

WPP

 The European House
Ambrosetti

Il ruolo della comunicazione
per la società di domani

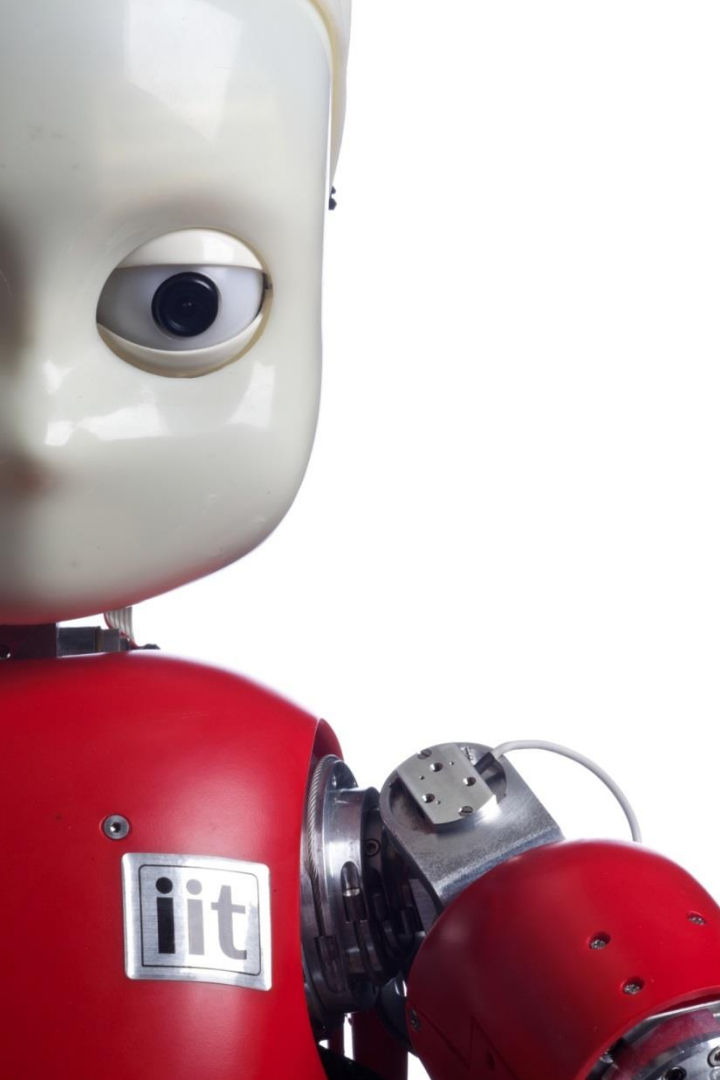
**Innovazione e tecnologia
per comunicare l'Italia di domani**

Giovedì 17 novembre 2022, Officine del Volo, Milano
Dalle ore 9.30 alle ore 12.15

Forum WPP | The European House – Ambrosetti



Giorgio Metta, Direttore Scientifico
Istituto Italiano di Tecnologia

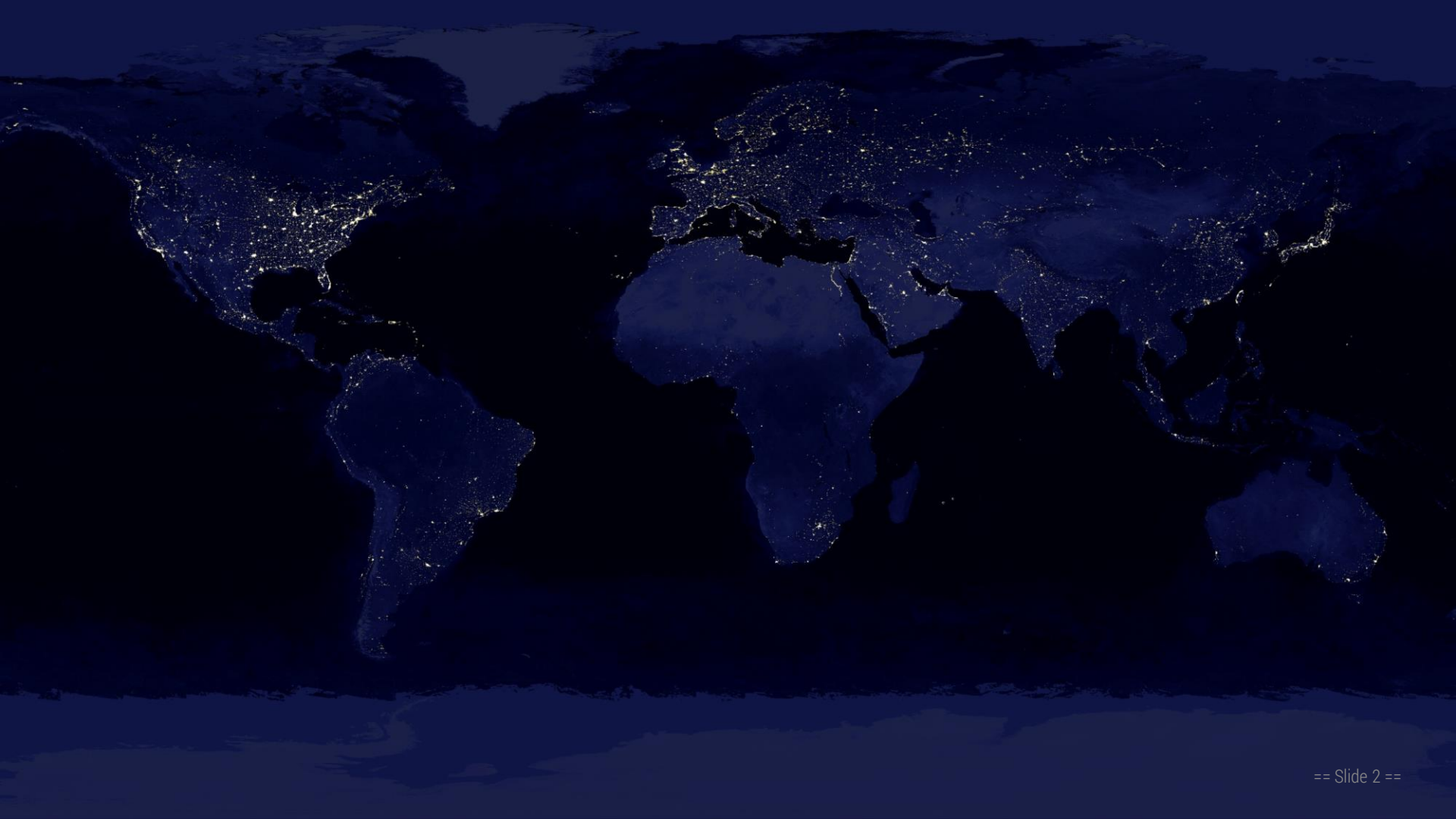


Four themes for the second half of the 21st century

Giorgio Metta



ISTITUTO ITALIANO
DI TECNOLOGIA

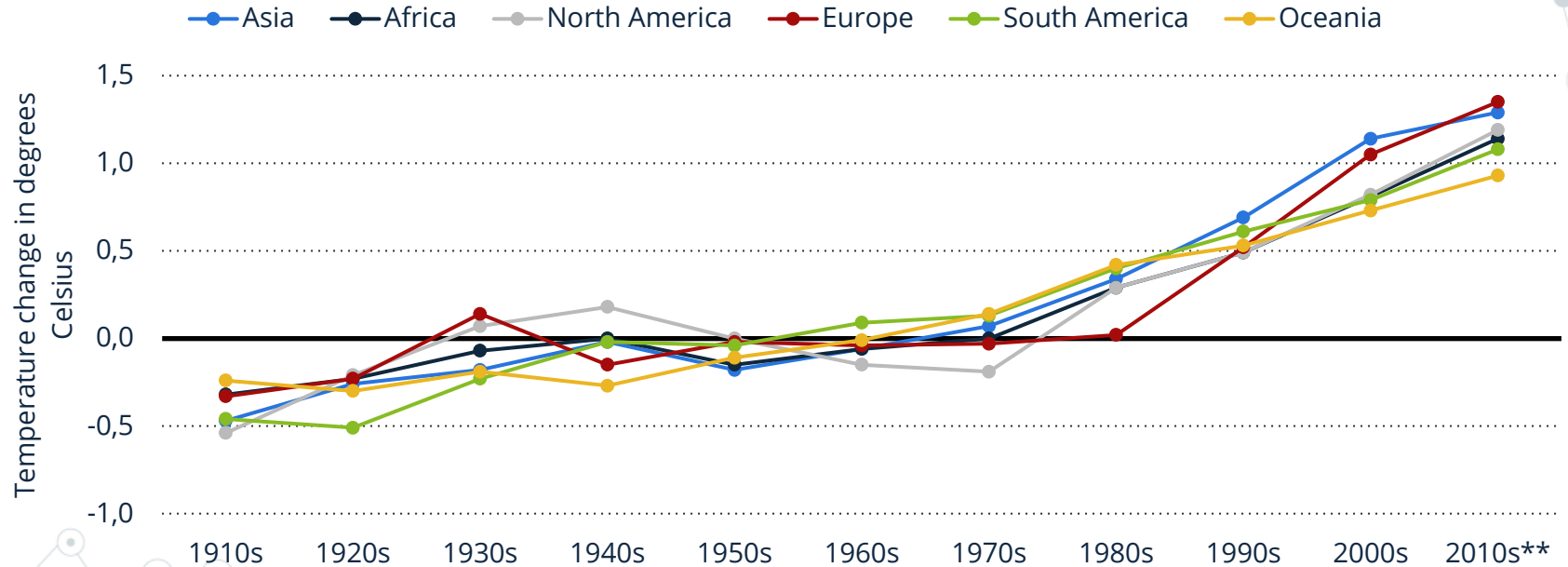




Climate change,
Energy,
Demographics,
&
the Unexpected

A measure of climate change

Global regional temperature change by decade 1910-2019



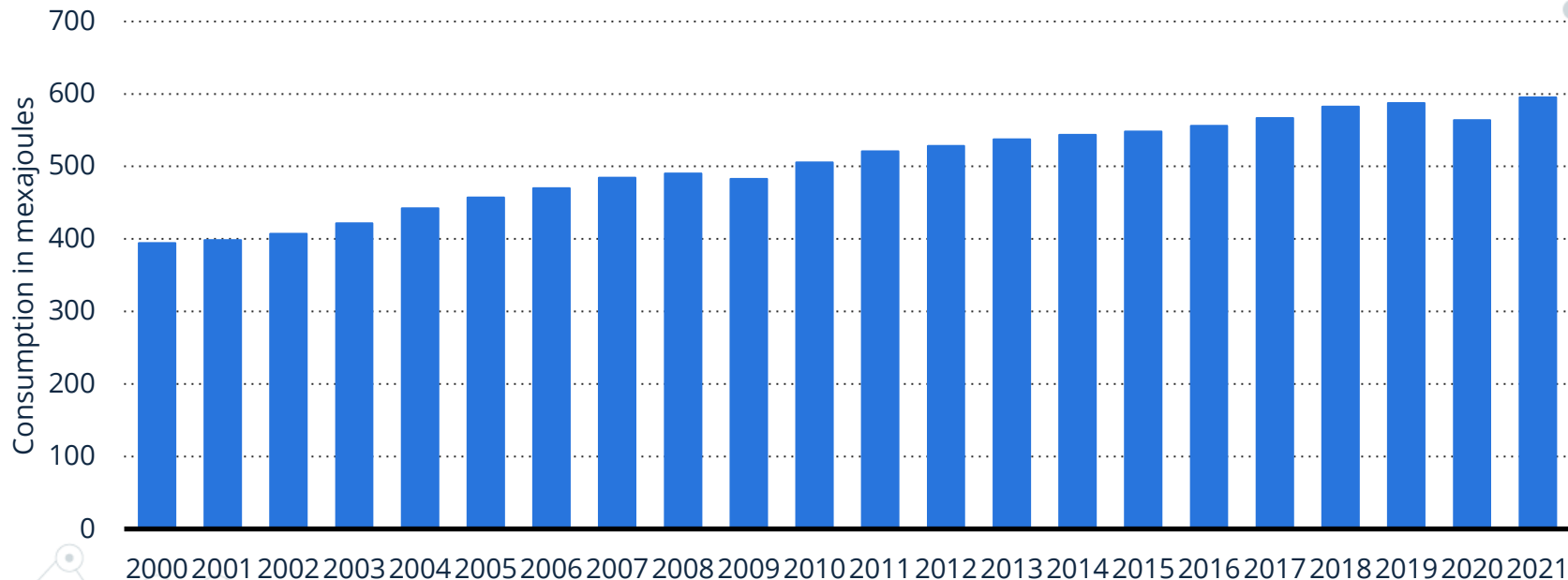
Description: Temperatures have risen in the last 100 years around the world. In the 1910s, North America had an average temperature some 0.54 degrees Celsius lower than average temperatures between 1910 and 2000. In the most recent decade, this region experienced temperatures 1.19 degrees Celsius over the average. [Read more](#)

Note(s): Worldwide; 1910s to 2010s; * Average temperature difference relative to a 1910-2000 average. ** Figure for 2010 refers to an average between 2010 and at the latest September 2019 (exact month was not listed). [Read more](#)

Source(s): NOAA; Time

Energy consumption in exajoule

Global primary energy consumption 2000-2021

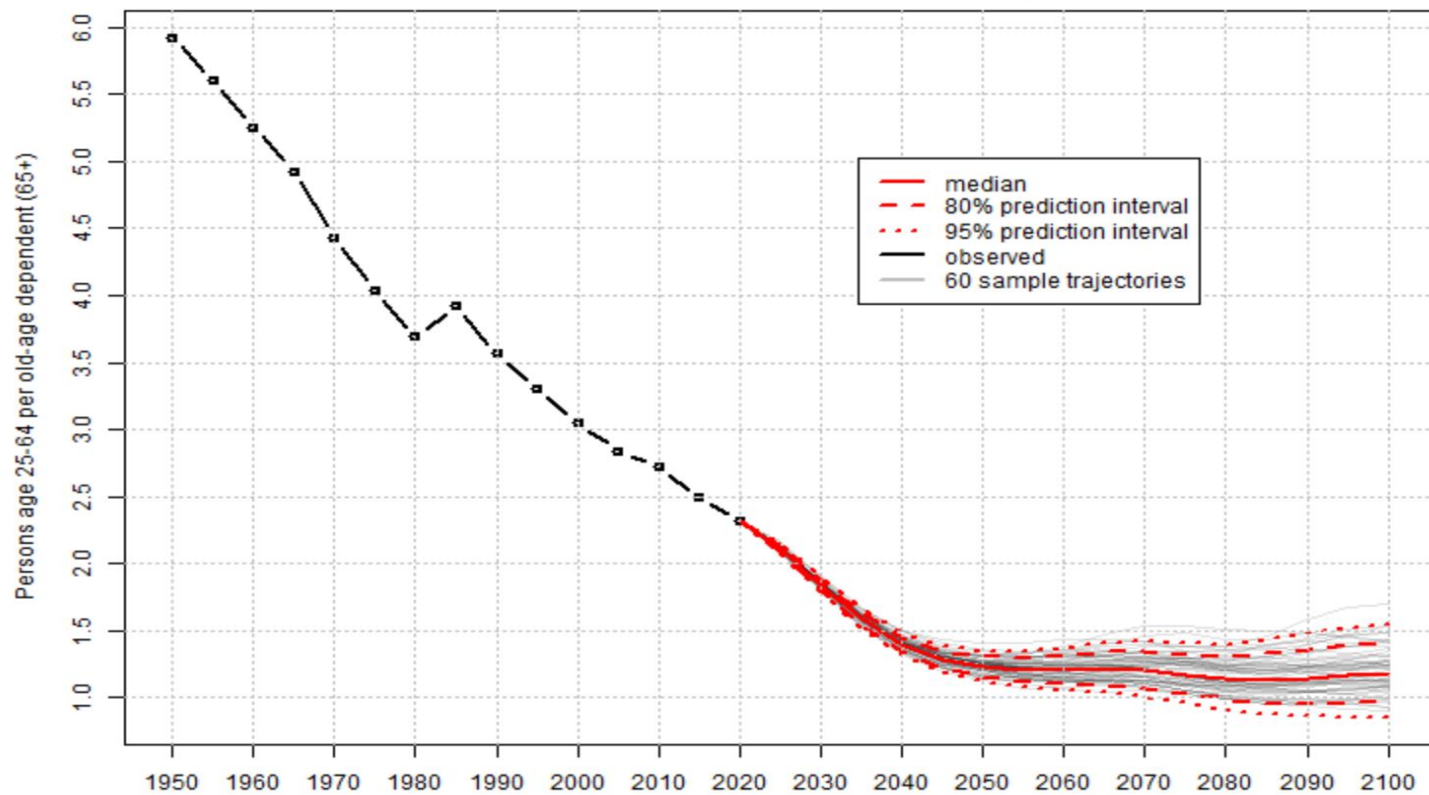


Description: Global primary energy consumption reached over 595 exajoules in 2021. This represented an increase of roughly 5.5 percent in comparison to 2020, when the coronavirus pandemic and its impact on transportation fuel demand and overall economic performance resulted in primary energy consumption declining to 2016 levels. Nevertheless, worldwide energy consumption is projected to increase over the next few decades. [Read more](#)

Note(s): Worldwide; 2000 to 2021

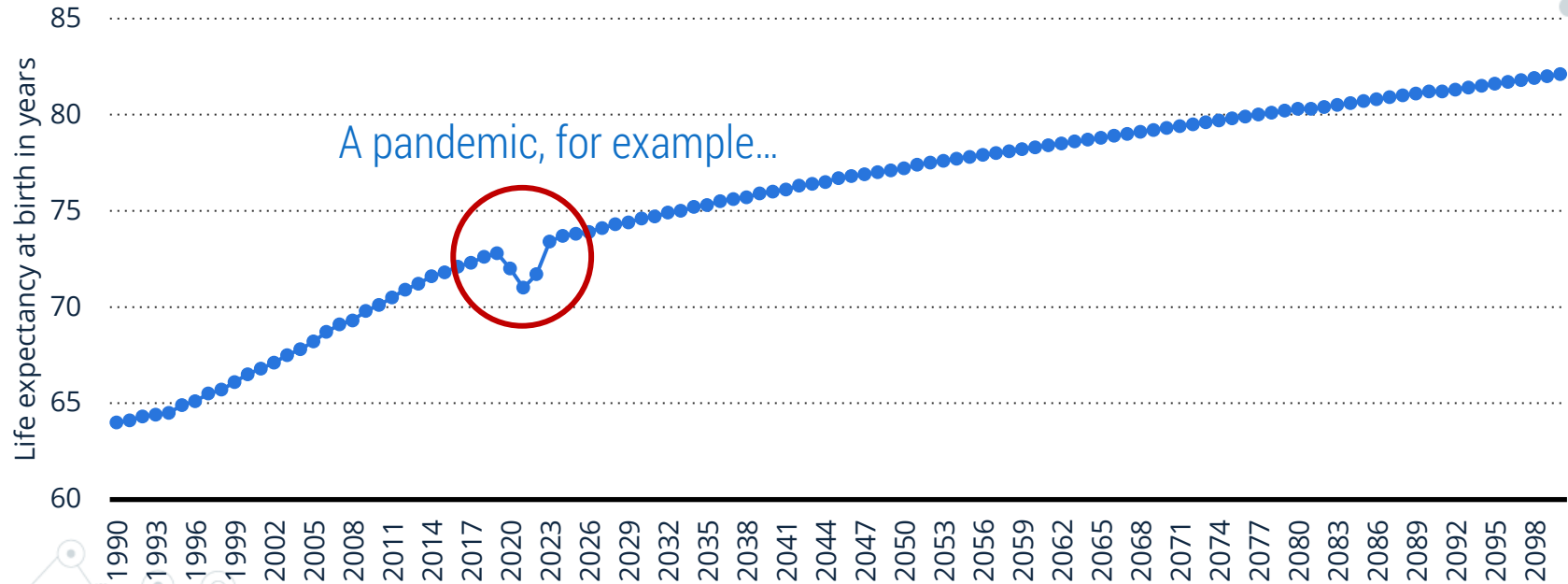
Source(s): BP

Italy: Potential Support Ratio $\left(\frac{\text{Age 25-64}}{\text{Age 65+}}\right)$



The unexpected (sort of)

Projected global life expectancy 1990-2100



Description: Global life expectancy increased since 1990 and is expected to continue to increase over the coming decades. Due to the COVID-19 pandemic, there was a fall in the global life expectancy in 2020 and 2021, but it is predicted to continue to increase in the future. In 2019, Europe was the region with the highest life expectancy at birth. [Read more](#)
Note(s): Worldwide; 2021; Life expectancy at birth
Source(s): UN DESA



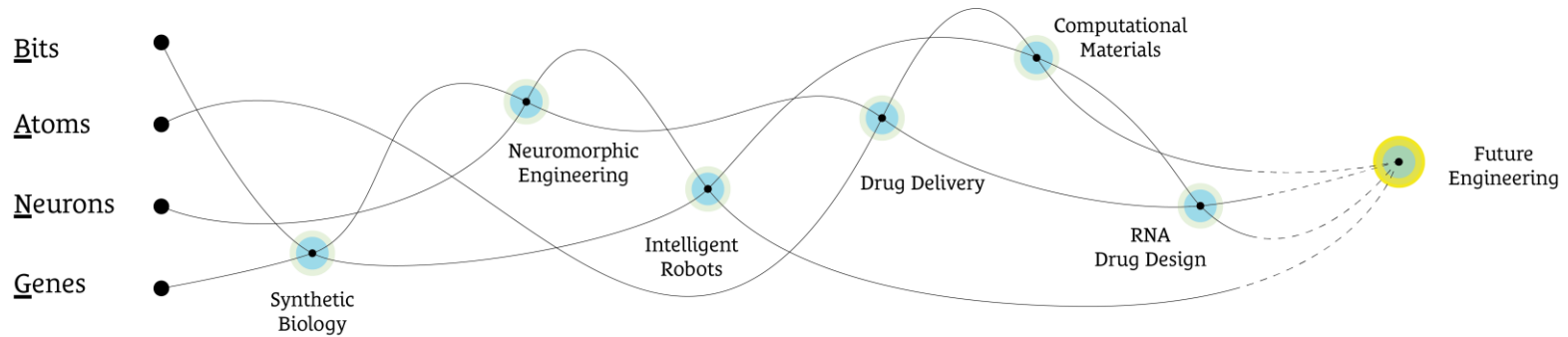
1010
1010 Bits

⚛️ Atoms

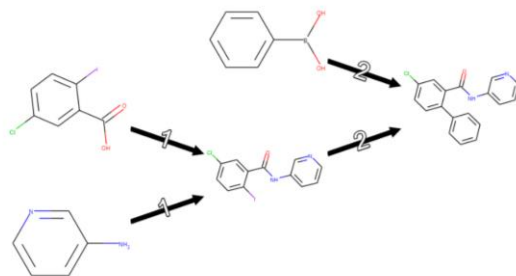
🧠 Neurons

🧬 Genes

The process of converging technology



A somewhat unusual example



► Test set accuracy for chemical synthesis plans (%)

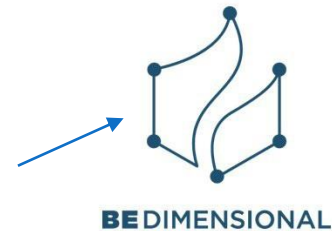
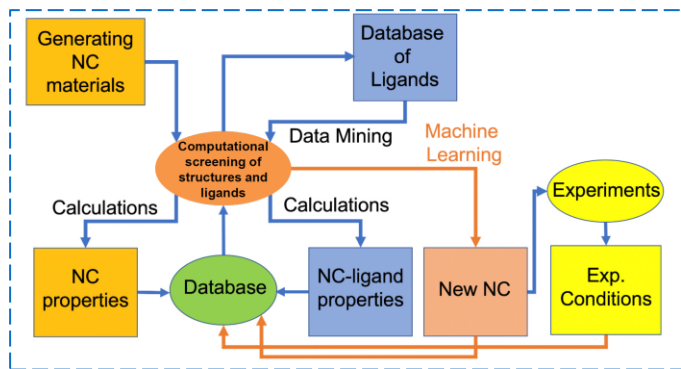
Jin et al. (2017)	79.60%
Schwaller et al. (2018)	80.30%
Coley et al. (2019)	85.60%
Schwaller et al (2019)	90.40%

Nanomaterials for energy

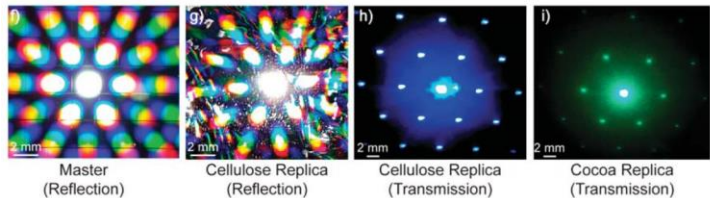
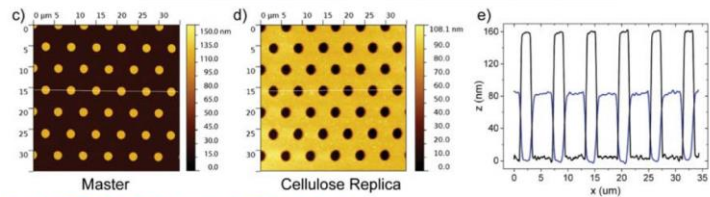
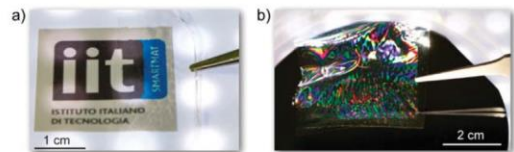
AI and data-driven

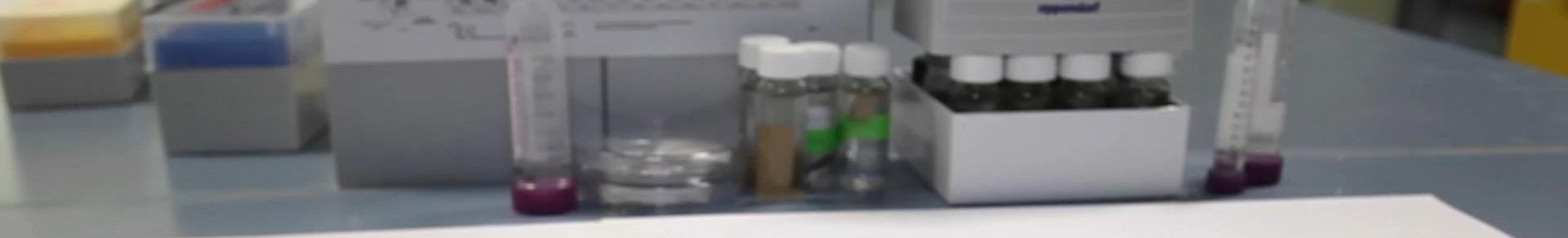
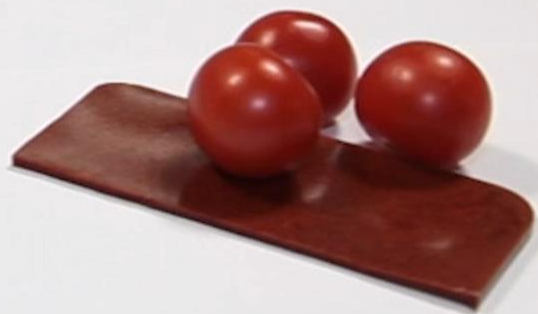
Robotized laboratory

More data

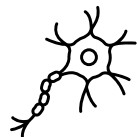


Nanomaterials for sustainability





Adapting or discovering new drugs



Chem CellPress
OPEN ACCESS

Article
Discovery of a Small Molecule Drug Candidate for Selective NKCC1 Inhibition in Brain Disorders

Selective NKCC1 inhibitor

Unselective NKCC1 inhibitors → **ARN23746** → NKCC1

← NKCC2

Annalisa Savardi, Marco Borgogno, Roberto Narducci, ... Andrea Contestabile, Marco De Vivo, Laura Cancedda

marco.de.vivo@it.ihf.it (M.D.V.)
laura.cancedda@it.ihf.it (L.C.)

HIGHLIGHTS
NKCC1 is a promising target for the treatment of brain disorders

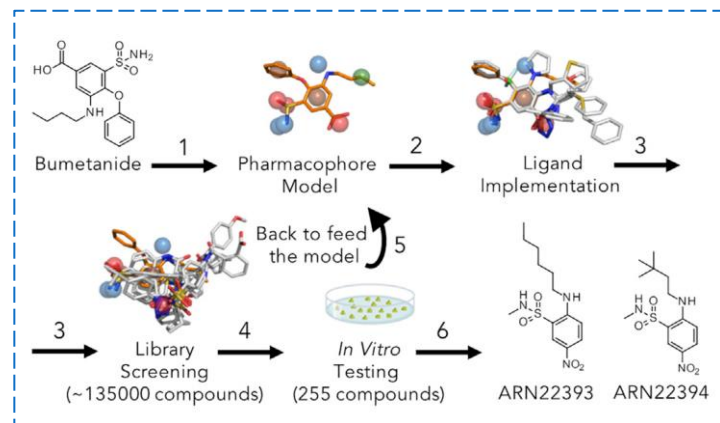
The newly discovered ARN23746 presents selective NKCC1 versus NKCC2 and KCC2 inhibition

ARN23746 restores altered neuronal chloride homeostasis *in vitro*

ARN23746 rescues core behaviors in DS and ASD mice with no diuretic effect or toxicity

Currently, therapeutic options for several neurological disorders are scant or not highly effective. This is possibly due to the poor understanding of the mechanisms underlying these conditions. Here, starting from former validation of the new pharmacological target NKCC1 in brain disorders, we developed a novel, potent, and safe NKCC1 inhibitor, able to restore core behaviors in Down syndrome and autistic mouse models. This compound has the potential to become a solid drug candidate for the treatment of several neurological conditions.

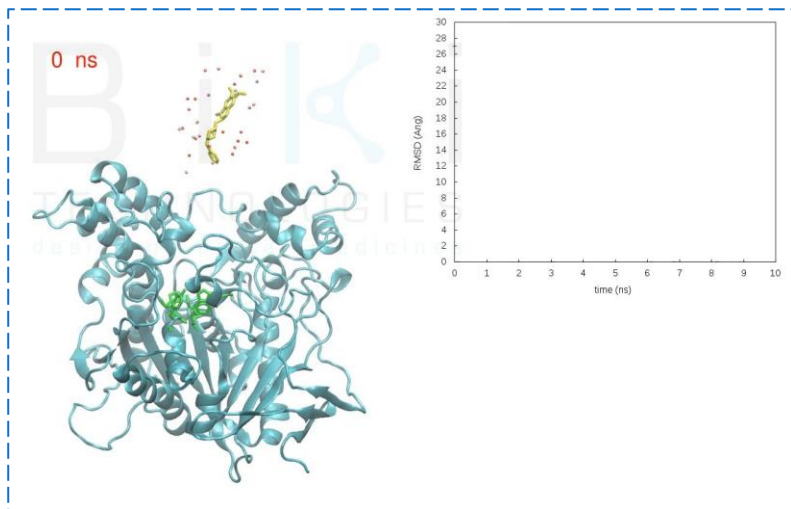
Savardi et al., Chem 6, 1–24 August 6, 2020 © 2020 The Authors. Published by Elsevier Inc. <https://doi.org/10.1016/j.chemp.2020.08.017>



iam **therapeutics**

Simulations and therapy

1010
1010



Journal of
Medicinal Chemistry
pubs.acs.org/jmc Perspective

Synthetic Lethality through the Lens of Medicinal Chemistry

Samuel H. Myers, Jose Antonio Ortega, and Andrea Cavalli*

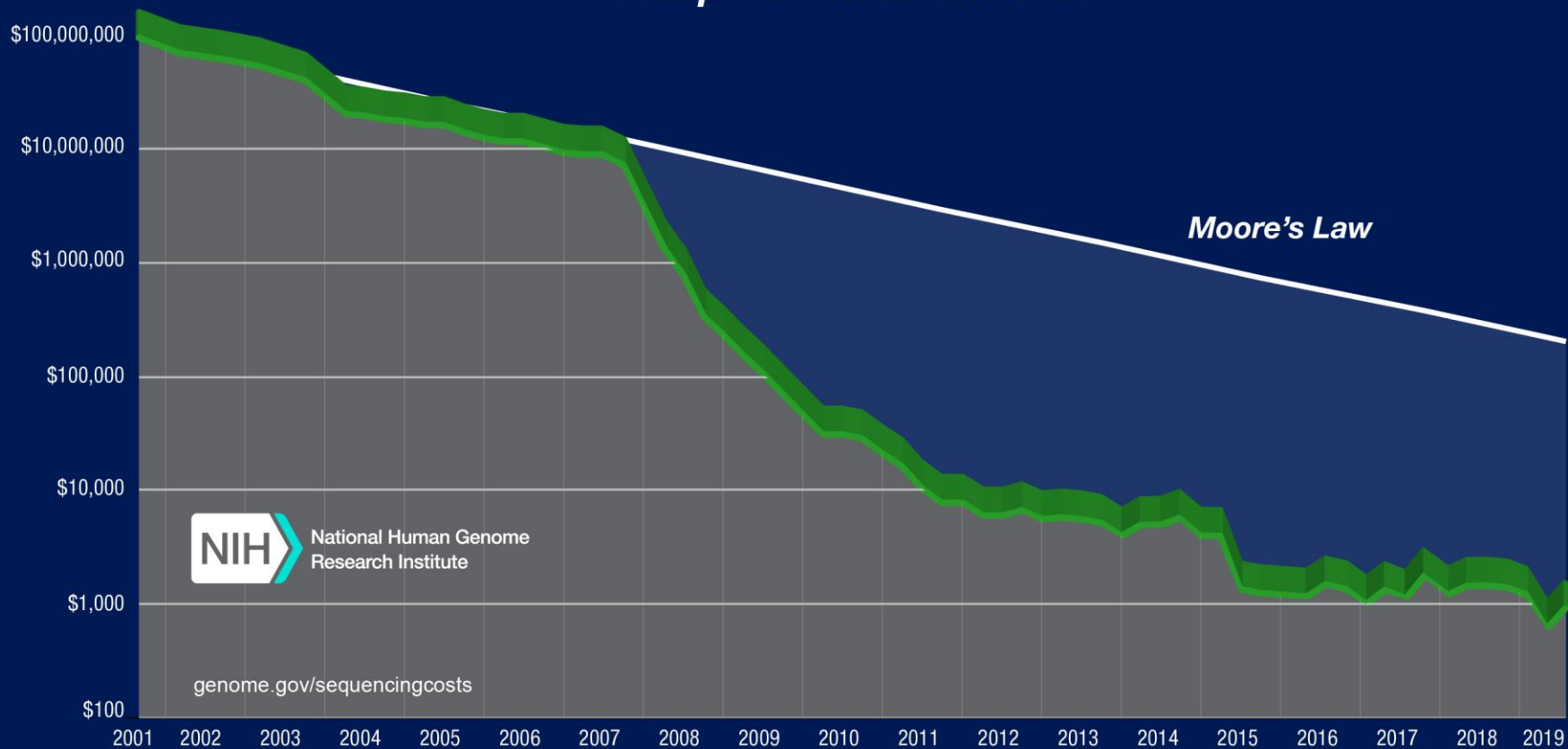
Cite This: <https://dx.doi.org/10.1021/acs.jmedchem.0c00766> Read Online

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ABSTRACT: Personalized medicine and therapies represent the goal of modern medicine, as drug discovery strives to move away from one-cure-for-all and makes use of the various targets and biomarkers within differing disease areas. This approach, especially in oncology, is often undermined when the cells make use of alternative survival pathways. As such, acquired resistance is unfortunately common. In order to combat this phenomenon, synthetic lethality is being investigated, making use of existing genetic fragilities within the cancer cell. This Perspective highlights exciting targets within synthetic lethality, (PARP, ATR, ATM, DNAPKs, WEE1, CDK12, RADS1, RADS2, and PD-1) and discusses the

*S. H. Myers, J. A. Ortega, A. Cavalli, and S. H. Myers, ACS J. Med. Chem. 2020, 13, 1010-1010. DOI: 10.1021/acs.jmedchem.0c00766. Content not certified by peer review. See the Terms & Conditions for more details.

Cost per Human Genome



Nanotechnologies for human health



nature
nanotechnology

ARTICLES

<https://doi.org/10.1038/441545-020-0496-1>

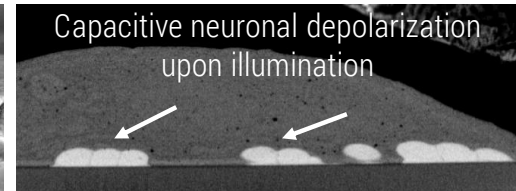
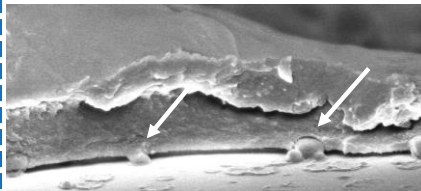
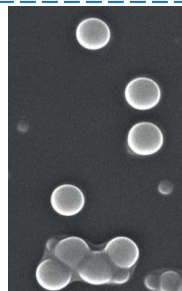
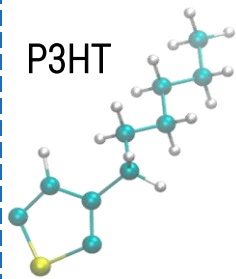
Check for updates

Subretinally injected semiconducting polymer nanoparticles rescue vision in a rat model of retinal dystrophy

José Fernando Maya-Vetencourt^{1,2,3}, Giovanni Manfredi⁴, Maurizio Mete⁵, Elisabetta Colombo^{1,2}, Mattia Bramini^{1,12}, Stefano Di Marco^{1,2}, Dmytro Shmal^{1,2}, Giulia Mantero^{1,2}, Michele Dipalo^{1,2}, Anna Rocchi^{1,2}, Mattia L. DiFrancesco^{1,2}, Ermanno D. Papaleo¹, Angela Russo¹, Jonathan Barsotti⁴, Cyril Eleftheriou^{1,3}, Francesca Di Maria¹, Vanessa Cossu^{2,4}, Fabio Piazza^{1,2}, Laura Emionite¹, Flavia Ticconi^{2,8,14}, Cecilia Marini¹⁰, Gianmarco Sambucetti^{2,4}, Grazia Pertile¹, Guglielmo Lanzani^{1,11,15} and Fabio Benfenati^{1,12,13}

Inherited retinal dystrophies and late-stage age-related macular degeneration, for which treatments remain the most prevalent causes of legal blindness. Retinal prostheses have been developed to stimulate the retina, however, lack of sensitivity and resolution, and the need for wiring or external cameras, limit their use. Here, we show that conjugated polymer nanoparticles (P3HT NPs) mediate light-dependent activation of the retina, rescue visual functions when subretinally injected in a rat model of retinal dystrophy, and promote light-dependent activity in the subretinal space.

P3HT



NOVAVIDO

A lot happens because of computers

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giorgio.metta@iit.it

