



SOLARI REPORT "FUTURE SCIENCE"

Ulrike Granögger

Medical Nanobots

Part 2

Epigenome and Wave Genome

Credits and Links for Further Study

General

Image: Nanobots

<https://blenderartists.org/t/nanobots/1182849>

Amy Webb (of WEF) on trends in Synthetic Biology

Amy Webb – Emerging Tech Trends | SXSW 2021

<https://youtu.be/ZnNUFbtC0Kw?t=3261>

Future Today Institute: 2021 Tech-Trends: Synthetic Biology, CRISPR, Agriculture

www.dropbox.com/s/dz95gm1vbzm2267/FTI_2021_Tech_Trends_Volume_1_2_SyntheticBio_Crispr_AgTech.pdf?dl=0

ATTRACT Conference: The future of Deep Tech and Its Impact on Society

<https://youtu.be/N7vT8wIEcG4>

Biodigital Convergence

Exploring Biodigital Convergence

<https://horizons.gc.ca/en/2020/02/11/exploring-biodigital-convergence/>

James Corbett - Biodigital Convergence: Bombshell Document Reveals the True Agenda

<https://www.corbettreport.com/biodigital-convergence-bombshell-document-reveals-the-true-agenda/>

Craig Venter: Synthia

Supporting Online Material for "Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome"

<https://science.sciencemag.org/content/sci/suppl/2010/05/18/science.1190719.DC1/Gibson.SOM.pdf>

Ken Shirriff's blog: Using Arc to decode Venter's secret DNA watermark
www.righto.com/2010/06/using-arc-to-decode-venters-secret-dna.html

Venter Creates First Synthetic Self-Replicating Bacteria from Scratch
<https://singularityhub.com/2010/05/20/venter-creates-first-synthetic-self-replicating-bacteria-from-scratch/>

DNA for Digital Data Storage

Video: Enzymatic DNA Synthesis for Data Storage | Henry Lee

<https://wyss.harvard.edu/technology/dna-data-storage/>

Storing data on DNA using synthetic fossils – Robert Grass and Wendelin Stark named European Inventor Award 2021 finalists

www.bionity.com/en/news/1171008/storing-data-on-dna-using-synthetic-fossils.html

Robert N. Grass & Wendelin Stark - DNA-based data storage

https://youtu.be/zosB_RUUiE

Overview: The Emergence of DNA Data Storage, and the Future of DNA Computing | Nick Gold, Catalog

https://youtu.be/1_OMEQ5SORg

Inner Workings: DNA for data storage and computing

www.pnas.org/content/112/52/15771

Book: Storing Digital Binary Data in Cellular DNA - Rocky Termanini

www.sciencedirect.com/book/9780323852227/storing-digital-binary-data-in-cellular-dna#book-info

Molecular Recording

Video: Movie Replayed From Living Cells' DNA Debuts "Molecular Recorder"

<https://youtu.be/gK3dcjBaJyo>

Scientists replay movie encoded in DNA

www.nih.gov/news-events/news-releases/scientists-replay-movie-encoded-dna

Molecular recording of mammalian embryogenesis
www.nature.com/articles/s41586-019-1184-5

Biological Computing

Amplifying Genetic Logic Gates

<https://science.sciencemag.org/content/340/6132/599>

A CRISPR/Cas9-based central processing unit to program complex logic computation in human cells

www.pnas.org/content/116/15/7214

Parallel computation with molecular-motor-propelled agents in nanofabricated networks

www.pnas.org/content/113/10/2591.abstract

and

www.researchgate.net/publication/295673531 Parallel computation with molecular-motor-propelled agents in nanofabricated networks

Video: Nano-Biological Computing – Quantum Computer Alternative!

<https://youtu.be/xcHcNyC6O84>

Institute of Human Obsolescence

<http://speculative.capital>

Dr. Michael Levin

Morphogenetic fields in embryogenesis, regeneration, and cancer: Non-local control of complex patterning

<https://sites.tufts.edu/biip2012/files/2012/05/Levin2012.pdf>

A scalable pipeline for designing reconfigurable organisms

www.pnas.org/content/117/4/1853

and

<https://www.pnas.org/content/suppl/2020/01/07/1910837117.DCSupplemental>

The wisdom of the body: future techniques and approaches to morphogenetic fields in regenerative medicine, developmental biology and cancer

www.futuremedicine.com/doi/pdf/10.2217/rme.11.69

TED Talk: The electrical blueprints that orchestrate life | Michael Levin

<https://youtu.be/XheAMrS8Q1c>

A cellular platform for the development of synthetic living machines

<https://robotics.sciencemag.org/content/6/52/eabf1571>

Scientists Create the Next Generation of Living Robots

https://youtu.be/g_eLsiAv8w4

Defects in developing frog brain can be prevented or repaired with bioelectric drugs

<https://sciencenewsnet.in/defects-in-developing-frog-brain-can-be-prevented-or-repaired-with-bioelectric-drugs/>

HCN2 Rescues brain defects by enforcing endogenous voltage pre-patterns

www.nature.com/articles/s41467-018-03334-5

This is the First LIVING Robot and it's Unbelievable

<https://youtu.be/js6uTRT8KO4>

Synthetic living machines: A new window on life

www.cell.com/action/showPdf?pii=S2589-0042%2821%2900473-9

Scientists Create the Next Generation of Living Robots

www.uvm.edu/uvmnews/news/scientists-create-next-generation-living-robots

Cells Form into 'Xenobots' on Their Own

www.quantamagazine.org/cells-form-into-xenobots-on-their-own-20210331/

Post-SSRI Sexual Dysfunction: A Bioelectric Mechanism?

www.liebertpub.com/doi/abs/10.1089/bioe.2019.0010

Mike Levin on electrifying insights into how bodies form

<https://wyss.harvard.edu/news/mike-levin-on-electrifying-insights-into-how-bodies-form/>

Persuading the Body to Regenerate Its Limbs

www.newyorker.com/magazine/2021/05/10/persuading-the-body-to-regenerate-its-limbs

Scientists Create the Next Generation of Living Robots

<https://now.tufts.edu/news-releases/scientists-create-next-generation-living-robots>

Meet the Xenobot, the World's First-Ever "Living" Robot

<https://youtu.be/wL64jqYn4CE>

Robert O. Becker

Electrical stimulation of partial limb regeneration in mammals

www.ncbi.nlm.nih.gov/pmc/articles/PMC1806700/pdf/bullnyacadmed00194-0024.pdf

Search for Evidence of Axial Current Flow in Peripheral Nerves of Salamander
<https://science.sciencemag.org/content/134/3472/101.abstract>

Book: The Body Electric: Electromagnetism and the Foundation of Life
www.goodreads.com/book/show/277641.The_Body_Electric

Epigenetics

Images from Wikipedia

A meta-analysis of epigenome-wide association studies in Alzheimer's disease highlights novel differentially methylated loci across cortex

<https://www.nature.com/articles/s41467-021-23243-4>

Spatial Computing and the Spatial Web

Spatial Computing in a COVID-19 World

www.iqt.org/spatial-computing-in-a-covid-19-world/

What is spatial computing?

www.ultraleap.com/company/news/blog/what-is-spatial-computing/

An Introduction to The Spatial Web

<https://medium.com/swlh/an-introduction-to-the-spatial-web-bb8127f9ac45>

Verses: Powering the Spatial Web | Hyperspace Transfer Protocol

<https://www.verses.io>

Video: VERSES - Let's Build the Spatial Web

<https://vimeo.com/311614349>

The Spatial Web and Web 3.0 - What business leaders should know about the next era of computing

www2.deloitte.com/us/en/insights/topics/digital-transformation/web-3-0-technologies-in-business.html

The Hexa-X vision is to connect human, physical, and digital worlds with a fabric of 6G key enablers

<https://hexa-x.eu>

Book: The Infinite Retina: Spatial Computing, Augmented Reality, and how a collision of new technologies are bringing about the next tech revolution

www.goodreads.com/book/show/53401494-the-infinite-retina

Book: The Spatial Web: How Web 3.0 Will Connect Humans, Machines, and AI to Transform the World

www.goodreads.com/book/show/52816204-the-spatial-web

Epigenetic 'Time' - DARPA Echo Program

Reading the Body's History of Threat Exposure

www.darpa.mil/news-events/2018-02-01

Preventing Pandemics (*Brochure*)

www.darpa.mil/attachments/Preventing_Pandemics_Vignette_Final_210208.pdf

Audio: "Voices from DARPA" Podcast, Episode 26: The Eclectic Biotechnician

<https://youtu.be/nJn7IY2y8C0>

An Early Warning System for Disease: An Interview With DARPA's Epigenetics Program Manager

www.forbes.com/sites/heatherwishartsmith/2021/04/05/an-early-warning-system-for-disease-an-interview-with-darpas-epigenetics-program-manager/

Identifying the Epigenetic Fingerprints of Weapons of Mass Destruction

<https://pratt.duke.edu/about/news/darpa-echo>

DARPA grants ASU up to \$38.8 million to create epigenetic tool for fight against weapons of mass destruction

<https://news.asu.edu/20190722-darpa-grants-asu-388-million-create-epigenetic-tool-fight-against-weapons-mass-destruction>

Combined with PREPARE Program: PRemptive Expression of Protective Alleles and Response Elements

www.darpa.mil/news-events/2019-06-27

and

<https://vlnovagenetika.cz/wp-content/uploads/2021/04/vlnovagenetika.cz-DARPA-DARPA-a-Preventivni-Ladeni-Genu-PREPARE-HR001118S0037.pdf>

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