Human_Internet @human_internet1

30 Mar 20 • 25 tweets • human_internet1/status/1244451370356191233

George Church, Ph.D.

George leads Synthetic Biology at the Wyss Institute, where he oversees the directed evolution of molecules, polymers, and whole genomes to create new tools with applications in regenerative medicine…

https://wyss.harvard.edu/team/core-faculty/george-church/

https://patents.google.com/?inventor=George+M.+Church&page=1

PATENTS ASSIGNED TO/ OR CONTRIBUTED BY

GEORGE CHURCH - HARVARD

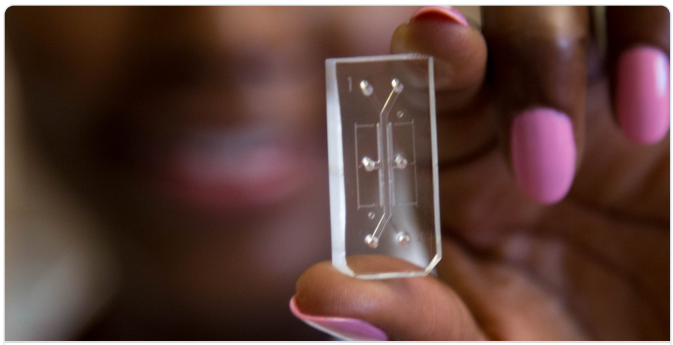
https://harvardmagazine.com/2004/01/dna-as-data.html

Speaking Nature's Language

A new editing technology could allow scientists to push genetic alterations through wild populations of organisms.

https://mail.harvardmagazine.com/2016/05/speaking-natures-language

Life: The Edited Version
George Church has developed tools for large-scale editing of the genome as fast and easy as word processing.
https://mail.harvardmagazine.com/2011/11/george-church-has-developed-tools-for-larg…

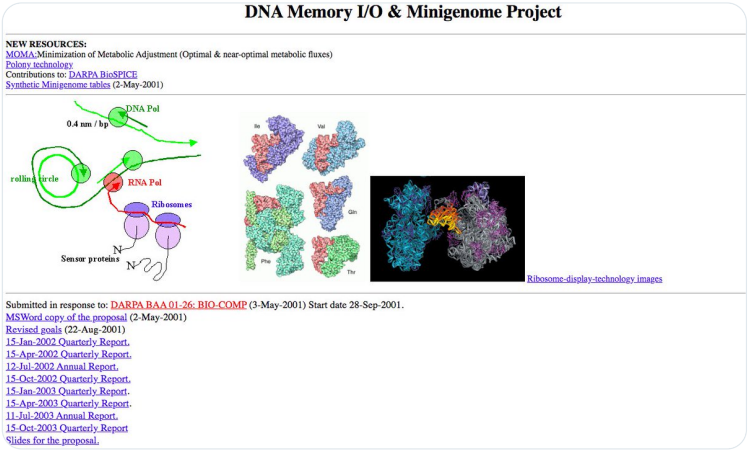


Technologies
The Wyss Institute develops groundbreaking bioinspired technologies that range from devices and materials to high-value therapeutics and diagnostics.
https://wyss.harvard.edu/technologies/?pg=10

Harvard - Synthetic Biology Projects
arep.med.harvard.edu/SBP/

2001 DARPA grant
arep.med.harvard.edu/darpabiocomp/

DARPA BAA 01-26: BIO-COMP (3-May-2001) Start date 28-Sep-2001
https://web.archive.org/web/20010306074918/https://www.darpa.mil/ito/Solicitations/PIP_01-26.html
I. DNA COMPUTING
II. COMPUTATIONAL MODELS AND SIMULATION OF INTRA-CELLULAR PROCESSES



George Church - Updated 3/3/2019
arep.med.harvard.edu/gmc/

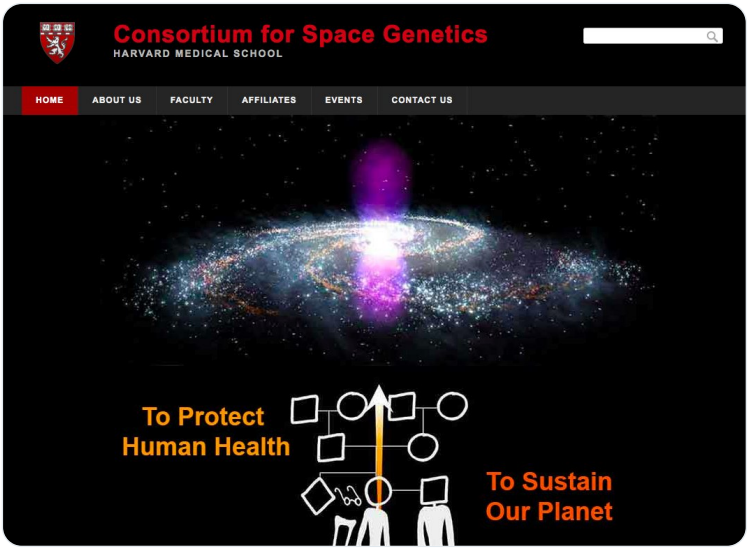
Harvard Molecular Technologies Updated 1/4/2019
arep.med.harvard.edu

64-x.com/news

64-x.com/team

64-x.com

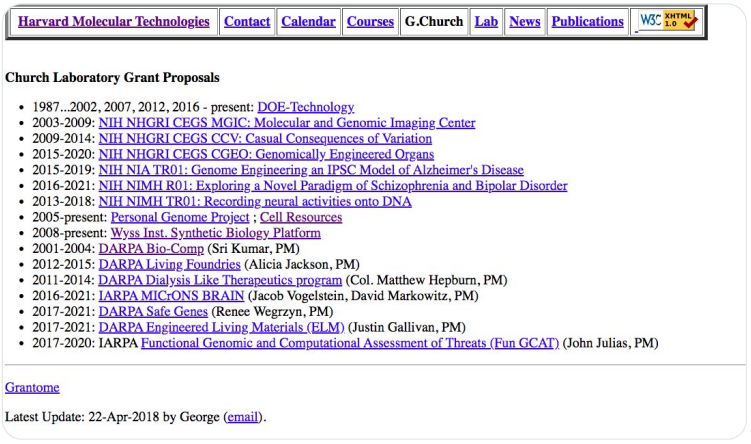
spacegenetics.hms.harvard.edu



GEORGE CHURCH LABORATORY GRANTS

HARVARD

http://arep.med.harvard.edu/gmc/gc_grants.html



DNA ENCODING
HARVARD
DNA AS "STORAGE" FOR DATA

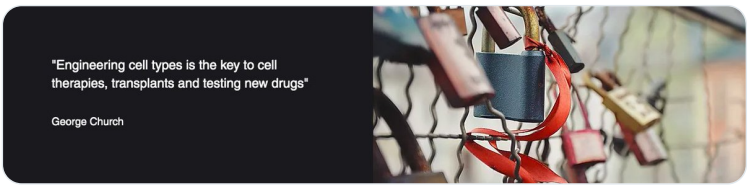
http://arep.med.harvard.edu/gmc/DNA_data.html

Novel Polymer Encoding Methods

Team	Method	Goal	*In vivo*
CatalogDNA	-	Info	N
Centrilliontech*	Chem+Enz	Seq	N
DNAScript	Enz	Bio	N
Iridia*	-	Info	N
Evonetix*	-	Bio	N
Kern Systems*	TdT	Info	N
Microsoft*	Chem	Info	N
Molecular Assemblies	TdT	Bio+Info	N
Nuclera*	TdT	Bio	N
Palluk et al.	TdT	Bio	N
Church et al. 2012*	Chem	0.5 Mbyte	N
Shipman et al. 2017*	Cas1/2	Info	Y
Kalhor et al. 2017*	hgRNA	1TByte	Y
Technicolor*	Chem	Info	N
Twist*	Chem	Bio+Info	N

Chem: Phosphoramidite, water-free acetonitrile, etc.
Enz: Enzymatic Polymerization (PNP, TdT, ligase, etc.)
TdT: Terminal deoxynucleotidyl Transferase
Bio: High fidelity required for synthetic biological applications
Info: Storage Lower raw accuracy, yet high consensus accuracy
Seq: Oligos for complete genome sequencing
In vivo, Y: applications to recording biological data in living cells
* = Church lab related.
Molecular Information Storage -- MIST IARPA.
The impending data storage crisis, and how DNA will fix it (Synbiobeta, 6-May-2019 | Matt Klusas)

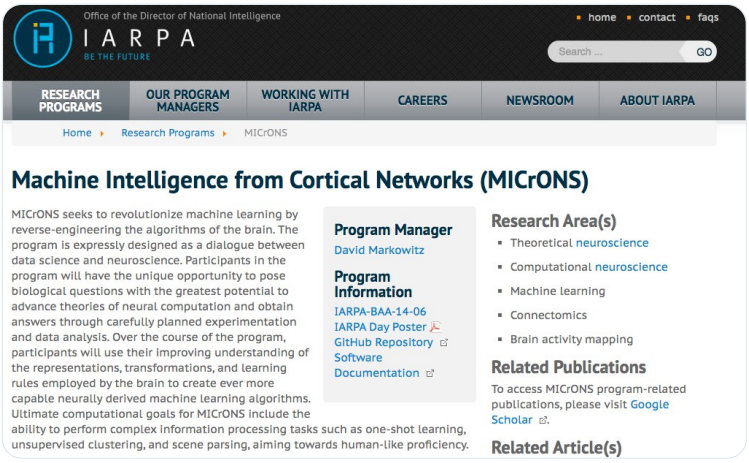
A Path to SuperCells Therapies



MICrONS (IARPA)

HARVARD Participation
arep.med.harvard.eduμ/

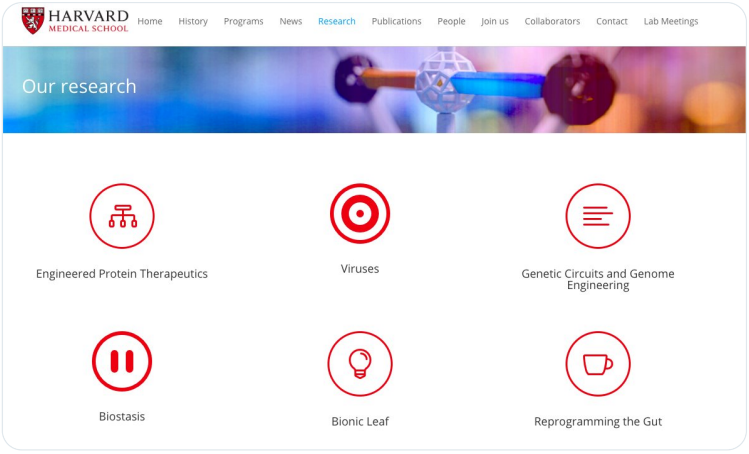
IARPA - MICrONS PROGRAM
https://www.iarpa.gov/index.php/research-programs/microns



HARVARD MEDICAL SCHOOL

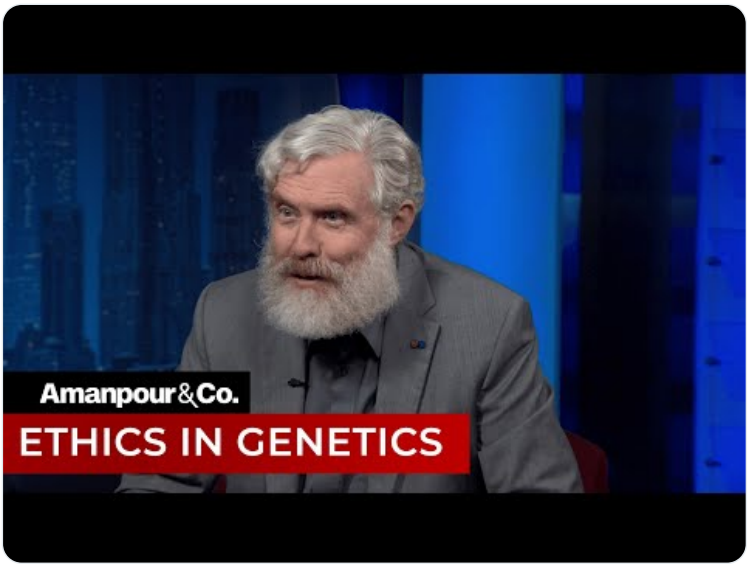
THE SILVER LAB

http://silver.med.harvard.edu/index.php/education-programs/

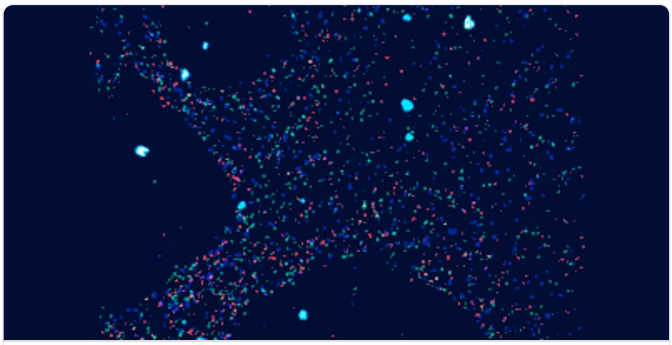


George Church A Peek at the Future of Synthetic Biology and Radical Wellness

https://www.youtube.com/embed/nvgaks9eePY



https://www.youtube.com/embed/gseGg_8gSSw

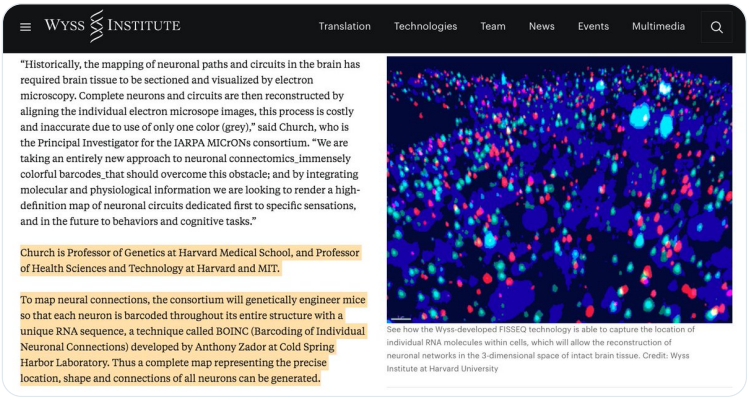


Wyss Institute Will Lead IARPA-Funded Brain Mapping Consortium

The Wyss Institute for Biologically Inspired Engineering at Harvard University today announced a cross-institutional consortium to map the brain_s neural…

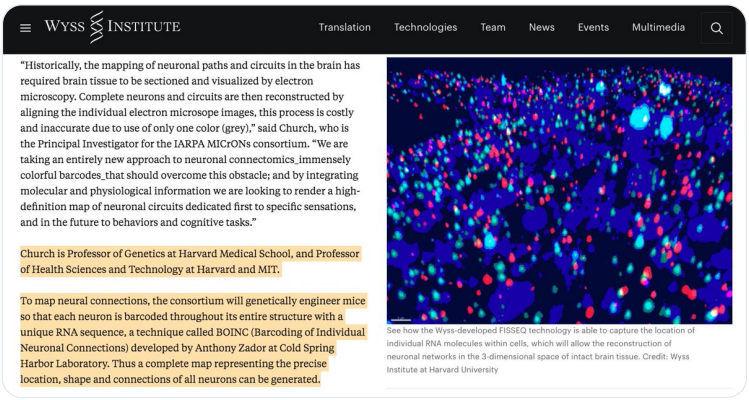
https://wyss.harvard.edu/news/wyss-institute-will-lead-iarpa-funded-brain-mapping-con…

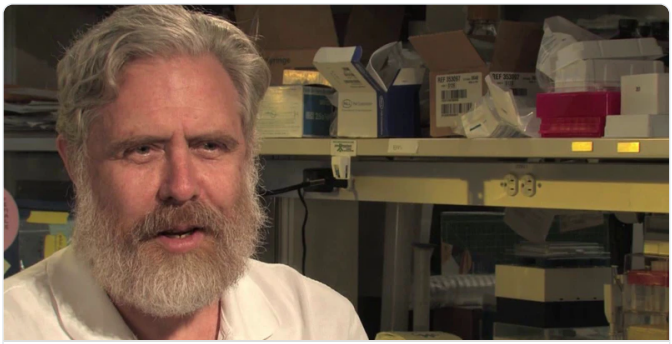
…To map neural connections, the consortium will genetically engineer mice so that each neuron is barcoded throughout its entire structure with a unique RNA sequence,…



… a technique called BOINC (Barcoding of Individual Neuronal Connections) developed by Anthony Zador at Cold Spring Harbor Laboratory. Thus a complete

map representing the precise location, shape and connections of all neurons can be generated...

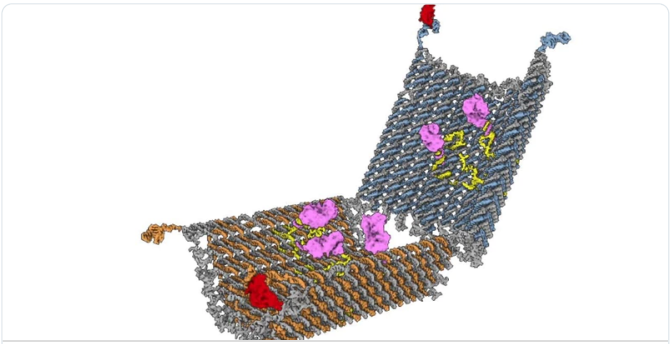




Information Storage in DNA

Information Storage in DNA on Wyss Institute | George Church and Sriram Kosuri discuss the benefits of using DNA as a storage medium and the approach they…

https://wyss.harvard.edu/media-post/information-storage-in-dna/



DNA Nanorobot: Cell-Targeted, Payload-Delivering

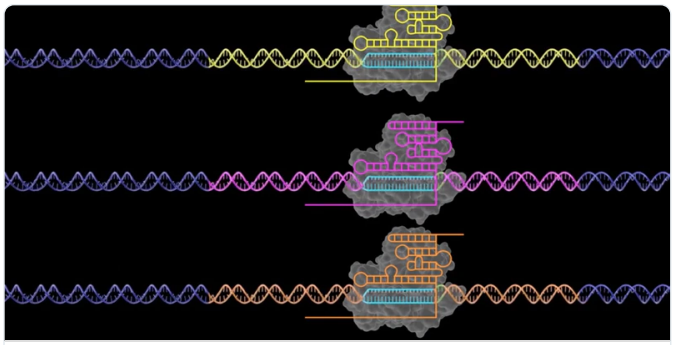
DNA Nanorobot: Cell-Targeted, Payload-Delivering on Wyss Institute | This video describes a cell-targeted, payload-delivering DNA nanorobot developed at the…

https://wyss.harvard.edu/media-post/dna-nanorobot-cell-targeted-payload-delivering/

CRISPR-Cas9: Gene Drives

CRISPR-Cas9: Gene Drives on Wyss Institute | This animation explains how an emerging technology called “gene drives” may be used to potentially spread…

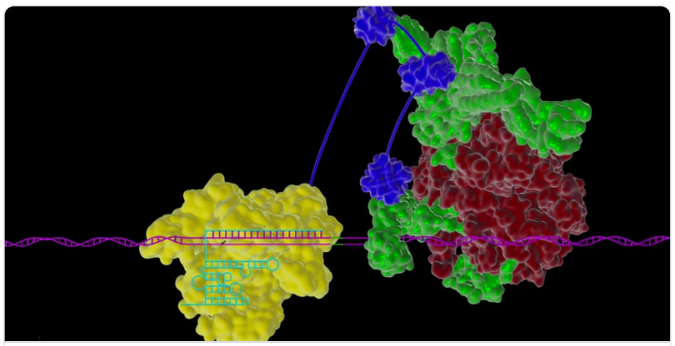
https://wyss.harvard.edu/media-post/crispr-cas9-gene-drives/



CRISPR-Cas9: Gene Target Troubleshooting

CRISPR-Cas9: Gene Target Troubleshooting on Wyss Institute | In this animation, learn how a “library on library” approach was used to create a software…

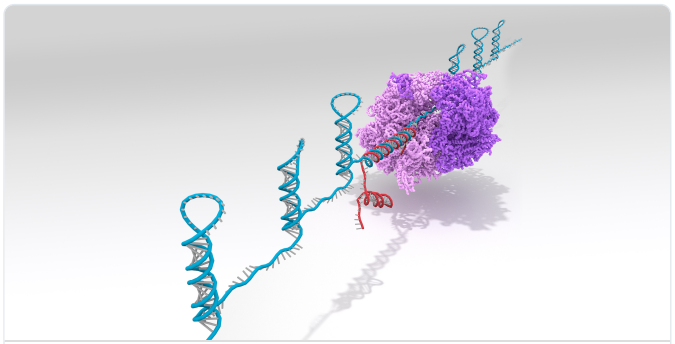
https://wyss.harvard.edu/media-post/crispr-cas9-gene-target-troubleshooting/



Cas9: As a Transcriptional Activator

Cas9: As a Transcriptional Activator on Wyss Institute | In this technical animation, Wyss Institute researchers instruct how they engineered a Cas9 protein…

https://wyss.harvard.edu/media-post/cas9-as-a-transcriptional-activator/



Toehold Switches for Synthetic Biology

A nanodevice that can sense environmental stimuli and produce proteins for diagnostic and other synthetic biology applications

https://wyss.harvard.edu/technology/toehold-switches-for-synthetic-biology/

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