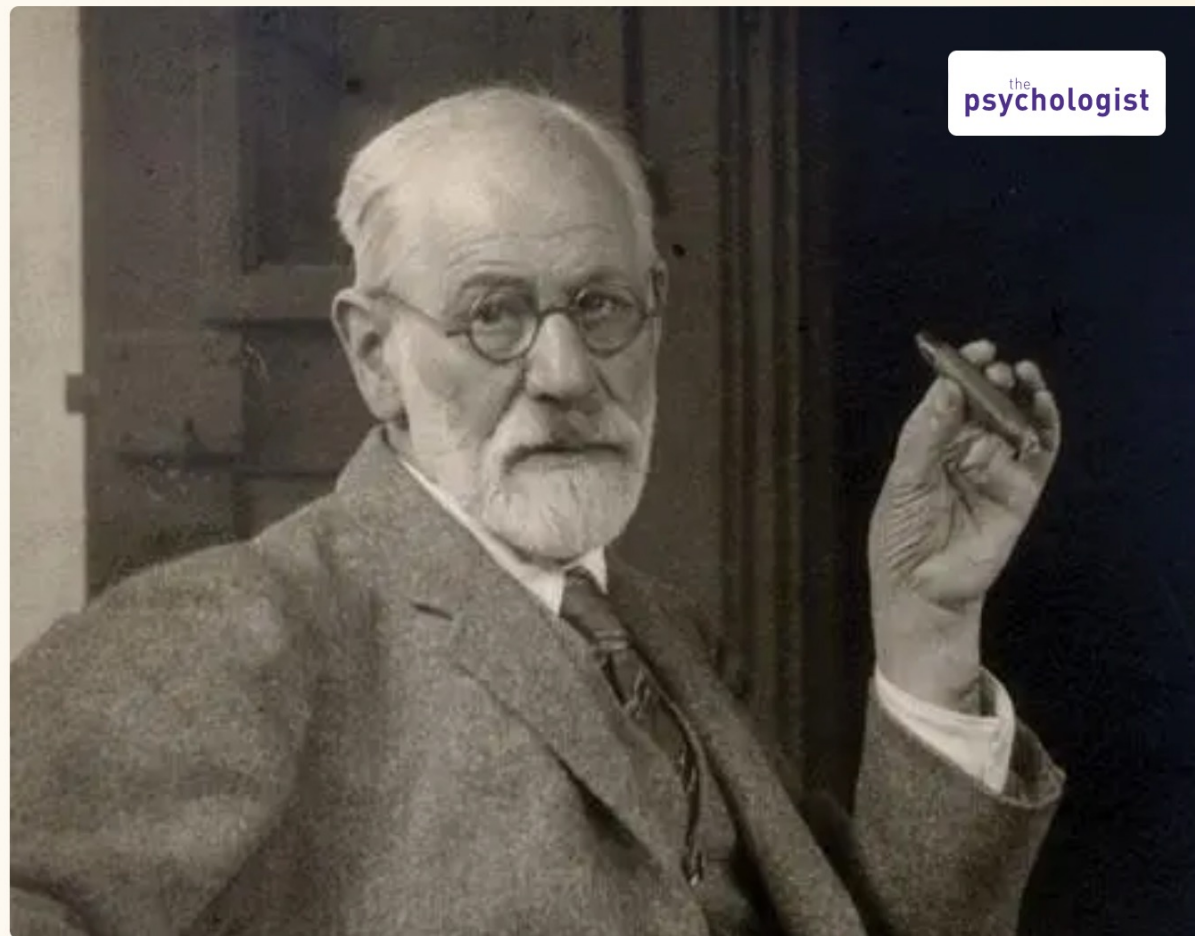


History and philosophy, Personality and self

Sigmund Freud and penis envy – a failure of courage?

Riya Yadav with a critical take on one of the psychoanalyst's most controversial theories; with an update.

08 May 2018



ROLAND
BARTHES



EMPIRE OF SIGNS

Translated by Richard Howard

MYTHO
LOGIES

THE COMPLETE EDITION, IN A NEW TRANSLATION

BARTHES

New York Times



New York Times

Group of Girls Puff at Cigarettes as a Gesture of 'Freedom'

April 1, 1929





The Doctors behind the Doctor

● Magical penicillin... the amazing "sulfas"... and now the new streptomycin... Thank the men of research medicine for those... and for all the other valuable aids they have placed in the doctor's "little black bag."

Biochemists and bacteriologists... pathologists and physiologists... whatever the field of research... they are, first and foremost, *doctors!* And, like all doctors, they are tirelessly devoting their lives to the cause of human health and happiness.

According to a recent Nationwide survey:

MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE

● What cigarette do you smoke, Doctor?... that was the question put to 113,597 doctors from the Atlantic to the Pacific, from the Gulf of Mexico to the Canadian border. Three independent research organizations did the asking... covered doctors in every branch of medicine.

The brand named most was Camel!

Like the rest of us, doctors smoke for pleasure. Their taste recognizes and appreciates the rich, full flavor and cool mildness of Camel's costlier tobaccos just as yours does.

YOUR "T-ZONE" WILL TELL YOU...



T for Taste...

T for Throat...

that's your proving ground for any cigarette. See if Camels don't suit your "T-Zone" to a "T."



CAMELS

Costlier Tobaccos



* The figures quoted have been checked and certified to by SYRANO, ROSS BROS. AND MONTGOMERY, Assessment and Auditors.

20,679* Physicians
say "**LUCKIES**
are less irritating"
"It's toasted"
Your Throat Protection against irritation against cough

*The milder smoke
that lets you*

Inhale to your heart's content!



New! EMBASSY

Good News! A really mild, flavorful
smoke that enters your mouth pleasantly cool
and filtered. Embassy's extra length
of fine, mellow tobacco provides extra
enjoyment plus an extra margin of
protection. With Embassy, you
can inhale to your heart's content!

EMBASSY

Embassy's longer smoke
means a milder smoke

REGULAR CIGARETTE

EMBASSY CIGARETTE

Now, this comparison. Smoke Embassy the way you
pull usually, under the regular length cigarette.
Discover the result! ... Embassy's longer smoke
means a milder smoke ... a pleasant taste
with no irritating throat!



PRODUCED BY
Philip Morris Inc.
BOSTON, MA

The White-Coat Effect: Physician Attire and Perceived Authority, Friendliness, and Attractiveness

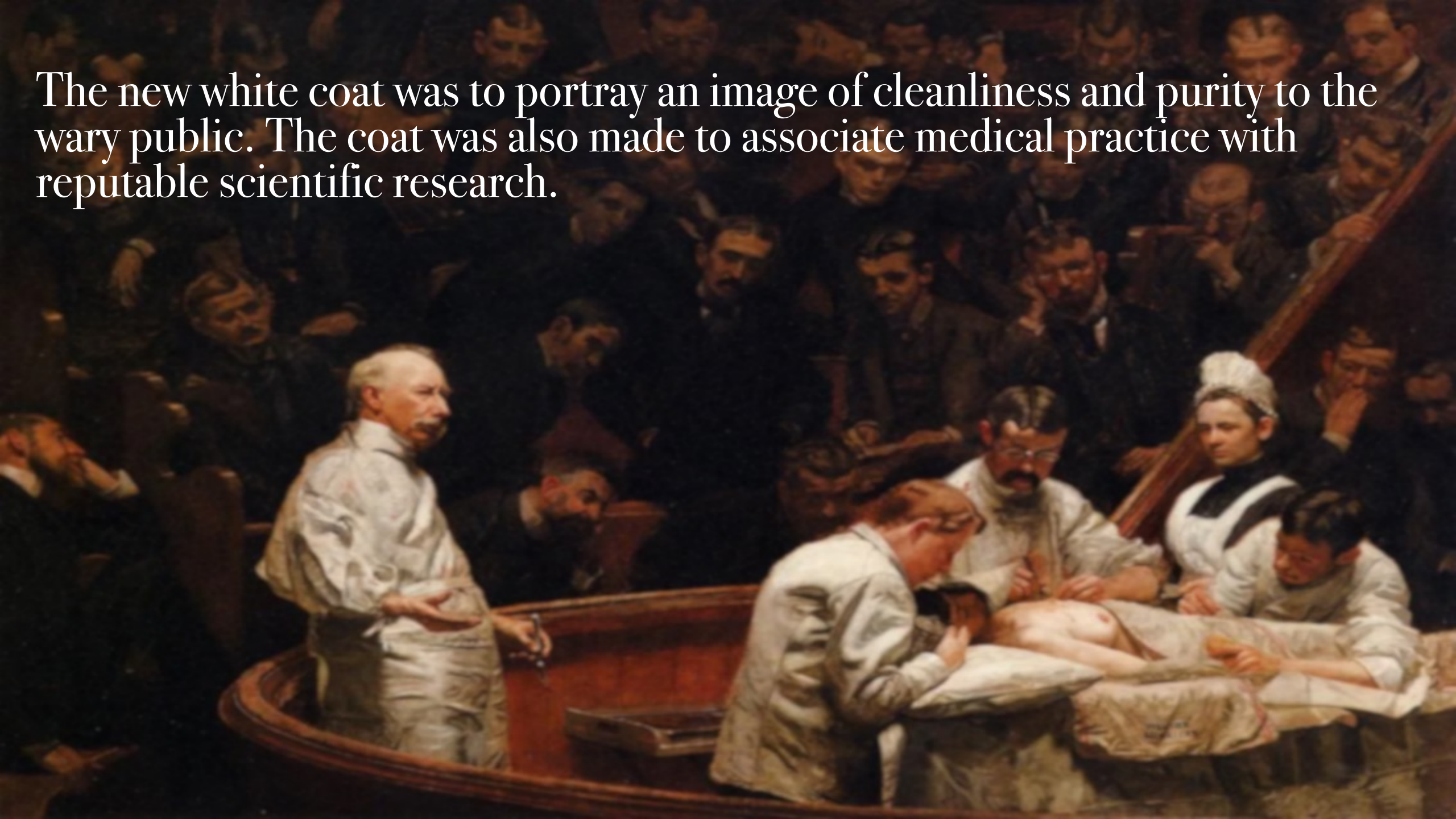
GARY L. BRASE¹ AND JILLIAN RICHMOND

*University of Sunderland
Sunderland, United Kingdom*

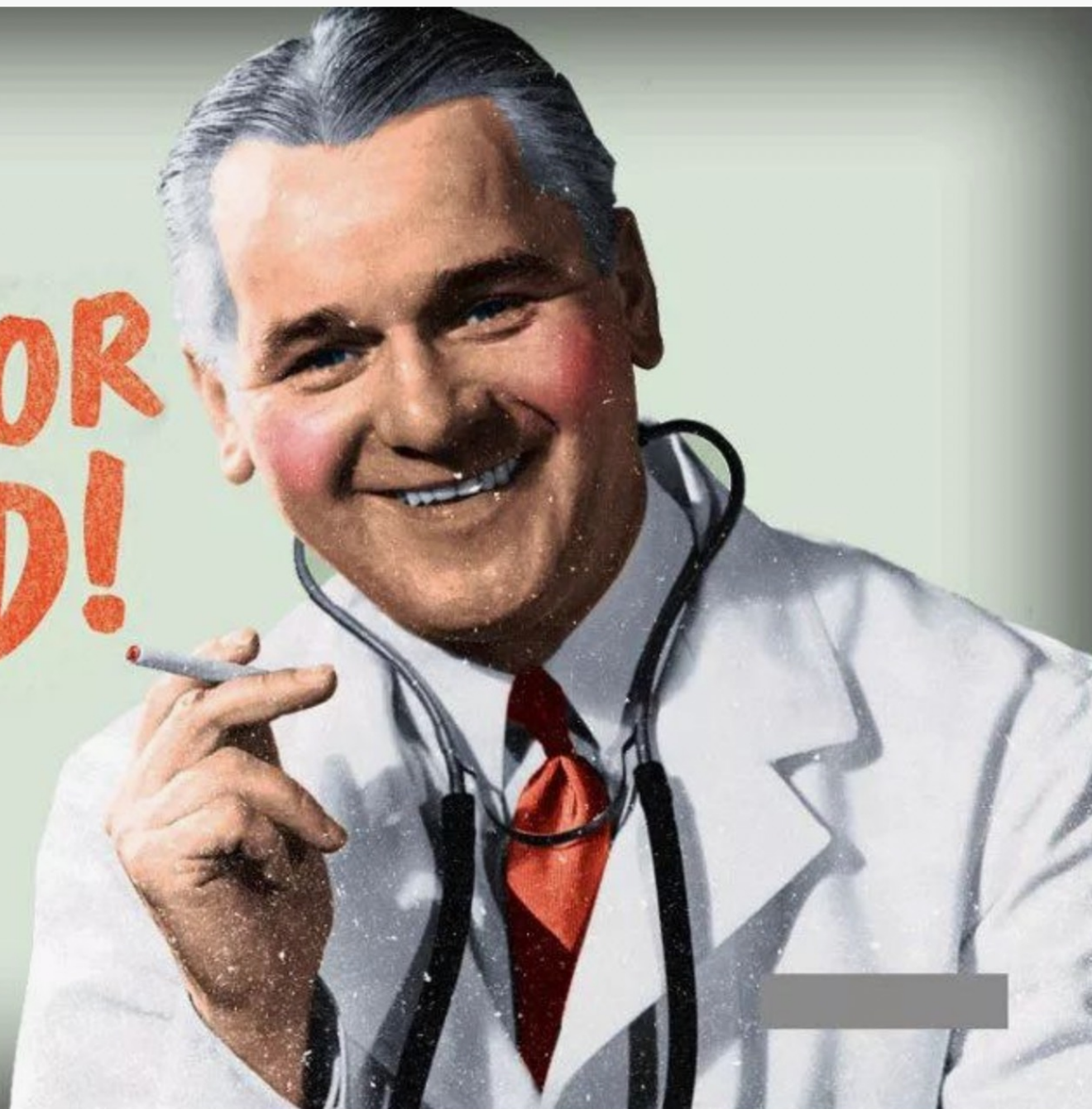
Although previous studies have evaluated the effects of attire on doctor–patient interaction, the common assumption of a tradeoff between perceptions of medical authority/status versus trustworthiness/openness has not been established. Thirty-eight male and 40 female participants rated their perceptions of same- and opposite-gender models who all were identified as doctors, but who were wearing different attire. The results indicate that authority and trust are not opposing factors and that a white coat and formal attire are clearly superior to casual attire. Additionally, perceptions of attractiveness of same- and opposite-gender doctors were rated, finding gender differences in perceptions different from, but theoretically similar to, prior findings. For females rating male models, perceptions of authority and attractiveness appear to be related.

Since the time of Hippocrates, physicians have been given advice on the way they should dress for functional and hygienic reasons, and because of the supposed influence on the doctor–patient relationship. Hippocrates stated that the physician should “be clean in person, well-dressed, and anointed with sweet-

The new white coat was to portray an image of cleanliness and purity to the wary public. The coat was also made to associate medical practice with reputable scientific research.

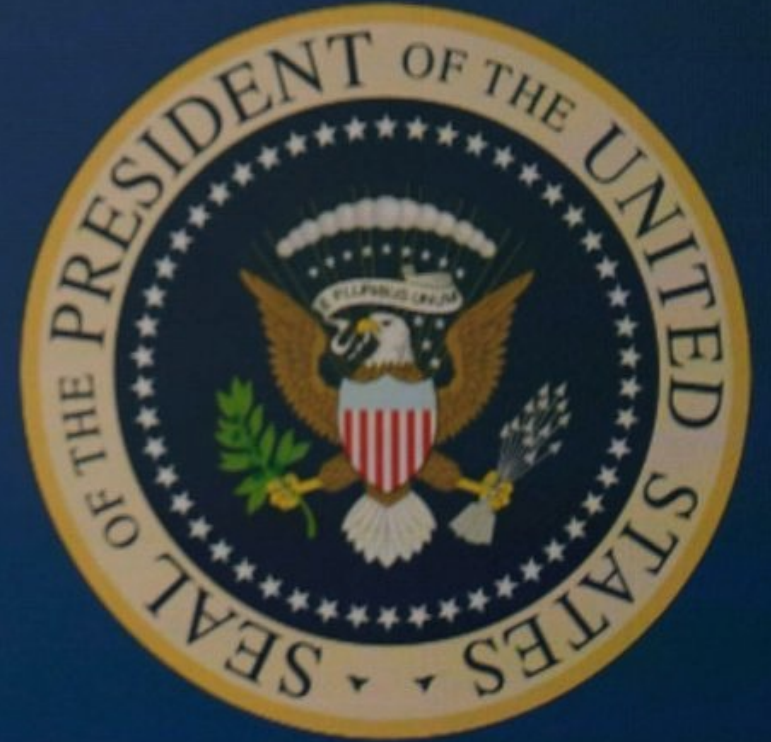


Just what the
**DOCTOR
ORDERED!**



Personification of Science

“I am the science.” (Fauci, 2021)





The Doctors behind the Doctor

● Magical penicillin... the amazing "sulfas"... and now the new streptomycin... Thank the men of research medicine for those... and for all the other valuable aids they have placed in the doctor's "little black bag."

Biochemists and bacteriologists... pathologists and physiologists... whatever the field of research... they are, first and foremost, *doctors!* And, like all doctors, they are tirelessly devoting their lives to the cause of human health and happiness.



20,679* Physicians
say "**LUCKIES**
are less irritating"

"It's toasted"

Your Throat Protection against irritation against cough



YOUR



**VACCINATION
TODAY!**

GET YOUR



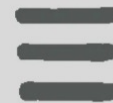
**VACCINATION
TODAY!**

GET YOUR



**VACCINATION
TODAY!**

V



POLITICS

MAY 12, 2020

ANTI-VAXXERS HAVE A **DANGEROUS** THEORY CALLED “**NATURAL IMMUNITY.**” NOW IT'S GOING MAINSTREAM

*“YOUR BODY IS AN AMAZING BEING – IT KNOWS
HOW TO TAKE CARE OF ITSELF.”*



KIERA BUTLER

SENIOR EDITOR

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Photograph: Amer Ghazzal/Rex/Shutterstock

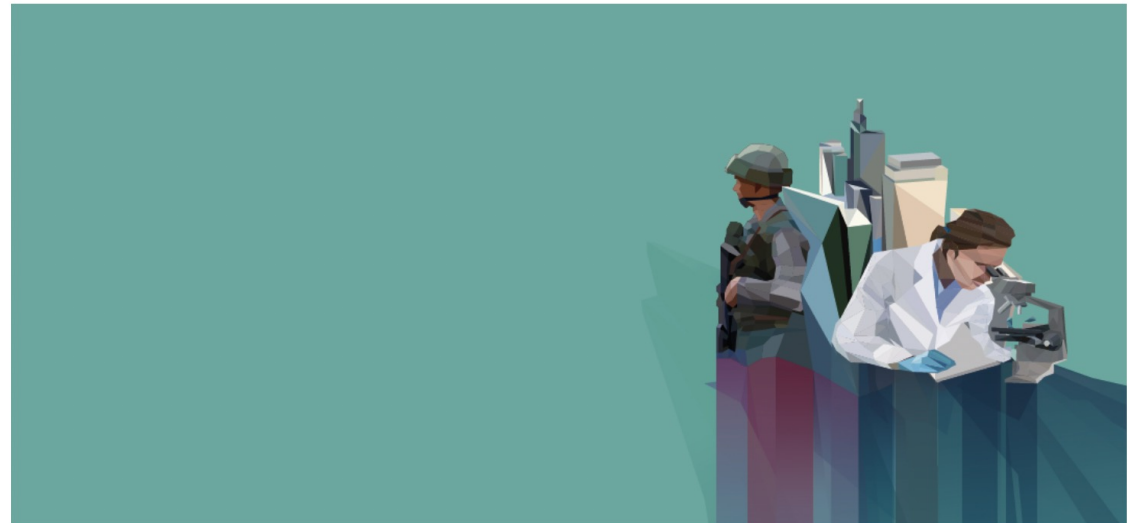
cheese

melted champagne Parmesan New York Greece Mozzarella
pizza goats Ritz pasta
milk smile Swiss omelet ham
party cottage fake burgers grated pepperoni yellow crackers
Kraft Kraft smelly deep-fried bleu snack welfare dairy fondue
eggs canned moon platter mold
beer cake government cream deli cheddar
aerosol grilled cholesterol red wine
COWS fat wedge carbonara
shredded breakfast salami



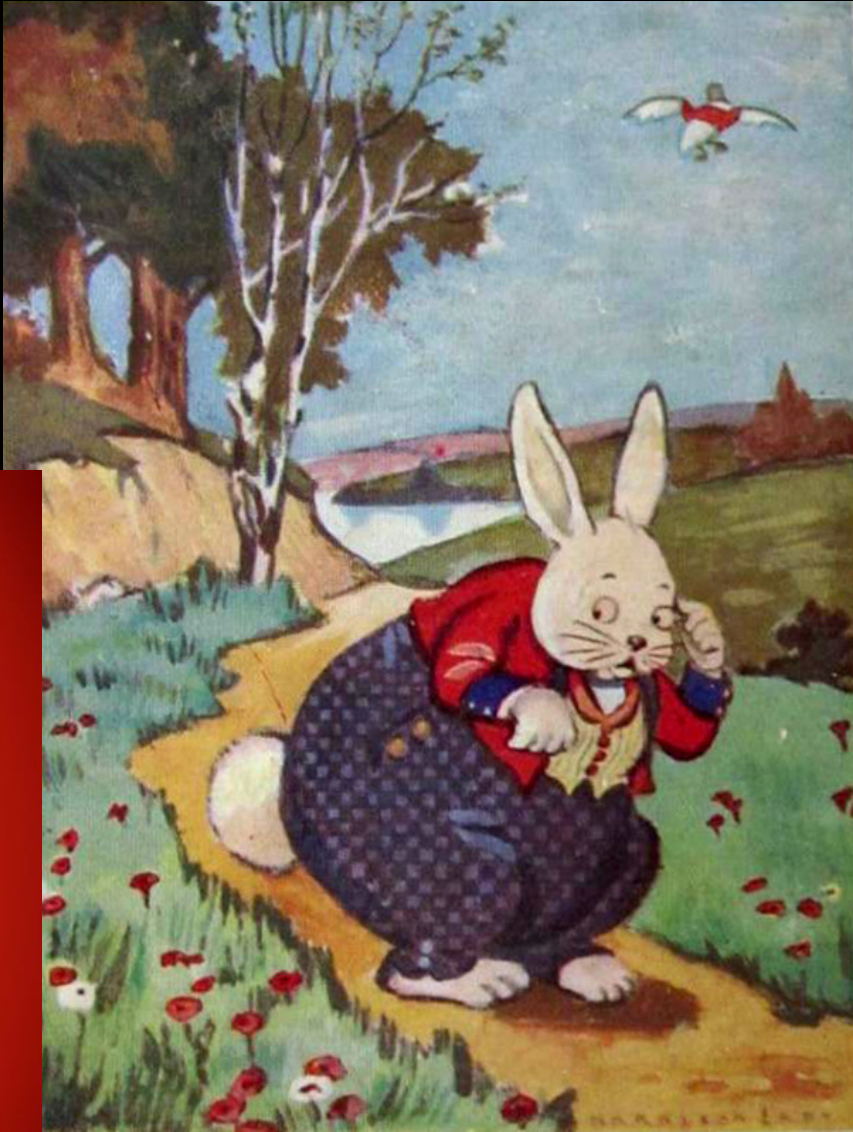
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Dual Use

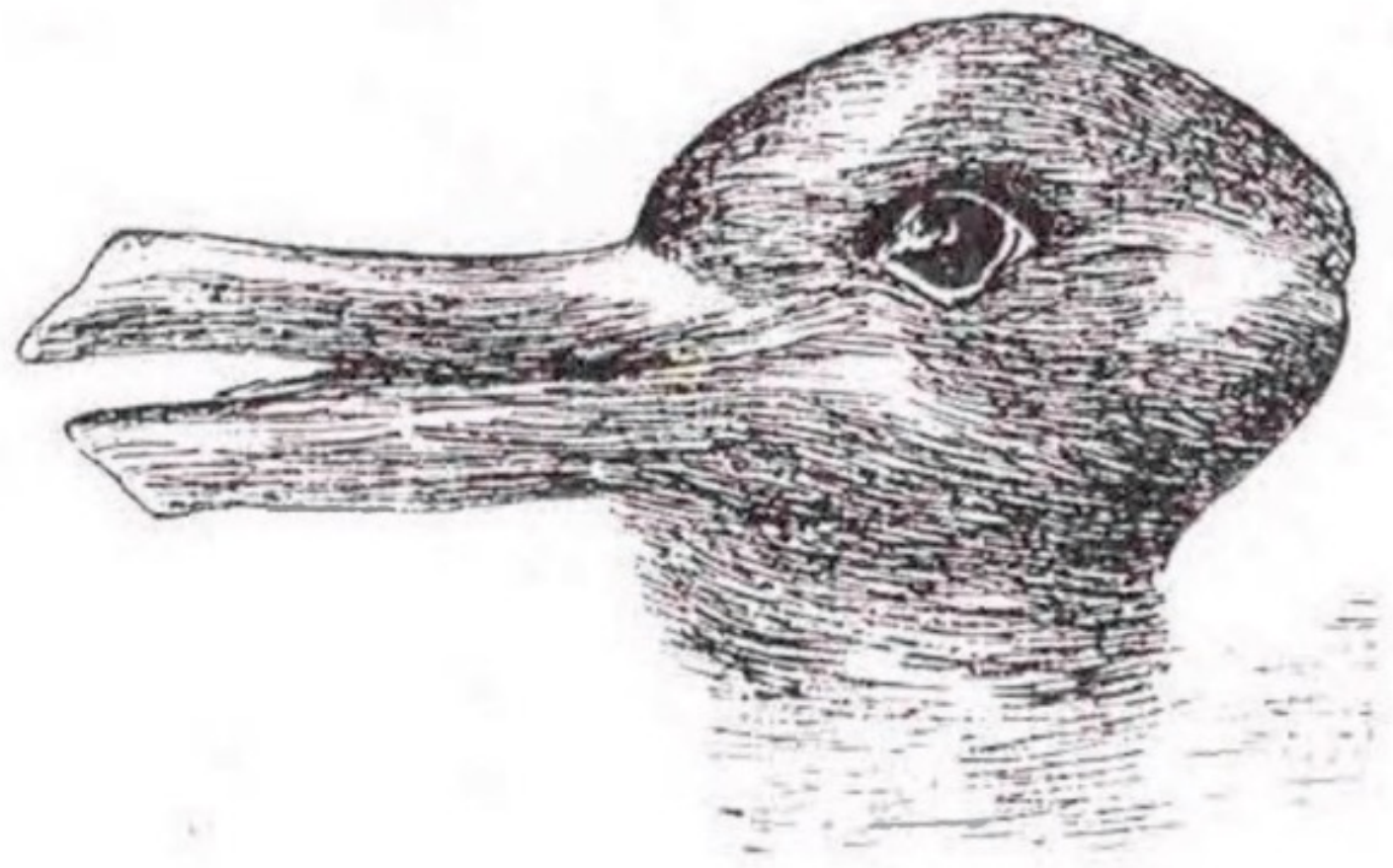
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Neuroscientific findings increase capabilities to access, assess and affect thought, emotion and behaviour. Research and development is primarily directed towards clinical use, but sometimes the research findings can also have implications in the political, security, intelligence and military domains.





PUSH



**“That, I would say, will get attention next time.”
(Gates, 2020)**





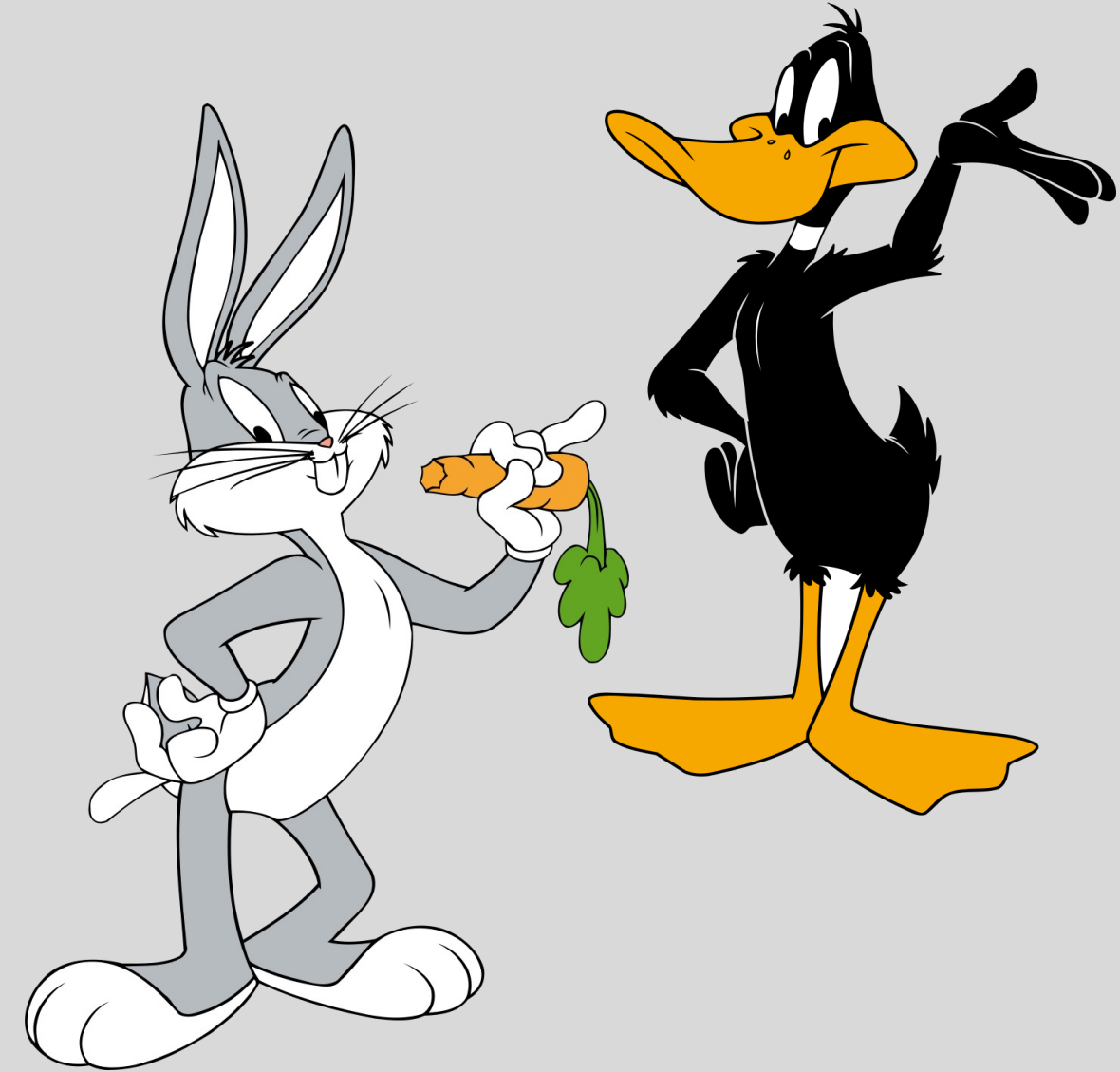


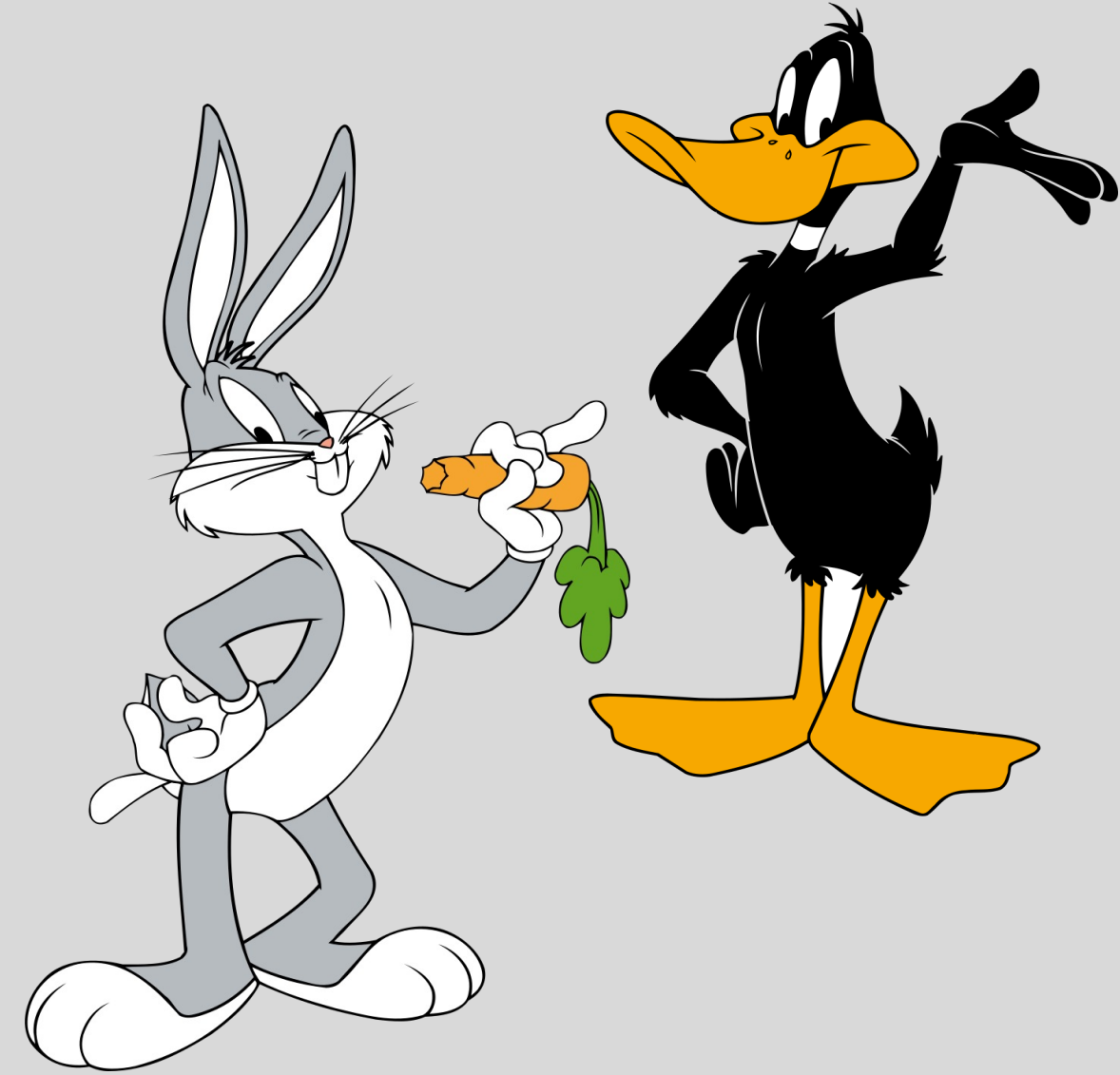
"We need to change cows"
(Gates 2024/4/11).



Group	Image Schemas
BASIC	object, substance
SPACE	center–periphery, contact, front–back, left–right, location, near–far, path, rotation, scale, up–down
CONTAINMENT	container, content, full-empty, in-out, surface
MULTIPLICITY	collection, count–mass, linkage, matching, merging, part–whole, splitting
PROCESS	cycle, iteration
FORCE	attraction, balance, blockage, compulsion, counterforce, diversion, enablement, momentum, resistance, restraint removal, self-motion
ATTRIBUTE	big–small, dark–bright, heavy–light, smooth–rough, straight, strong–weak, warm–cold











Overall reports submitted to VAERS, Florida 2006–2022

In Florida alone, there was a 1,700% increase in VAERS reports after the release of the COVID-19 vaccine, compared to an increase of 400% in overall vaccine administration for the same time period (*Figure 1*).

The reporting of life-threatening conditions increased over 4,400%. This is a novel increase and was not seen during the 2009 H1N1 vaccination campaign. There is a need for additional unbiased research to better understand the COVID-19 vaccines' short- and long-term effects.

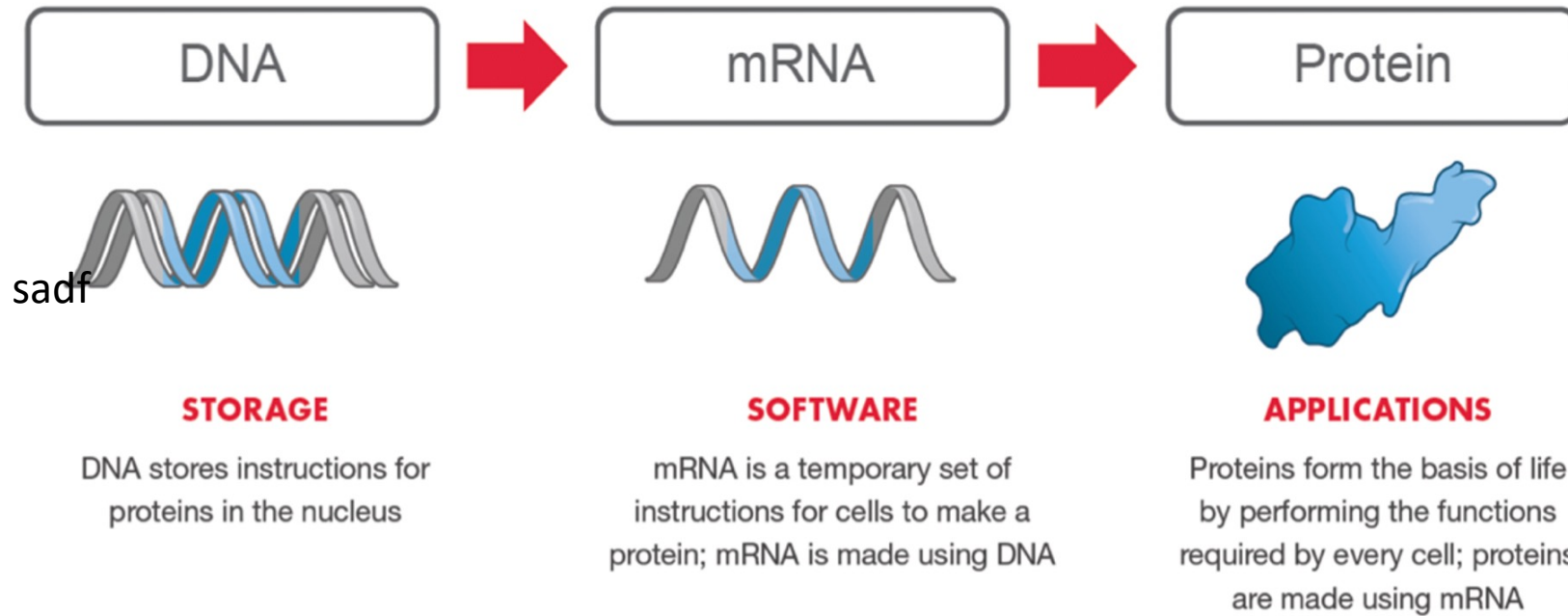


Figure 2 Conceptual model of DNA-as-Computer-Program featured on Moderna webpage of 2021 preserved at the following address. https://thereisnopandemic.net/wp-content/uploads/2021/04/www_modernatx_com-mrna-technology-mrna-platform-enabling-drug-discovery-development.pdf

When a young person dies suddenly

fs

Information for the family and relatives of
a young person who has died of Sudden
Arrhythmic Death Syndrome (SADS)



by Dr Elijah R Behr MD

Produced by Cardiac Risk In the Young





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[Health](#) [Society](#)

Agitation and Integration Propaganda in the Covid Era

Breaking the Psychological and Neurological Connections to Mass Obedience

January 20, 2025



**I just got my vaccine.
I would recommend it
to anyone and everyone.
Come with me if you want to live.**

**— Arnold Schwarzenegger
2021/2/15**



**Remember to book
your Christmas booster!**

**Each booster gives
you up to six months
worth of freedoms!***

No Jab No Job, no refunds.



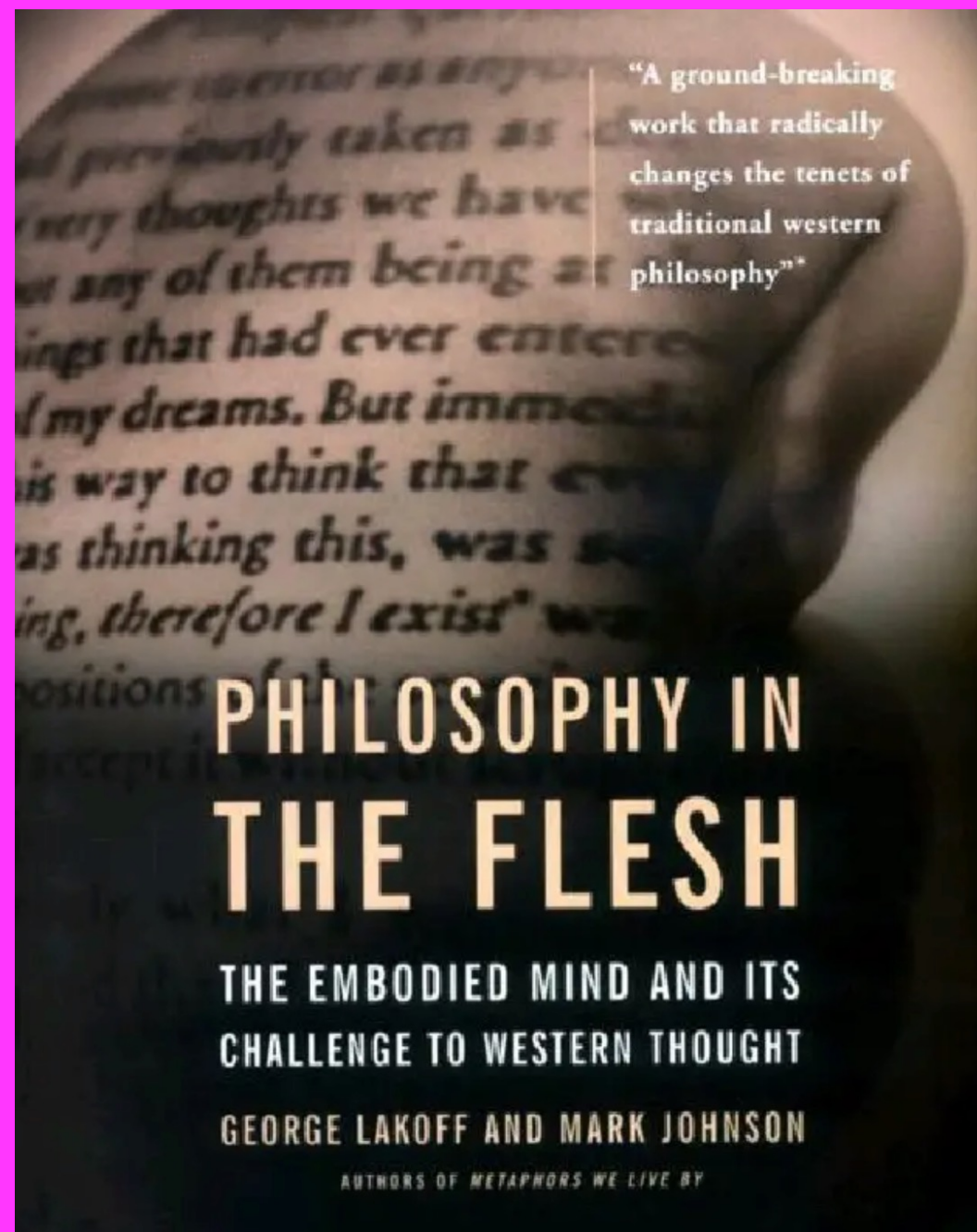
Labour

*Freedoms not available in all areas and are subject to change. www.labour-unit-freedoms.govt.nz

THE BODY IN THE MIND

The Bodily Basis
of Meaning,
Imagination, and
Reason

Mark Johnson



"A ground-breaking
work that radically
changes the tenets of
traditional western
philosophy"

PHILOSOPHY IN THE FLESH

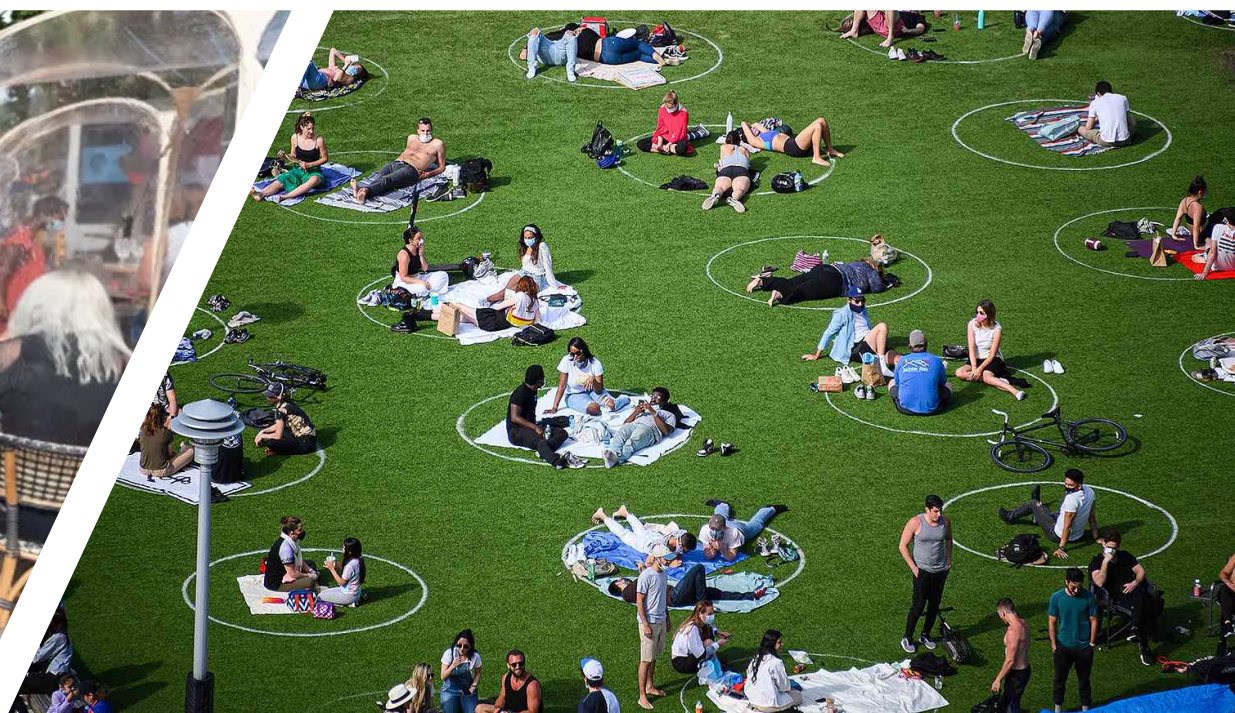
THE EMBODIED MIND AND ITS
CHALLENGE TO WESTERN THOUGHT

GEORGE LAKOFF AND MARK JOHNSON

AUTHORS OF METAPHORS WE LIVE BY











Bodies, Brains and Synthetic Containers

This presentation is part of the 'Bodies, Brains and Synthetic Containers' project, which is a collaboration between the University of Cambridge and the University of Oxford. The project is funded by the Wellcome Trust and the UK Research and Innovation (UKRI) programme. The project aims to explore the relationship between the body, the brain, and the synthetic container, and to develop a new framework for understanding the human mind.

ENTERING CONSCIOUSNESS

we rise **out** of slumber

come into consciousness

climb out from under the comforter

shifting our weight **onto** our feet

step **into** our slippers

stretch out our limbs

take in a deep breath of fresh air

shuffle **into** the kitchen

through the haze of a waking state

de-containerize our Capn' Crunch

pour some **into** a bowl

pour **in** some milk

dip a spoon **into** the bowl

scoop up some cereal

shovel it **into** our mouths

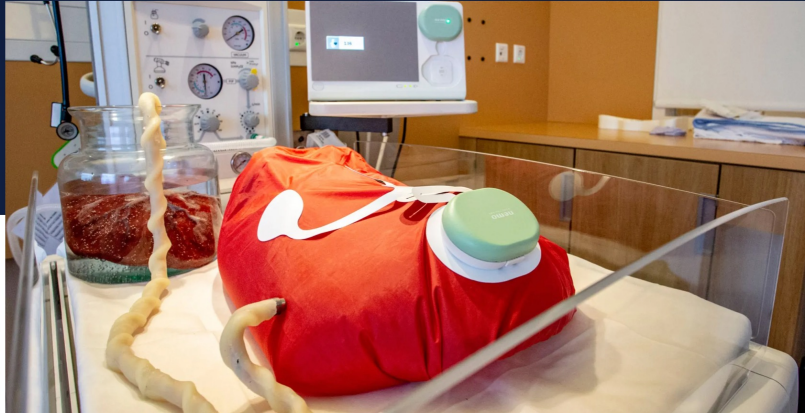
BIOTECHNOLOGY AND HEALTH

Everything you need to know about artificial wombs

Artificial wombs are nearing human trials. But the goal is to save the littlest preemies, not replace the uterus.

By Cassandra Willyard

September 29, 2023



BIOTECHNOLOGY AND HEALTH

Everything you need to know about artificial wombs

Artificial
preemies

By Cassar

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Two Women-Led Startups Look To Solve Baby- Formula Crisis With Synthetic Breast Milk





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Are we really going to merge our minds with computers some time soon?



STEVEN TUCKER

August 05, 2024 8 Mins Read 2 Reactions

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The Singularity Is Nearer: When We Merge With AI
by Ray Kurzweil | The Bodley Head/Penguin, 2024, 419 pages

Nearly a decade ago, I wrote a book named *Forgotten Science* about overblown delusions of scientific hubris throughout history. One chapter featured a potted account of [Aleksandr Sukhovo-Kobylin](#) (1817–

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ENTERING CONSCIOUSNESS

we rise **out** of slumber
come into consciousness
climb out from under the comforter
shifting our weight **onto** our feet
step **into** our slippers
stretch out our limbs
take in a deep breath of fresh air
shuffle **into** the kitchen
through the haze of a waking state
de-containerize our Capn' Crunch
pour some **into** a bowl
pour **in** some milk
dip a spoon **into** the bowl
scoop up some cereal
shovel it **into** our mouths

ENTERING REPRODUCTION

the man goes **into** the woman
semen comes **out** of him
travels **through** her birth canal
into her uterus
his seed **breaks through** the barrier
of her egg, and the fertilized egg
attaches to the **wall** of her womb
in time a protective **barrier surrounds**
the embryo and new life develops
inside the amniotic **sac**
at 9 months gestation, the baby **pushes**
through the protective **layer**
breaking the water
and **entering into** a new material world

**“Previously surveillance was
above the skin. Now, it is going
under the skin.**

**Governments want to know
not just where we go or
who we meet.**

**Above all, they want to know
what is happening under
our skin.”**

Yuval Noah Harari



ENTERING POSTHUMAN FUTURES

The Internet of Bodies: The Human Body as an Efficient and Secure Wireless Channel

Abdulkadir Celik, *Senior Member, IEEE*, and Ahmed M. Eltawil, *Senior Member, IEEE*.

Abstract—The Internet of Bodies (IoB) is a network of smart objects placed in, on, and around the human body, allowing for intra- and inter-body communications. This position paper aims to provide a glimpse into the opportunities created by implantable, injectable, ingestible, and wearable IoB devices. The paper starts with a thorough discussion of application-specific design goals, technical challenges, and enabling communication standards. We discuss why the highly radiative nature of radio frequency (RF) systems results in inefficient communication due to over-extended coverage, causing interference and becoming susceptible to eavesdropping. Alternatively, body channel com-

millions of deaths caused by fatal and chronic diseases each year, IoB may pave the way for a scalable and affordable medical system that offers proactive and preventative care for all. In addition to healthcare, IoB can revolutionize many other sectors such as smart-home assisted independent living, occupational health and safety, wellness & fitness, sports, and entertainment.

The remainder of this paper starts with a taxonomy of IoB devices and applications, providing a myriad of opportunities.

The 4th Industrial Revolution



Pandemic is key moment in history when “... our physical, ... digital ... and biological identities can merge.”

—Klaus Schwab, 2020

The 21st-Century Game Changer

COGNITIVE WARFARE



Although most of the cognitive attacks remain below the threshold of armed conflict, the effects can be lethal and multi-domain, affecting all five domains of warfare.

COGNITIVE WARFARE

“Neural nanotechnology can be used to bring nano-sized robots close to a neuron via the bloodstream and make it possible to link the human brain directly to a computer, making use of artificial intelligence in the process.”

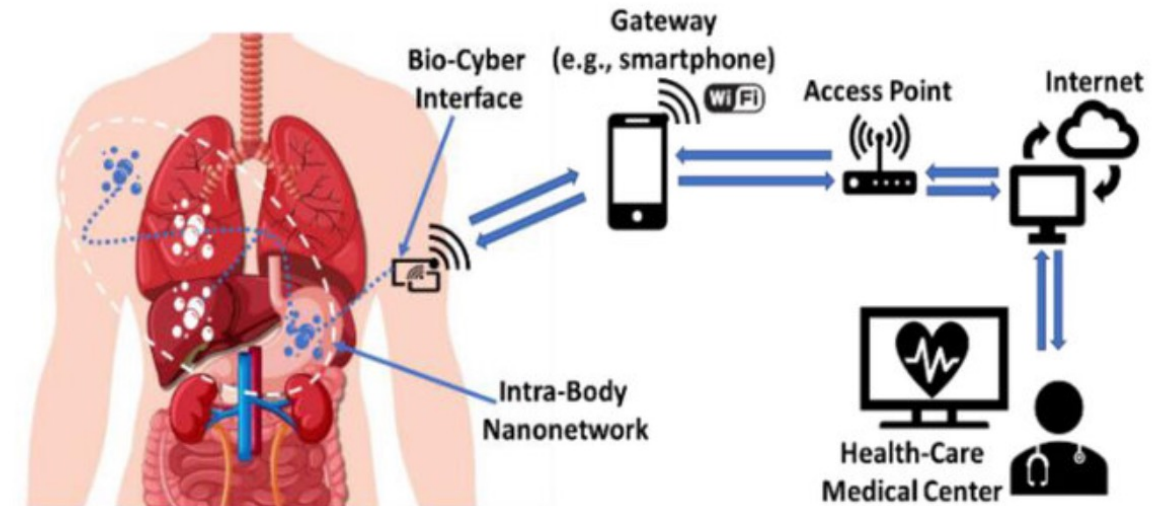
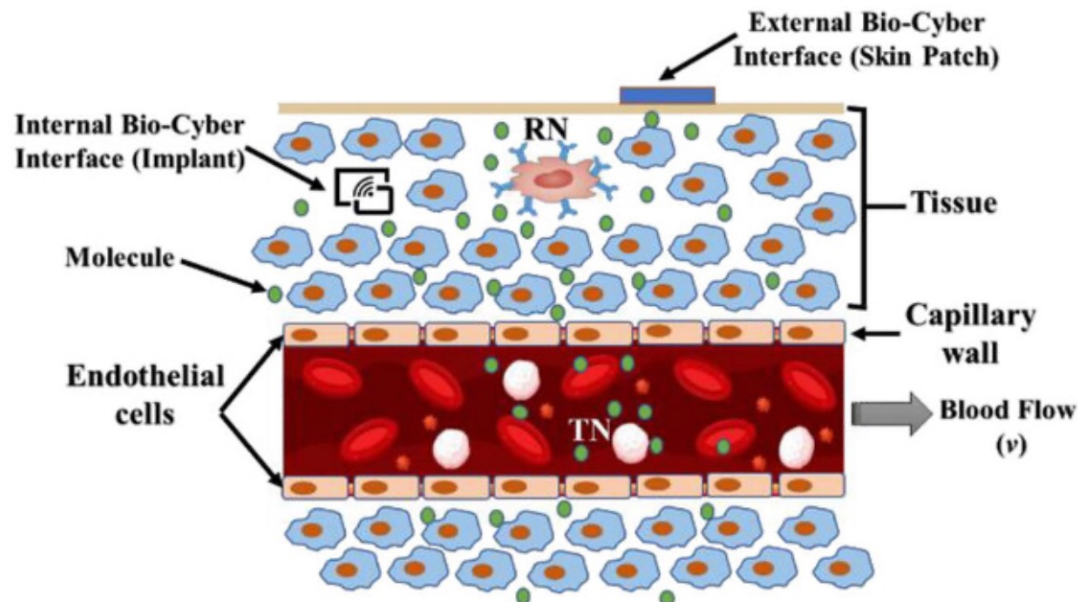
Intrabody Molecular Communication via Blood-Tissue Barrier for Internet of Bio-Nano Things

Muneer M. Al-Zubi^{ID}, Ananda S. Mohan^{ID}, Peter Plapper^{ID}, and Sai Ho Ling^{ID}, *Senior Member, IEEE*

2022

Abstract—Molecular communication (MC) is an emerging communication paradigm that allows bio-nanomachines (NMs) to communicate using biochemical molecules as information car-

riers [aka, nanomachines (NMs), nanorobots, or bio-nano things] in the body. This paradigm is a promising solution for biomedical applications, such as drug delivery, disease diagnosis, and health monitoring. In this paper, we propose a novel intrabody molecular communication (IMC) paradigm that allows bio-nano machines (NMs) to communicate via the blood-tissue barrier (BTB) for the Internet of Bio-Nano Things (IoBNT). The proposed IMC paradigm is based on the concept of molecular communication (MC) and is designed to enable NMs to communicate via the BTB. The proposed IMC paradigm is based on the concept of molecular communication (MC) and is designed to enable NMs to communicate via the BTB. The proposed IMC paradigm is based on the concept of molecular communication (MC) and is designed to enable NMs to communicate via the BTB.



ENTERING POSTHUMAN FUTURES

1. Bodies as data centers/sources (Container schema) – our physical selves reconceived as generators of valuable information to be extracted, analyzed, and utilized for the new economy
2. Health as optimization (Container schema) – human wellness reframed as a technical problem to be solved through continuous technocratic tinkering, oversight, monitoring, adjustment, and update
3. Connection as inherently good (Container schema) – the metaphorical mapping of physical (body/brain) network connectivity onto social and medical benefit
4. Progress as unquestionable inevitability (Space schema) – technological advancement framed through journey metaphors as a predetermined path

*The American Journal of*
ECONOMICS and SOCIOLOGY

Original Article | Open Access |

From Greta to the Great Reset: Making Emergencies Work

Matthew T. Witt

First published: 23 May 2022 | <https://doi.org/10.1111/ajes.12457>

SECTIONS



PDF



TOOLS



SHARE

Abstract

This article examines the continuity of incidents linking Greta Thunberg to an ongoing stream of political shifts. It first takes us back to 1992 to her preteen predecessor, Severn Suzuki, and then forward to the COVID-19 period and its consequences. The connecting thread that runs from 1992 to the present is the use of rhetoric to inspire terror in the population. Terror is used to promote acceptance of censorship and authoritarian restrictions that ironically interfere with the capacity of democracies to solve the problems confronting the world, such as climate change and pandemics. Elite actors create anxiety and terror to retain legitimacy in their control of narratives that preserve their power. This article shows how the World Economic Forum is transforming the acerbic language of Greta Thunberg into the basis for what is called the Great Reset, a set of policies that will enable the state and select businesses and NGOs to monitor and track the population and eliminate dissent. In short, when children are put in the world spotlight with a message,

**Volume 81, Issue 2**

March 2022

Pages 381-406



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Fauci admits pandemic social distancing rules were NOT base on science they “sort of just appeared”

On January 11, 2024 it was revealed that when **Dr Anthony Fauci** was under oath in a 2 day closed-door **interview** with the House Select **Committee** on Coronavirus Pandemic, he admitted that pandemic guidance such as the “6-feet apart” **social distancing** recommendations that were forced on Americans, **“it just sort of appeared”** and were likely not based on scientific data. [1, 2, 3]

Yet during the pandemic he claimed that measures imposed were based on “following the science”

During the interview he said **“over 100 times** that he “did not recall” important information and conversations relevant to the origins of Covid-19 and the U.S. pandemic response he presided over.”

In November 2022 deposition he also **didn’t recall** much about his hand in the COVID-19 response, even though he **forgets**, he thinks people **“don’t have the ability”** to decide what’s best for themselves. [2]

On June 20, 2021 Fauci claimed to be “the science” that an attack on him was an attack on science. If you questioned him on the justification for face mask mandates, you were attacking “the science”!

*“If you are trying to ...get at me ... you’re really attacking not only Dr Anthony Fauci, **you’re attacking science**”*

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99th Congress (1985-1986)

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Passed House amended (10/14/1986)

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Shown Here:
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(Measure passed House, amended)
National Childhood Vaccine Injury Act of 1986 - **Title I: Vaccines - Subtitle 1: National Vaccine Program** - Amends the Public Health Service Act to establish in the Department of Health and Human Services a National Vaccine Program to: (1) direct vaccine research and development within the Federal Government; (2) ensure the production and procurement of safe and effective vaccines; (3) direct the distribution and use of vaccines; and (4) coordinate governmental and nongovernmental activities. Requires the Director of the Program to report to specified congressional committees.

Establishes the National Vaccine Advisory Committee to recommend: (1) ways to encourage the availability of an adequate supply of vaccines; and (2) research priorities.





The MAC Address Phenomenon:

Persistent, Unregistered Bluetooth Emissions and the Emergence of a Synthetic Signal Layer

David Nixon, M.B., Ch.B.

Independent Scholar and Physician

Brisbane, Australia

Email: david@drdavidnixon.com | Website: www.journalbnt.org | ORCID: 0009-0007-9817-5421

Keywords: *Bluetooth anomalies, unregistered MAC addresses, synthetic signal layer, entropy compression, OUI turnover, bio-nano communication, wireless surveillance, persistent emissions, BLE identity spoofing, Wireless Body Area Networks (WBAN), Internet of Bodies (IoB),*

Abstract

Since 2021, the consistent appearance of unnamed, unregistered Bluetooth MAC addresses in human-dense environments has raised profound questions about the nature, origin, and intent of these signals. Detected through passive scanning, these emissions conform to Bluetooth structure but fail to resolve to known commercial devices. Frequently observed in proximity to individuals—including those vaccinated against COVID-19—these signals exhibit constrained

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Digital Object Identifier 10.1109/ACCESS.2021.3093442

A Systematic Review of Bio-Cyber Interface Technologies and Security Issues for Internet of Bio-Nano Things

**SIDRA ZAFAR^{ID1}, MOHSIN NAZIR¹, TAIMUR BAKHSI^{ID2},
HASAN ALI KHATTAK^{ID3}, (Senior Member, IEEE), SARMA DULLAH KHAN⁴,
MUHAMMAD BILAL^{ID5}, (Senior Member, IEEE),
KIM-KWANG RAYMOND CHOO^{ID6}, (Senior Member, IEEE),
KYUNG-SUP KWAK^{ID7}, (Life Senior Member, IEEE), AND ANEEQA SABAH^{ID8}**

¹Department of Computer Science, Lahore College for Women University, Lahore 54000, Pakistan

²Center for Information Management and Cyber Security, National University of Computer and Emerging Sciences, Lahore 54770, Pakistan

³School of Electrical Engineering and Computer Science, National University of Sciences and Technology (NUST), Islamabad 44000, Pakistan

⁴School of Computer Science and Informatics, De Montfort University, Leicester LE1 9BH, U.K.

⁵Department of Computer Engineering, Hankuk University of Foreign Studies, Yongin, Gyeonggi 17035, South Korea

⁶Department of Information Systems and Cyber Security, The University of Texas at San Antonio, San Antonio, TX 78249, USA

⁷Department of Information and Communication Engineering, Inha University, Incheon 22212, South Korea

⁸Department of Physics, Lahore College for Women University, Lahore 54000, Pakistan

Corresponding authors: Muhammad Bilal (mbilal@hufs.ac.kr) and Kyung-Sup Kwak (kskwak@inha.ac.kr)

This work was supported by the National Research Foundation of Korea Grant through the Korean Government (Ministry of Science and

I love the smell of napalm in the morning.





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Computers in Biology and Medicine

Volume 136, September 2021, 104707



Securing Bio-Cyber Interface for the Internet of Bio-Nano Things using Particle Swarm Optimization and Artificial Neural Networks based parameter profiling

Sidra Zafar ^a , Mohsin Nazir ^a , Aneeqa Sabah ^b , Anca Delia Jurcut ^c [Show more](#) [+](#) Add to Mendeley [Share](#) [Cite](#)<https://doi.org/10.1016/j.compbiomed.2021.104707> [Get rights and content](#)

Highlights

- Identification and simulation of communication parameters for BioFET based bio-cyber interface.
- Individuation of security concerns for bio-cyber interface.
- Implementation of Particle Swarm Optimizer (PSO) for Artificial Neural Network (ANN).
- To propose a security framework for bio-cyber interface of IoBNT, based on ANN classification.
- Extensive simulations to gather results and evaluate performance of the proposed framework.

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Energy and spectrum-aware MAC protocol for perpetual wireless nanosensor networks in the Terahertz Band

Pu Wang ^{a 1}  , Josep Miquel Jornet ^{b 1} , M.G. Abbas Malik ^{c 1} , Nadine Akkari ^{c 1} ,
Ian F. Akyildiz ^{c d 1} 

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Abstract

Wireless NanoSensor Networks (WNSNs), i.e., networks of nanoscale devices with unprecedented sensing capabilities, are the enabling technology of long-awaited applications such as advanced health monitoring systems or surveillance networks for chemical and biological attack prevention. The peculiarities of the Terahertz Band, which is the envisioned frequency band for communication among nano-devices, and the extreme energy limitations of nanosensors, which require the use of nanoscale energy harvesting systems, introduce major challenges in the design of MAC protocols for WNSNs. This paper aims to design energy and spectrum-aware MAC protocols for WNSNs with the objective to achieve fair, throughput and lifetime optimal channel

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At Least 55 Undeclared Chemical Elements Found in COVID-19 Vaccines from AstraZeneca, CanSino, Moderna, Pfizer, Sinopharm and Sputnik V, with Precise ICP-MS¹

Lorena Diblasi, PhD¹, Martín Monteverde, MD², David Nonis, PhD³, Marcela Sangorrín, PhD⁴

¹ Biotechnologist, Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán, Argentina

² Physician, MD, Colegio Médico de Santa Fe, Argentina

³ Molecular and Cellular Biologist, PhD, California, USA

⁴ Biologist, PhD, PROBIEN (Instituto de Investigación y Desarrollo en Ingeniería de Procesos, Biotecnología y Energías Alternativas) — CONICET-UNCO, Neuquén, Argentina. sangorin.marcela@gmail.com ORCID <https://orcid.org/0000-0001-7372-8359>

Microbiome-Gut-Brain Axis as a Biomolecular Communication Network for the Internet of Bio-NanoThings

IAN F. AKYILDIZ¹, (Fellow, IEEE), JIANDE CHEN², MAYSAM GHOVANLOO³, (Fellow, IEEE),
ULKUHAN GULER⁴, (Member, IEEE), TEVHIDE OZKAYA-AHMADOV¹,
MASSIMILIANO PIEROBON⁵, (Member, IEEE), A. FATIH SARIOGLU¹, (Member, IEEE),
AND BIGE D. UNLUTURK¹, (Student Member, IEEE)

¹School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA 30332, USA

²Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD 21218, USA

³Bionic Sciences, Atlanta, GA 30316, USA

⁴Department of Electrical and Computer Engineering, Worcester Polytechnic Institute, Worcester, MA 01609, USA

⁵Department of Computer Science and Engineering, University of Nebraska–Lincoln, Lincoln, NE 68588, USA

Corresponding author: Bige D. Unluturk (bigedeniz@ece.gatech.edu)

The work of I. F. Akyildiz, U. Guler, M. Pierobon, and B. D. Unluturk was supported by the U.S. National Science Foundation (NSF) under Grant CNS-1763969.

• **ABSTRACT** This article presents fundamental challenges in the development of a self-sustainable and biocompatible network infrastructure to interconnect the next-generation electrical and biological wearable and implantable devices, i.e., the Internet of Bio-NanoThings. The direct contact of IoBNT devices with the human body, where the cells naturally communicate and organize into networks, suggests the possibility to exploit these biological communications for the device-to-device interconnection. The aim of this work is to investigate minimally invasive, heterogeneous, and externally accessible electrical/molecular communication channels to transmit information between these devices through the Microbiome-Gut-Brain Axis (MGBA), composed of the gut microbial community, the gut tissues, the enteric nervous system. A framework to develop a network infrastructure on top of the biological processes underlying the MGBA, and the intercommunications among its components is proposed. To implement this framework, the following challenges need to be tackled. First, physical channel models should be developed to quantitatively

implants, pacemakers, and smart watches, whereas biological devices comprise manipulated natural cell and tissues or man-made synthetic ones such as engineered immune system cells, engineered gut microbes, and artificial cornea.

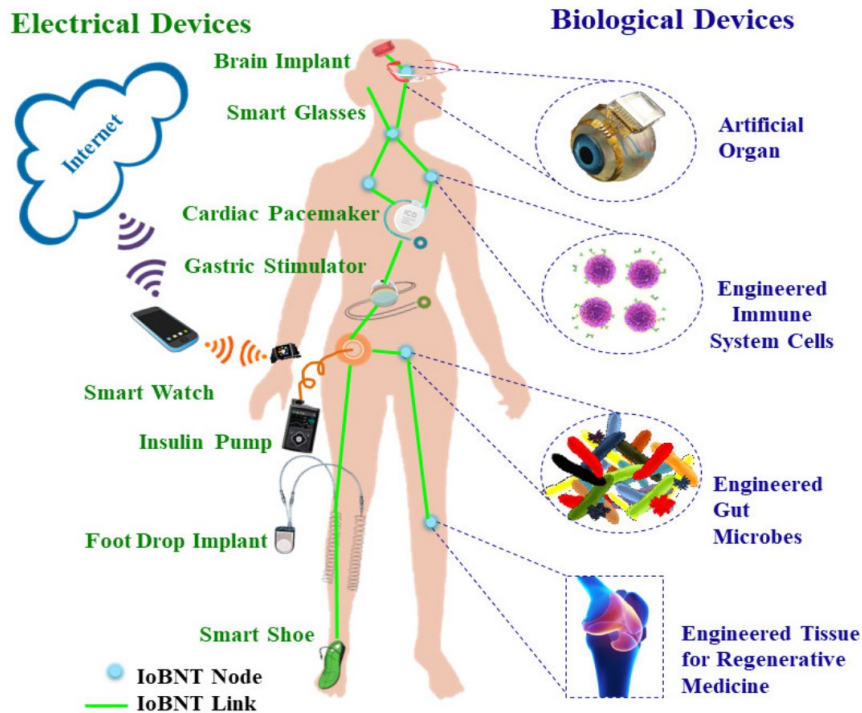


FIGURE 1. The Internet of Bio-NanoThings paradigm.

Developing the IoBNT communication network infrastructure requires the following main prerequisites: (i) integrating accurate and predictable models of communication and networking parameters, (ii) minimizing the interference with natural body functions in order to prevent any psychological or physical discomfort, (iii) interconnecting heterogeneous devices (electrical and molecular), (iv) accessibility from

The accessibility of MGBA from the external environment through the alimentary canal, and the presence of microbial cells, which are genetically programmable as biological devices, make this system particularly interesting to explore in light of the IoBNT paradigm. A direct connection with the MGBA will also provide a large amount of data about the health of the central and autonomous nervous system, as well as the gut.

This article discusses the **utilization of the MGBA as an IoBNT communication network infrastructure** to transmit and receive information generated by and/or directed to electronic and biological devices, as shown in Fig. 2, where this infrastructure is also envisioned to communicate with the external environment through dedicated molecular (alimentary canal) and electrical (wireless data transfer through skin) interfaces.

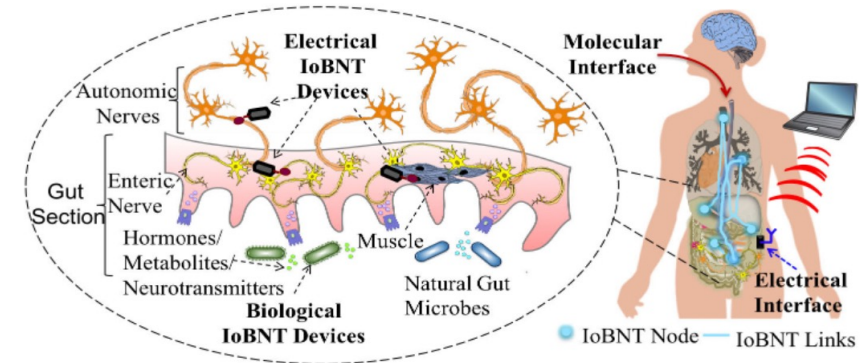


FIGURE 2. Microbiome-Gut-Brain-Axis IoBNT communication network infrastructure.

To this end, we present a methodology that comprises both analytical and experimental efforts. The analytical effort builds on top of neuroscience and bioinformatics to abstract

1960

Man-Computer Symbiosis*

J. C. R. LICKLIDER†

Summary—Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. The main aims are 1) to let computers facilitate formulative thinking as they now facilitate the solution of formulated problems, and 2) to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs. In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform them. Prerequisites for the achievement of the effective, cooperative association include developments in computer time sharing, in memory components, in memory organization, in programming languages, and in input and output equipment.

I. INTRODUCTION

A. Symbiosis

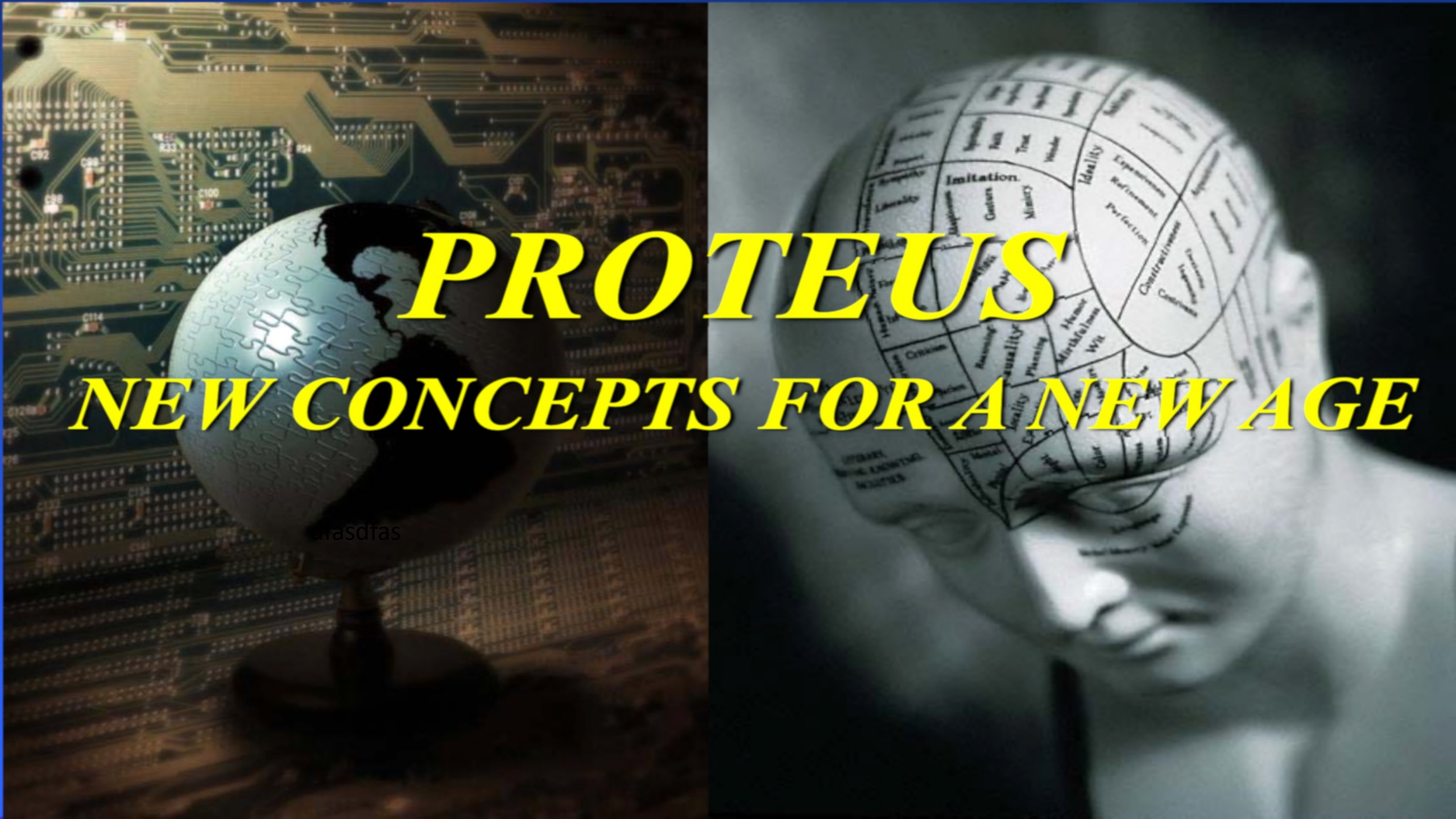
THE fig tree is pollinated only by the insect *Blastophaga grossorum*. The larva of the insect lives in the ovary of the fig tree, and there it gets its

will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today.

B. Between "Mechanically Extended Man" and "Artificial Intelligence"

As a concept, man-computer symbiosis is different in an important way from what North² has called "mechanically extended man." In the man-machine systems of the past, the human operator supplied the initiative, the direction, the integration, and the criterion. The mechanical parts of the systems were mere extensions, first of the human arm, then of the human eye. These systems certainly did not consist of "dissimilar organisms living together . . ." There was only one kind of organism—man—and the rest was there only to help him.

In one sense of course, any man-made system is intended to help man, to help a man or men outside the system. If we focus upon the human operator(s) within the system, however, we see that, in some areas of technology, a fantastic change has taken place during the



PROTEUS

NEW CONCEPTS FOR A NEW AGE

masdras

2024

represents a bias of its own, and a lack of due diligence on our critics' part. The "Nano–Bio–Info–Cogno (NBIC)" era of the 21st century (see Jamali et al., 2018) is an already very well-documented development (Cevallos et al., 2022; The White House, 2022), and our aim is to urge scholars to enlarge the critical lens they use to assess these phenomena. This broadening of perspective has direct bearing on science and scholarship, direct implications for the status of legacy biosciences, and requires inclusion in any explanatory framework, which we discuss briefly in this reply.

Keywords: *COVID-19 injectables, incubation studies, lipids, nanotechnology, self-assembly*

Introduction

Professor Ian Akyildiz, pioneer of the Internet of Bio-Nano Things (IoBNT), pointed out in an advanced technology symposium in 2023:

... the **Bio-nanoscale machines** [behind the IoBNT] are for injecting into the body ... and that is going really well with these Covid vaccines. It's going that direction. These mRNAs are nothing [other] than small scale, nano-scale machines. They are programmed, and they are injected [Akyildiz, 2023; also see Akyildiz et al., 2015].

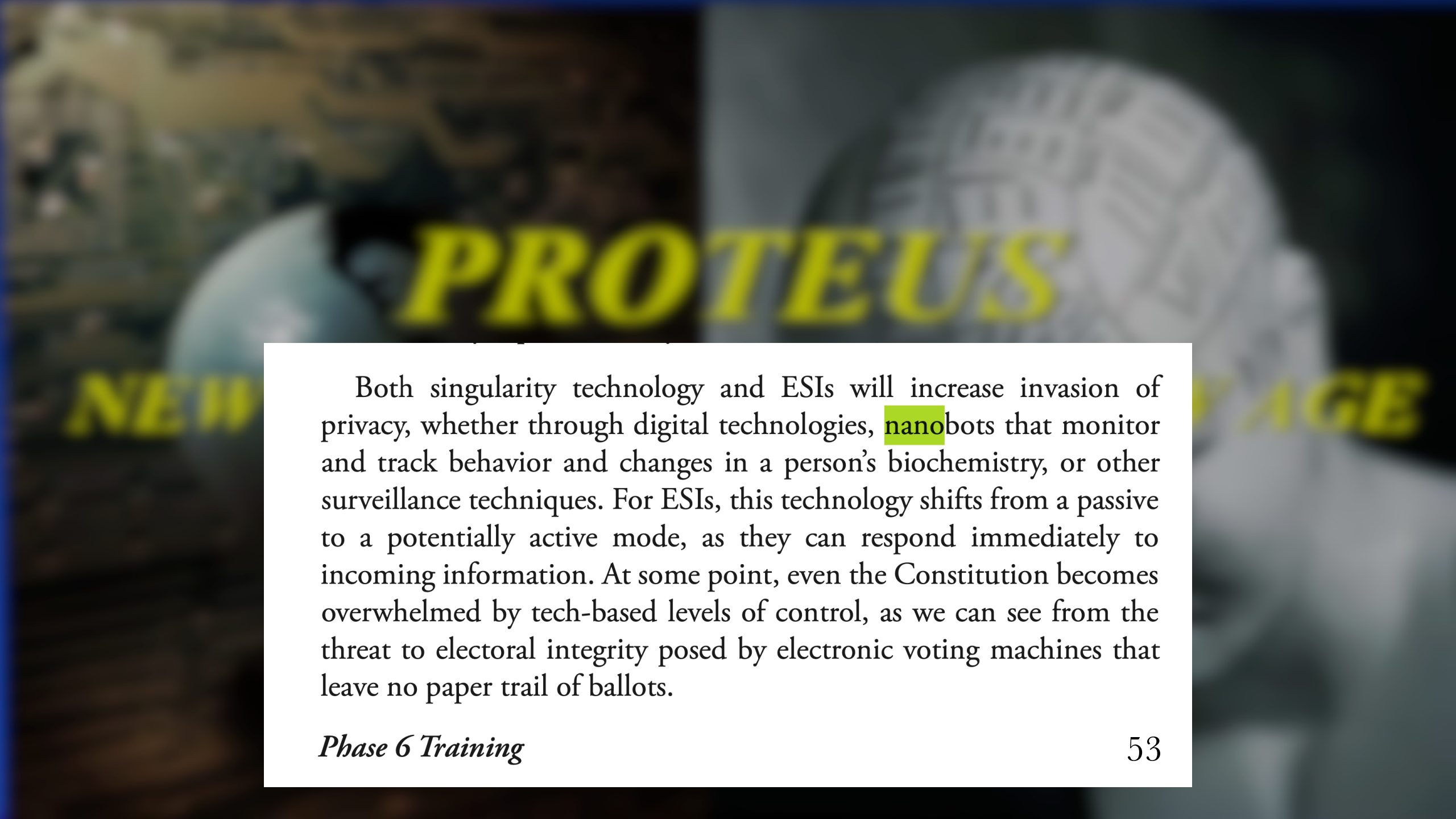
In the article, "Real-Time Self-Assembly of Stereomicroscopically Visible Artificial Constructions in Incubated Specimens of mRNA Products Mainly from Pfizer and Moderna: A Comprehensive Longitudinal Study", Lee and Broudy (2024) described the results of an observational and exploratory study of 54 samples of COVID injectable products, viewed under a stereomicroscope. The samples were incubated for up to 630 days and observed for both morphology and behavior. Various self-assembling structures were found to form over time, some of which showed responsiveness to conditions of incubation, including a marked acceleration in development upon exposure to wireless radiation. In the context of relevant scholarly discussions in the diverse fields of interest, we noted that, "our observations suggest the presence of some kind of nanotechnology in the COVID-19 injectables" (in our abstract on p. 1180). We added that "both the morphology

2. *Miniaturization*: that power is packed into smaller and smaller packages, down to atom-sized machines.
3. *Speed*: the speed of all processes is accelerating, which changes the fundamentals of business, politics, economics, relationships, etc.
4. *Materials*: new materials that achieve extraordinary effects are created on a daily basis.
5. *Convergence*: the applications of all these technologies are converging. Faster computers affect every field; nanotechnology promises quantum leaps in bioengineering, brain work, etc. New materials can be designed to achieve a host of envisioned

effects. The convergence point seems to be the human mind and body.

6. *Interface*: there is no question that, given the first five elements, these technologies will inevitably be integrated into the human body and brain. Not only is the technology increasingly available, but the will is there as well. The ability to enhance human power has been a staple of myth and popular culture at least since the Gilgamesh epic sold out its first edition in ancient Sumeria, and self-improvement is virtually a religion, with hundreds of millions of devout adherents.

leaders' "gut instincts." Meanwhile, the whole point of the singularity is functionality, true of technology in general. It is also, by definition, "counter-visceral": when machines—even nanobots the size of molecules—replace bio-chemistry, they replace the activities of the body's viscera. The singularity occurs because the processing speed of the machine, combined with the ability to integrate with biological systems, enables it to replace visceral biological operations with mechanical ones. This is true for nanobots facilitating cell function, super-computers calculating at peta-hertz speeds, tweaked genes resulting in great intellect or strength, longevity formulas based on artificially induced hyper-efficient biological activity, or implants granting microscopic vision.



Both singularity technology and ESIs will increase invasion of privacy, whether through digital technologies, nanobots that monitor and track behavior and changes in a person's biochemistry, or other surveillance techniques. For ESIs, this technology shifts from a passive to a potentially active mode, as they can respond immediately to incoming information. At some point, even the Constitution becomes overwhelmed by tech-based levels of control, as we can see from the threat to electoral integrity posed by electronic voting machines that leave no paper trail of ballots.

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equipment, and to Dr. G. E. R. Deacon and the captain and officers of R.R.S. *Discovery II* for their part in making the observations.

¹ Young, F. B., Gerrard, H., and Jevons, W., *Phil. Mag.*, **40**, 149 (1920).

² Longuet-Higgins, M. S., *Mon. Not. Roy. Astro. Soc., Geophys. Supp.*, **5**, 285 (1949).

³ Von Arx, W. S., Woods Hole Papers in Phys. Oceanog. Meteor., **11** (3) (1950).

⁴ Ekman, V. W., *Arkiv. Mat. Astron. Fysik. (Stockholm)*, **2** (11) (1905).

MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

WE wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest.

A structure for nucleic acid has already been proposed by Pauling and Corey¹. They kindly made their manuscript available to us in advance of publication. Their model consists of three intertwined chains, with the phosphates near the fibre axis, and the bases on the outside. In our opinion, this structure is unsatisfactory for two reasons: (1) We believe that the material which gives the X-ray diagrams is the salt, not the free acid. Without the acidic hydrogen atoms it is not clear what forces would hold the structure together, especially as the

is a residue on each chain every 3.4 Å. in the z-direction. We have assumed an angle of 36° between adjacent residues in the same chain, so that the structure repeats after 10 residues on each chain, that is, after 34 Å. The distance of a phosphorus atom from the fibre axis is 10 Å. As the phosphates are on the outside, cations have easy access to them.

The structure is an open one, and its water content is rather high. At lower water contents we would expect the bases to tilt so that the structure could become more compact.

The novel feature of the structure is the manner in which the two chains are held together by the purine and pyrimidine bases. The planes of the bases are perpendicular to the fibre axis. They are joined together in pairs, a single base from one chain being hydrogen-bonded to a single base from the other chain, so that the two lie side by side with identical z-co-ordinates. One of the pair must be a purine and the other a pyrimidine for bonding to occur. The hydrogen bonds are made as follows: purine position 1 to pyrimidine position 1; purine position 6 to pyrimidine position 6.

If it is assumed that the bases only occur in the structure in the most plausible tautomeric forms (that is, with the keto rather than the enol configurations) it is found that only specific pairs of bases can bond together. These pairs are: adenine (purine) with thymine (pyrimidine), and guanine (purine) with cytosine (pyrimidine).

In other words, if an adenine forms one member of a pair, on either chain, then on these assumptions

“two helical chains”

“coiled round the same axis”

**“sequences of the atoms in the two chains
run(ning) in opposite directions”**

“specific pairs of bases”

**“suggests a possible copying mechanism
for the genetic material”**

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mRNA DESIGN STUDIO™ 2020

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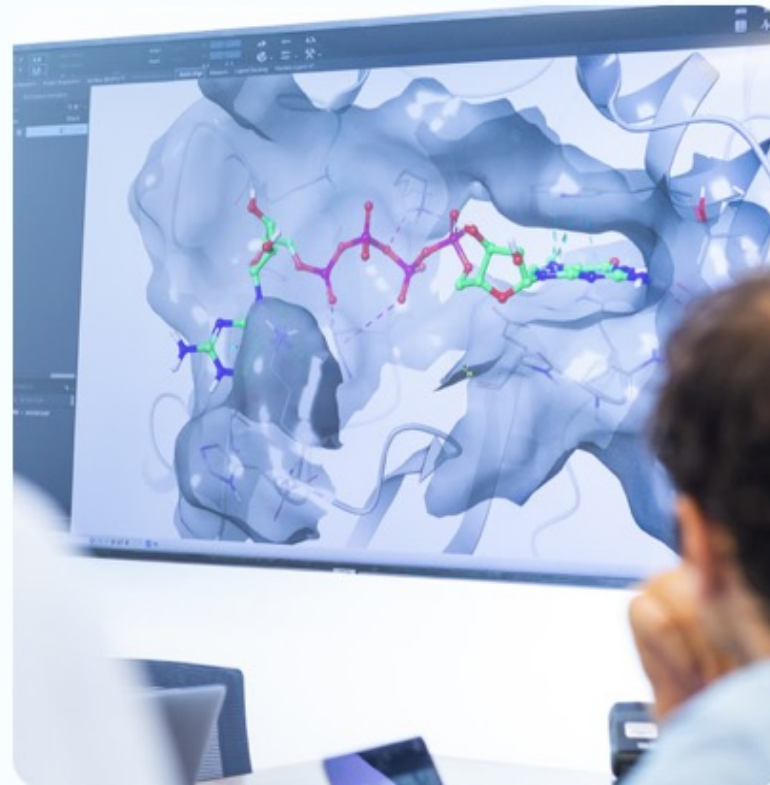
As the DIGITAL BIOTECH COMPANY™, we **maximize the utility** of mRNA in our proprietary, web-based mRNA DESIGN STUDIO.

Protein targeting

mRNA tailoring

Parallel design

Automation platforms



Parallel design

- The utility of cloud-based capacity allows us to provide flexible computational capacity on demand.
- This allows the Research Engine to **power parallel intake and design** of multiple mRNA sequences.

Recognizing the broad potential of mRNA science, we set out to create an mRNA technology platform that functions very much like an operating system on a computer.

It is designed so that it can plug and play interchangeably with different programs. In our case, the “program” or “app” is our mRNA drug — the unique mRNA sequence that codes for a protein.

(Moderna, 2020)

Mechanistic Representations of Biological Systems

brain = CPU

body = machine

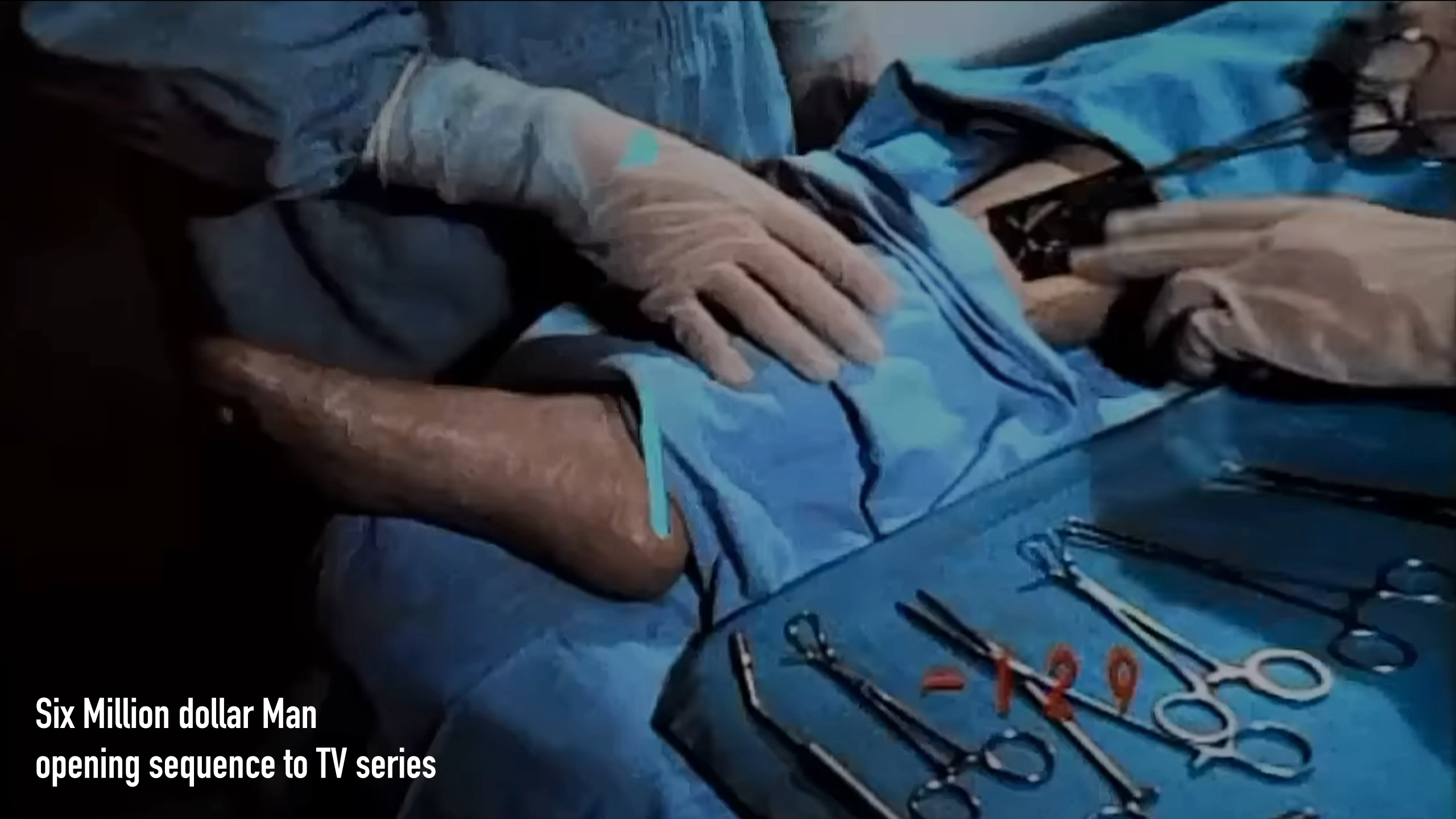
DNA = computer code

We'll be like house cats.

**The solution is to have
an AI layer of . . . your limbic
system, your cortex and then
a digital layer above the cortex
that could work symbiotically
with you.**

Musk, 2016





**Six Million dollar Man
opening sequence to TV series**





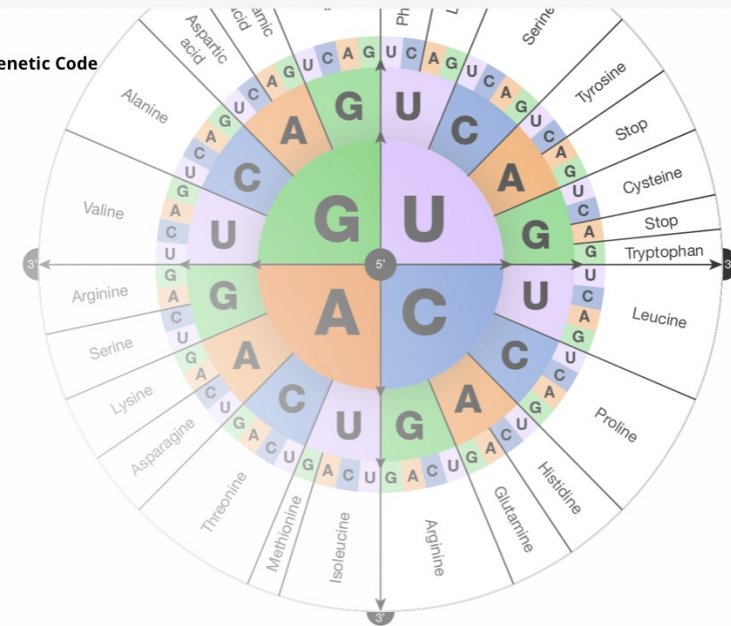
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GENETIC CODE

updated: April 5, 2025



En Español

Definition



00:00



00:33



Genetic code refers to the instructions contained in a gene that tell a cell how to make a specific protein. Each gene's code uses the four nucleotide bases of DNA: adenine (A), cytosine (C), guanine (G) and thymine (T) — in various ways to spell out three-letter “codons” that specify which amino acid is needed at each position within a protein.

George Lakoff

Women,
Fire, and
Dangerous
Things

*What Categories Reveal
about the Mind*

" ... understanding of the world in terms of objects, properties, and relations [which] is an imposition of our conceptual schemes upon external reality; reality as we understand it is structured by our conceptual schemes" (1987, 262).

A woman with dark hair, a yellow flower in her hair, and a purple t-shirt is reaching for a memorial tag on a wall. She has tattoos on her arms. The background is a wall covered with many memorial tags and flowers.

SUBSTANCE USE DISORDER

Young Adults Are Dying Earlier Than Expected

Mortality among adults ages 25-44 began rising at an alarming rate in 2011 and accelerated even more during the COVID-19 pandemic. This spike was largely driven by substance misuse, followed by poor nutrition and transportation accidents.

Two Clashing Paradigms

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Interdisciplinary relations of converging technologies: Nano–Bio–Info–Cogno (NBIC)

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Abstract

Hamid R. Jamali [✉](#) Ghasem Azadi-Ahmadabadi & Saeid Asadi
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NaBoCom - Connecting in-body nano communication with body area networks



TKN is co-organizing

- ICC WS Tactile Internet with Human-in-the-Loop
- IEEE MedComNet 2025
- IEEE INFOCOM 2025
- SI in T-MBMC on IoBNT

Featured Paper

- XAIomaly: Explainable and Interpretable Deep Contractive Autoencoder for O-RAN Traffic Anomaly Detection

Institutions

- TU Berlin
- University of Lübeck

Description

Research and development on sensor networks and body area networks has gained increased maturity in recent years. Yet, in-body nanonetworks built from nanodevices represent a new and fascinating direction of research, extending upon and going well beyond sensor networks. The vision of these networks is that nanodevices (nanoscale devices), for example, patrol the body, take measurements wherever necessary, and send collected data to the outside. Even better, these machines may immediately work on problems they detect within the body, such as cancer cells, arteriosclerosis, or HI viruses. While the in-body nanonetwork research community is still young, a number of concepts has already been presented on how to organize the communication in such networks. Even though these have not been realized in large-scale experiments or applications yet, it now makes sense to start research in a broader spectrum, looking both at techniques to bring nano communications to the real world and at further aspects such as higher-level protocols, algorithmic issues, as well as applications. In this proposal, we are looking at biomedical applications with a focus on the necessary integration of in-body nano communication with out-of-body IT infrastructures, resulting in the so-called Internet of Nano Things (IoNT). It has three major objectives: First, as a technical base for further research, we plan to design a reference architecture for the IoNT, specifically looking at connecting in-body nanonetworks to body area networks and further IT infrastructures. Secondly, we want to achieve first research results focusing on important base technologies for IoNT, particularly naming and addressing, reliability and real-time capabilities, and finally localization. Finally, since real-world experimentation in nano communication is still far from becoming reality, but we still need to evaluate our results (and those of others), we will develop a simulator, which allows to simulate numerous scenarios including body area networks and in-body nanonetworks. We explicitly focus our ambitions on more abstract problems, which greatly benefit from previous works in computer science and networking rather than reinventing signal processing.

Selected Publications

2025

Conferences and Workshops

1. [Saswati Pal](#), [Jorge Torres Gómez](#), [Lisa Y. Debus](#), Regine Wendt, Florian-Lennert Adrian Lau, Cyrus Khandanpour, Malte Sieren, Stefan Fischer and [Falko Dressler](#), "Machine Learning-Driven Localization of Infection Sources in the Human Cardiovascular System," Proceedings of 9th Workshop on Molecular Communications (WMC 2025), Catania, Italy, April 2025. (to appear) [\[BibTeX\]](#), [More details](#)

paper, Achieving Resilience in ...

- March 27, 2025
New IEEE Transactions on Networking article

Stable Age of Information Scheduling with NOMA in Edge Networks

Abstract: Achieving resilience in edge networks from the perspective of information scheduling is a challenging task. In this paper, we consider a multi-user edge network with a central server and multiple edge nodes. The server is responsible for scheduling the information of the edge nodes to the central server. The edge nodes are responsible for scheduling the information of the central server to the edge nodes. The information scheduling is a complex task, and it is necessary to design a scheduling algorithm that can achieve resilience in edge networks. In this paper, we propose a scheduling algorithm that can achieve resilience in edge networks. The proposed algorithm is based on the idea of information scheduling. The proposed algorithm is based on the idea of information scheduling. The proposed algorithm is based on the idea of information scheduling.

Our article Stable Age of Information Scheduling with NOM...

- March 26, 2025
New Elsevier Computer Communications article

How Mature is 5G Deployment? A Cross-Sectional, Year-Long Study of 5G Uplink Performance

Abstract: 5G is the fifth generation of mobile communication technology. It is a key technology for the development of the Internet of Things (IoT) and the Industrial Internet of Things (IIoT). The 5G network is a complex system, and it is necessary to design a scheduling algorithm that can achieve resilience in edge networks. In this paper, we propose a scheduling algorithm that can achieve resilience in edge networks. The proposed algorithm is based on the idea of information scheduling. The proposed algorithm is based on the idea of information scheduling. The proposed algorithm is based on the idea of information scheduling.

Our article How Mature is 5G Deployment? A Cross-Sectiona...

- March 24, 2025
Keynote at IEEE WResNet6G 2025

All ▾



ADVANCED SEARCH

Journals & Magazines > IEEE Internet of Things Magaz... > Volume: 5 Issue: 3 ?

The Internet of Bodies: The Human Body as an Efficient and Secure Wireless Channel

Publisher: IEEE

Cite This



Abdulkadir Celik ; Ahmed M. Eltawil **All Authors**

12

Cites in
Papers

696

Full
Text Views



Abstract

Document Sections

» Introduction

» IoB Opportunities: A
Taxonomy of IoB Devices &
Applications

» IoB Design Goals and
Technical Challenges

» IoB Standards and Enabling
Technologies

Abstract:

The Internet of Bodies (IoB) is a network of smart objects placed in, on, and around the human body, allowing for intra- and inter-body communications. This position article aims to provide a glimpse into the opportunities created by implantable, injectable, ingestible, and wearable IoB devices. The article starts with a thorough discussion of application-specific design goals, technical challenges, and enabling communication standards. We discuss why the highly radiative nature of radio frequency (RF) systems results in inefficient communication due to over-ex-tended coverage, causing interference and becoming susceptible to eavesdropping. Alternatively, body channel communication (BCC) uses the human body as a transmission medium by coupling harmless electrical signals, yielding secure and efficient communication thanks to better channel conditions and lower signal leakage than over-the-air RF systems. Numerical results show that various BCC topologies can respectively reach 8–12 Mb/s and 1.5-3 Mb/s max-sum and max-min rates with 1 MHz bandwidth and -30 dBm transmission power, which is three orders of magnitude lower than safety limits. Moreover, the BCC is capable of accommodating tens of IoB nodes up to 1 Mb/s rates, which is sufficient for most IoB applications. Furthermore, as the cyber and biological worlds meet, security risks and privacy concerns take center stage, leading to a discussion of multi-faceted legal, societal, ethical, and political issues related to technology governance.

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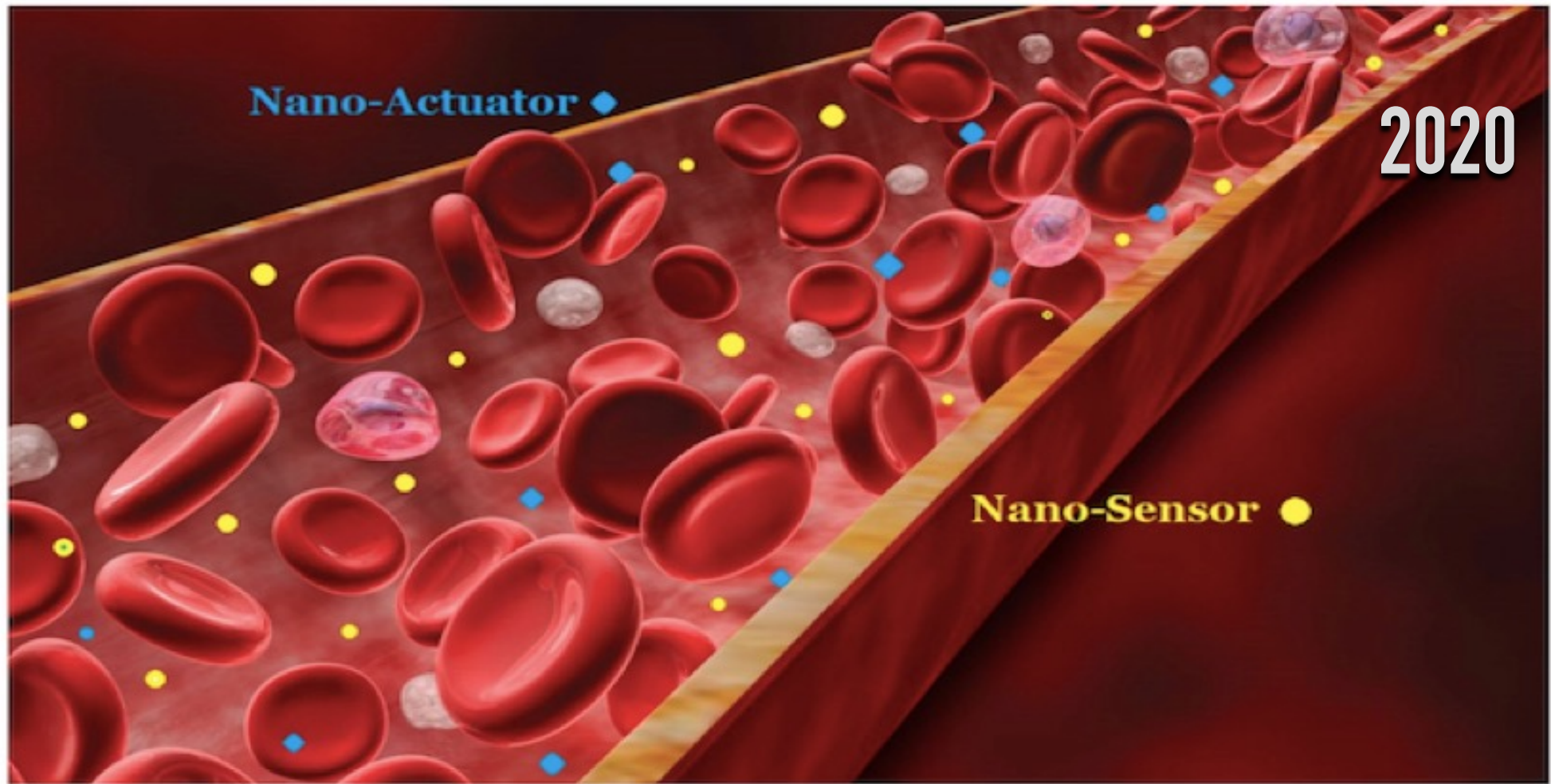
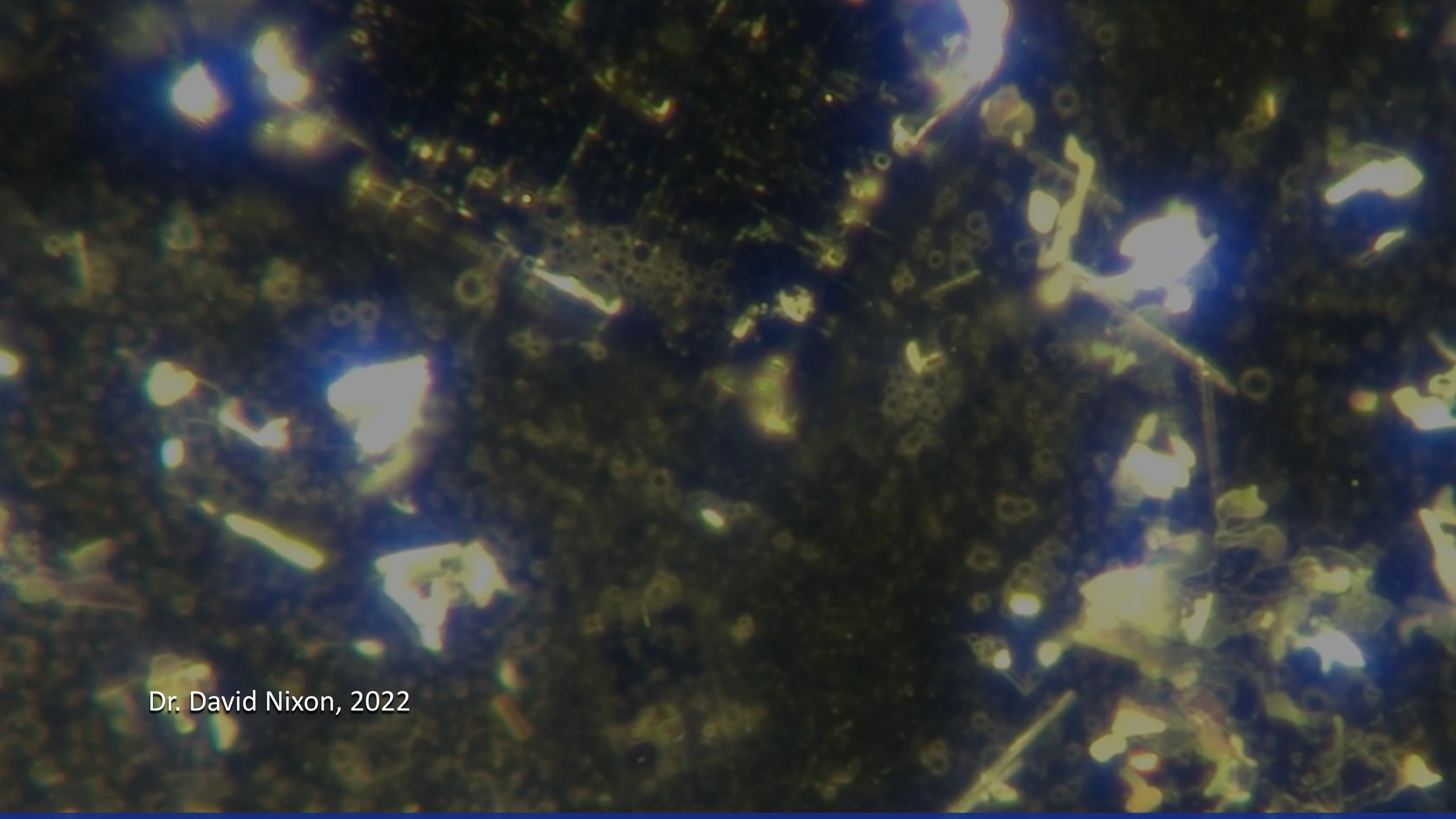
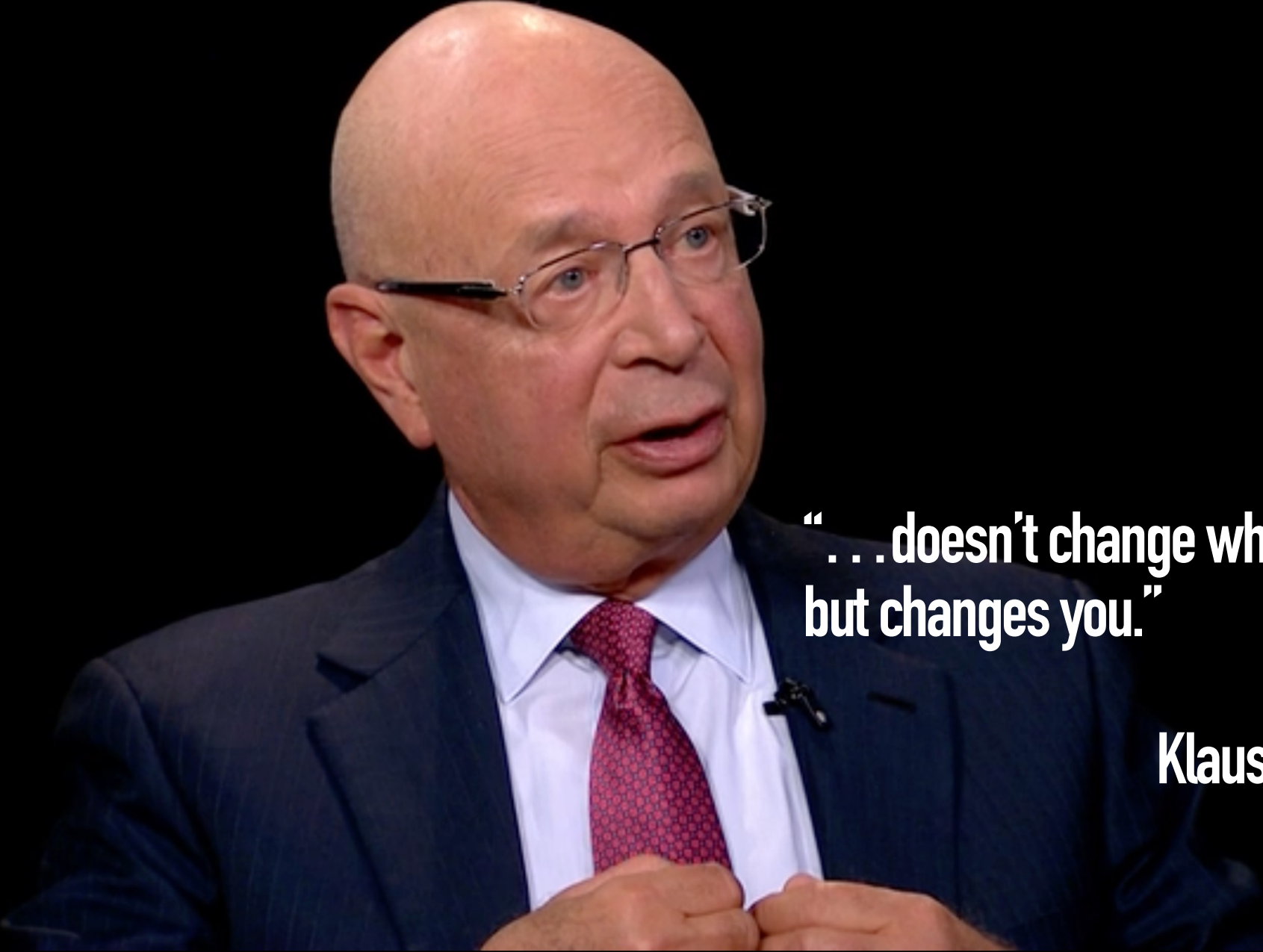


Fig. 3: Nanonetwork for drug delivery

Image from Yang, K., Bi, D., Deng, Y., Zhang, R., Rahman, M.M.U., Ali, N.A., Imran, M.A., Jornet, J.M., Abbasi, Q.H., & Alomainy, A. (2020). A comprehensive survey on hybrid communication in context of molecular communication and terahertz communication for body-centric nanonetworks. *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, 6(2), 107-133.



Dr. David Nixon, 2022

A medium shot of Klaus Schwab, a bald man with glasses, wearing a dark blue suit, white shirt, and a red patterned tie. He is speaking and looking slightly to his right. His hands are clasped in front of him. The background is dark and out of focus.

**“... doesn’t change what you are doing
but changes you.”**

Klaus Schwab, 2015

New Categories of Revolutionary Cellular Activity

INTERNATIONAL ENCYCLOPEDIA of UNIFIED SCIENCE

The Structure of Scientific Revolutions

By
Thomas S. Kuhn

VOLUMES I AND II • FOUNDATIONS OF THE UNITY OF SCIENCE

VOLUME II • NUMBER 2



“What man sees depends both upon what he looks at and also upon what his previous visual-conception experience has taught him to see”

Birth data 2022

		2021	2022	Chng	Mths	TFR 2015	TFR 2020	TFR 2021	TFR fcast
	Ireland					1,87	1,63	1,72	
	Finland	20.315	18.291	-10,0	5	1,65	1,37	1,46	1,30
	Iceland	1.140	1.110	-2,6	3	1,81	1,72	1,82	1,73
	Norway	13.726	12.869	-6,2	3	1,73	1,48	1,56	1,46
	Sweden	37.950	35.454	-6,6	4	1,85	1,66	1,67	1,56
	Denmark	15.148	14.298	-5,6	3	1,71	1,67	1,72	1,62
	Germany	187.543	164.614	-12,2	3	1,50	1,53	1,57	1,37
	Austria	20.668	19.152	-7,3	3	1,49	1,44	1,48	1,37
	Switzerland	26.530	24.468	-7,8	4	1,54	1,46	1,51	1,38
	Netherlands	71.421	67.058	-6,1	5	1,66	1,55	1,62	1,50
	Belgium	37.039	37.199	0,4	4	1,69	1,55	1,60	1,56
	France	289.400	296.600	2,5	5	1,96	1,82	1,83	1,82
	Portugal	24.632	25.065	1,8	4	1,31	1,40	1,34	1,23
	Spain	104.467	105.454	0,9	4	1,33	1,19	1,19	1,15
	Italy	94.461	90.798	-3,9	3	1,33	1,24	1,25	1,17
	Greece	41.274	36.968	-10,4	6	1,33	1,37	1,42	1,29
	Estonia	5.375	4.779	-11,1	5	1,58	1,58	1,59	1,44
	Latvia	5.386	5.199	-3,5	4	1,71	1,55	1,54	1,52
	Lithuania	9.560	8.441	-11,7	5	1,70	1,48	1,38	1,25
	Poland*	109.800	98.900	-9,9	4	1,44	1,52	1,45	1,34
	Czechia	27.200	24.200	-11,0	3	1,57	1,71	1,83	1,66
	Slovakia	18.414	16.903	-8,2	4	1,40	1,59	1,62	1,52
	Hungary	36.482	33.822	-7,3	5	1,44	1,56	1,59	1,49
	Slovenia	5.927	5.371	-9,4	4	1,57	1,59	1,63	1,50
	Croatia	14.840	13.839	-6,7	5	1,40	1,49	1,54	1,49
	Serbia*	23.656	24.171	2,2	5	1,61	1,62	1,62	1,68
	Romania	51.938	50.373	-3,0	4	1,48	1,63	1,67	1,66
	Bulgaria	12.641	12.393	-2,0	3	1,53	1,56	1,58	1,59
	Moldova					1,88	1,62	1,55	
	North Macedonia*	3.896	4.009	2,9	3	1,89	1,70	1,68	1,76
	Montenegro	1.662	1.644	-1,1	3	1,74	1,75	1,75	1,75
	Bosnia & Herzeg.	5.817	5.711	-1,8	3	1,24	1,19	1,22	1,22
	Albania*	6.006	6.056	0,8	3	1,80	1,53	1,51	1,54
	Russia	447.628	420.073	-6,2	4	1,78	1,51	1,51	1,45
	Ukraine*	21.931	18.062	-17,6	1	1,63	1,34	1,28	
UK:	England & Wales					1,82	1,58	1,61	
	Northern Ireland	9.196	8.773	-4,6	5	1,96	1,71	1,82	1,71
	Scotland	18.949	19.542	3,1	5	1,56	1,29	1,31	1,34

		2021	2022	Chng	Mths	TFR 2015	TFR 2020	TFR 2021	TFR fcast
	USA					1,84	1,64	1,66	1,64
	Australia					1,80	1,58	1,64	1,58
	New Zealand	14.070	15.555	10,6	3	2,00	1,61	1,64	1,75
	Puerto Rico					1,34	0,92	1,00	
	Costa Rica	16.763	17.149	2,3	4	1,76	1,41	1,31	1,34
	Chile					1,80	1,38	1,22	
	Kazakhstan	137.435	127.018	-7,6	4	2,73	3,13	3,29	3,07
	Uzbekistan	311.726	338.626	8,6	5	2,49	2,86	3,08	3,35
	Kyrgyzstan	48.346	46.309	-4,2	4	3,19	3,05	2,89	2,75
	Georgia					2,30	1,97	1,95	
	Armenia	11.501	10.665	-7,3	4	1,64	1,66	1,71	1,63
	Azerbaijan	39.718	40.036	0,8	4	2,12	1,69	1,53	1,55
	Iran	378.492	399.347	5,5	4	2,14	1,64	1,61	1,72
	Egypt	310.000	353.100	13,9	2	3,68	2,93	2,82	
	Israel	58.266	57.306	-1,6	4	3,09	2,90	2,99	2,91
	Mongolia	24.000	19.200	-20,0	4	3,01	2,94	2,77	2,24
	Japan	263.559	255.277	-3,1	4	1,45	1,33	1,30	1,28
	South Korea	92.880	89.300	-3,9	4	1,24	0,84	0,81	0,79
	Taiwan	59.481	56.206	-5,5	5	1,18	0,99	0,98	0,86
	Hong Kong	14.130	9.434	*	4	1,20	0,88	0,77	
	Macao	1.584	1.496	-5,6	4	1,14	0,89	0,76	0,71
	Singapore	8.949	8.995	0,5	3	1,24	1,10	1,12	1,06
	Thailand	253.906	232.059	-8,6	6	1,52	1,27	1,18	1,08
	Malaysia					2,00	1,70	1,63	
	Mauritius					1,36	1,46	1,40	
CA:	British Columbia	10.439	9.975	-4,4	3	1,38	1,18	1,20	1,13
	Quebec	19.550	19.200	-1,8	3	1,67	1,52	1,56	1,50

Forecasts based
on selected
subnational
areas
(experimental,
treat data with
caution):

	TFR 2015	TFR 2020	TFR 2021	TFR fcast
UK	1,80	1,56	1,59	1,56
Canada	1,60	1,40	1,43	1,37
Brazil	1,86	1,67	1,60	1,55
Argentina	2,35	1,57	1,59	1,62
China	1,75	1,28	1,16	1,08

Values in grey are based on developments in some subnational regions and are less reliable

This year, the TFR forecast for some countries will be calculated based on a comparison between 2020 and 2022

* Corrected for unaccounted emigration

* In HK, birth registration in February and March 2022 was inhibited

Mths: Number of months of data available, e.g. 3 means data from January to March

Chng: Percentage change compared to the same period one year earlier

2021 and 2022 data refer to the same period within the year

*Science, Public Health Policy,
and the Law*

Volume 3:100–129

October, 2021

Clinical and Translational
Research

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Public Health Policy
Initiative (PHPI)



Critical Appraisal of VAERS Pharmacovigilance: Is the U.S. Vaccine Adverse Events Reporting System (VAERS) a Functioning Pharmacovigilance System?

Jessica Rose, PhD, MSc, BSc

The Institute for Pure and Applied Knowledge

“Patterns of adverse events, or an unusually high number of adverse events reported after a particular vaccine, are called ‘signals.’ If a signal is identified through VAERS, scientist[s] may conduct further studies to find out if the signal represents an actual risk.”

CDC on Vaccine Safety

Abstract

Following the initiation of the global rollout and administration of the COVID-19 vaccines^{1,2} on December 17, 2020, in the United States, hundreds of thousands of individuals have reported Adverse Events (AEs) using the Vaccine Adverse Events Reporting System (VAERS). To date, approximately 50%



Post Jab Autopsy Autopsy: post-jab Findings

23 October 2022

[Home](#) > [Blog](#) > [Pandemic-Response](#) > [COVID-19 Vaccines](#) > [Autopsy: post-jab](#)

Below are a collection of links specific to **autopsy** information in relation to the COVID-19 vaccines and COVID-19 the illness. You'll find articles, science papers, interviews, discussions and more which further builds the picture of anomalies and the characterisation of the potential harm from the gene technology, medical interventions released onto the public under "emergency use" in December 2020, and which only began human clinical trials earlier that same year.

An autopsy in the medical world is the equivalent of a financial audit in the corporate world. This involves an official examination of an organisation's accounts, verifying inputs and performance, and focusing on significant risks.

Dr Philip McMillan

Also included

- Articles where NO autopsy was performed,
- Surgical procedures revealing abnormal findings
- Autopsy following COVID-19 death, with or without jab

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Remember, autopsies were discouraged in not out-right not allowed in pandemic 2020. The first

The Internet of Bio-Nano Things in Blood Vessels: System Design and Prototypes

2023

Changmin Lee, Bon-Hong Koo, Chan-Byoung Chae, and Robert Schober

Abstract—In this paper, we investigate the Internet of bio-nano things (IoBNT) which pertains to networks formed by molecular communications. By providing a means of communication through the ubiquitously connected blood vessels (arteries, veins, and capillaries), molecular communication-based IoBNT enables a host of new eHealth applications. For example, an organ monitoring sensor can transfer internal body signals through the IoBNT to health-monitoring applications. We empirically show that blood vessel channels introduce a new set of challenges in the design of molecular communication systems in comparison to free-space channels. Then, we propose cylindrical duct channel models and discuss the corresponding system designs conforming to the channel characteristics. Furthermore, based on prototype implementations, we confirm that molecular communication techniques can be utilized for composing the IoBNT. We believe that the promising results presented in this work, together with the rich research challenges that lie ahead, are strong indicators that IoBNT with molecular communications can drive novel applications for emerging eHealth systems.

We spotlight health-monitoring systems based on bio-nano machines, which function and communicate with each other inside a body. Such systems require substantial provisions for biocompatibility and energy efficiency. The communication function of conventional robots for eHealth mainly relies on electromagnetic (EM) waves. However, this approach poses several problems, such as the development of nanoscale actuators, antennas, and bodily absorption of tera-hertz-band frequencies. In this work, we introduce molecular communications for eHealth as an alternative technology.

Molecular communication is a bio-inspired technology wherein the system components exchange information through molecules. For example, in nature, an ant colony implements swarm intelligence using pheromone signals, and organs work in harmony by regulating each other through hormones. Studies have indicated that in certain applications, molec-

The Internet of Bio-Nano Things in Blood Vessels: System Design and Prototypes

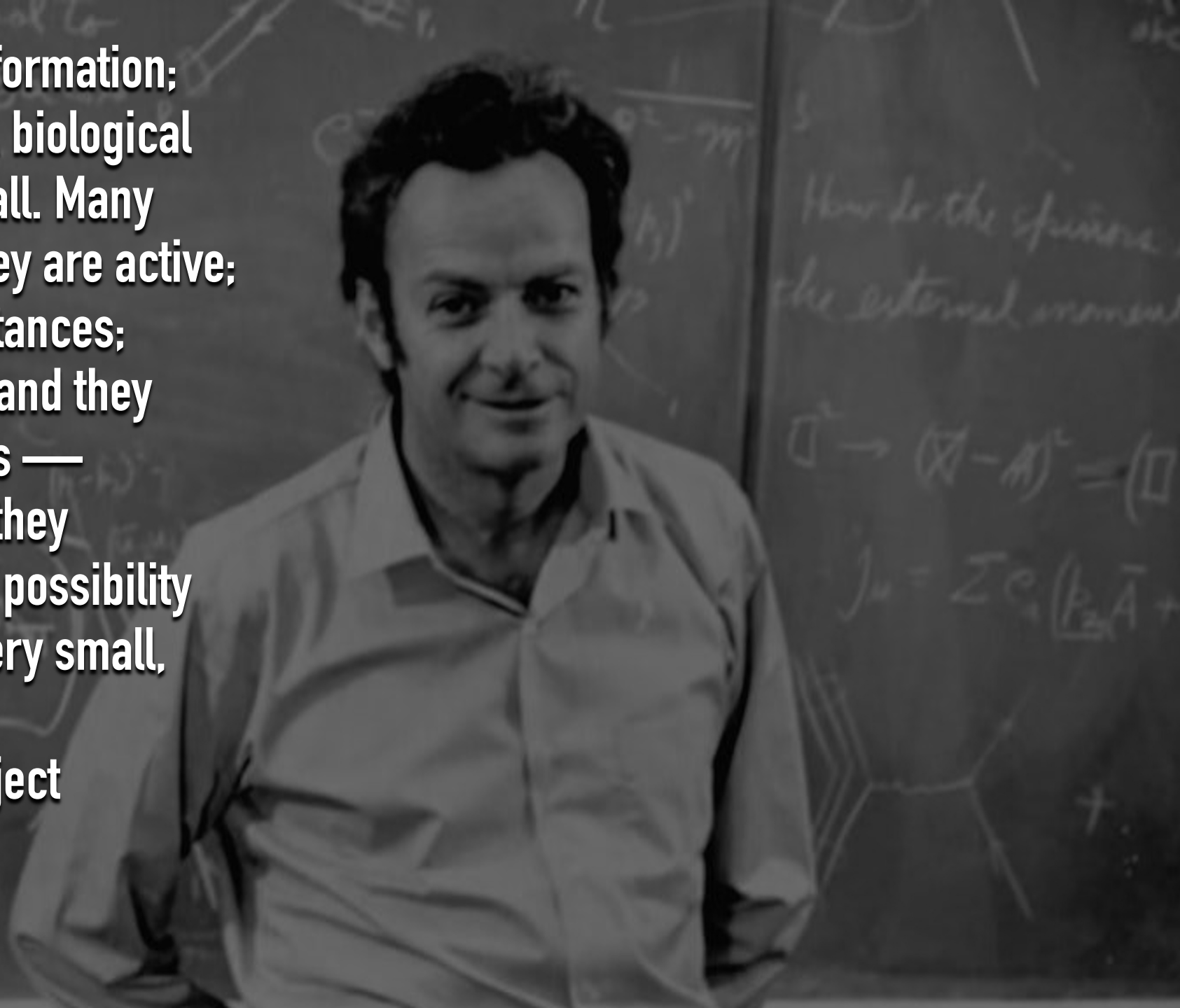
2023

Changmin Luo, Ben-Hong Kwon, Chan-Byoung Chae, and Robert Schaefer

For channel characteristics of molecular and RF communications. Numerous studies on molecular communications for general scenarios have been conducted in [4], [7].

The system exploits blood vessels as molecular communication channels. This requires a distinct channel model, whereas most existing studies on molecular communications have focused on free-space diffusive channels. Spatial limitations and the drift inherent in blood vessels are the main differences between blood vessels and free-space diffusive channels. These spatial limitations can be approximated using a cylindrical duct shape. In the studies on such cases [8]–[17],

Biology is not simply writing information; it is doing something about it. A biological system can be exceedingly small. Many of the cells are very tiny, but they are active; they manufacture various substances; they walk around; they wiggle; and they do all kinds of marvelous things — all on a very small scale. Also, they store information. Consider the possibility that we too can make a thing very small, which does what we want — that we can manufacture an object that moves at that level!



Works Cited

- Abdulkadir, C. and Ahmed, M. Eltawil, A. M. 2022. The Internet of Bodies: The Human Body as an Efficient and Secure Wireless Channel. *Internet of Things Magazine*.
- Al-Zubi, M. M., Mohan, A. S., Plapper, P., Ling, S. H. 2022. Intrabody Molecular Communication via Blood-Tissue Barrier for Internet of Bio-Nano Things. *IEEE Internet of Things Journal*. 9(21)
- Akyildiz, I. F., Chen, J., Ghovanloo, M., Guler, U., Ozkaya-Ahmadov, T., Pierobon, M., Fatih Sarioglu, A., Unluturk, B. D. 2019. Microbiome-Gut-Brain Axis as a Biomolecular Communication Network for the Internet of Bio-Nano Things. *IEEE Access*, 7:136161-136175
- Behr, E. R. 2014. When a young person dies suddenly. Surrey, UK: Cardiac Risk in the Young.
- Butler, K. 2020. Anti-vaxxers have a dangerous new theory called ‘natural immunity’: Now it’s going mainstream. Mother Jones.
- Celik, A., Eltawil, A. M. 2022. The Internet of Bodies: The Human Body as an Efficient and Secure Wireless Channel. *IEEE Internet of Things Magazine*. 5(3)
- Feynman, R. P. 1959. Plenty of Room at the Bottom. https://web.pa.msu.edu/people/yang/RFeynman_plentySpace.pdf
- Kuhn, T. S. 1962. *The Structure of Scientific Revolutions*. International Encyclopedia of Unified Science.
- McMillan, P. 2022. Post Jab Autopsy Findings. Totality of Evidence.
- Lakoff, G. 1985. Women, Fire and Dangerous Things: What Categories Reveal About the Mind. Chicago: University of Chicago Press.
- Lakoff, G. and Johnson, M. 1990. Metaphors We Live By. Chicago: University of Chicago Press
- Lakoff, G. and Johnson, M. 1999. Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought. New York: Basic Books
- Lee, C., Koo, B-H., Chae, C-B., Schober, R. 2023. The Internet of Bio-Nano Things in Blood Vessels: System Design and Prototypes. *Journal of Communications and Networks*. 25(2):222-231
- Lewicki, P. 1986. Nonconscious Social Information Processing. Orlando: Academic Press.
- Licklider, J. C. R. 1960. Man-Computer Symbiosis. *IRE Transactions in Human Factor in Electronics*.
- TOE. 2022. “Fauci admit pandemic social distancing rules were NOT based on science: They ‘sort of just appeared’” *Totality of Evidence*. <https://totalityofevidence.com/dr-anthony-fauci/>
- Wang, P., Jornet, J. M., Abbas Malik, M. G., Akkari, N. 2013. Energy and Spectrum-Aware MAC Protocol for Perpetual Wireless Nanosensor Networks in the Terahertz Band. *Ad Hoc Networks*. 11(8):2541-2555.
- Watson, J., Crick, F. 1953. Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid. *Nature* **171**:737-738
- Witt, M. T. 2022. From Greta to the Great Reset: Making Emergencies Work. *The American Journal of Economics and Sociology*. 81(2):381-406.
- Zafar, S., Nazir, M., Sabah, A., Jurcut, A. D. 2022. Securing Bio-Cyber Interface for the Internet of Bio-Nano Things Using Particle Swarm Optimzation and Artificial Neural Networks Based Parameter Profiling. *Computers in Biology and Medicine*.
- Zafar, S., Nazir, M., Bakhshi, T., Khattak, H. A., Khan, S., Bilal, M., Choo, K-K. R., Kwak, K-S., Sabah, A. 2021. A Systematic Review of Bio-Cyber Interface Technologies and Security Issues for Internet of Bio-Nano Things. *IEEE Access*. 136.

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