FisMatEcol Boletin

Octubre y Noviembre

Dr. Oliver López Corona
Dra. Elvia Ramírez Carrillo

Eventos


CICLO
LAS NEUROCIENCIAS EN MÉXICO Y EL MUNDO
TALLER MULTIDISCIPLINARIO
Coordinan:
Pablo Rudomin
Miembro de El Colegio Nacional
Ranier Gutiérrez
Cinvestav
Enrique Hernández Lemus
Instituto Nacional de Ciencia Genómica
Hugo Merchant
Instituto de Neurobiología-UNAM
Noviembre de 2024
11 a 14:30 h (CDMX)
Martes 19
ENSAMBLES NEURONALES Y TOMA DE DECISIONES
Modera:
Ranier Gutiérrez
Programa:
REGISTROS NEURONALES SIMULTÁNEOS Y MULTI-AREA DURANTE PROCESOS COGNITIVOS: PASOS INICIALES BUSCÁNDOLE SIGNIFICADO A LA MAYORÍA DE LA ACTIVIDAD NEURONAL
Carlos D. Brody
Princeton Neuroscience Institute
DE MICROCIRCUITOS CANÓNICOS A ENSAMBLES
José Bargas
Instituto de Fisiología Celular-UNAM
OFFSEMBLES: INHIBICIÓN ESPECÍFICA DE NEURONAS PARA LA CODIFICACIÓN DE ESTÍMULOS
Jesús Pérez
Columbia University
TOMA DE DECISIONES Y PERCEPCIÓN GUSTATIVA
Esmeralda Fonseca
Princeton Neuroscience Institute
Mércoles 20
NEUROFISIOLOGÍA INTEGRATIVA EN PRIMATES HUMANOS Y NO-HUMANOS
Modera:
Hugo Merchant
Programa:
LOS MODELOS INTERNOS DE NUESTRO CEREBRO
Victor De Lafuente
Instituto de Neurobiología-UNAM
PROCESAMIENTO NEURONAL DE SECUENCIAS AUDITIVAS EN PRIMATES HUMANOS Y NO HUMANOS
Yaneri A. Ayala
Human Brain Research Laboratory-University of Iowa Hospital and Clinics
INTERFACES CEREBRO-MÁQUINA BASADAS EN MÚLTIPLES ÁREAS CORTICALES PARA EL CONTROL DE DISPOSITIVOS DE ASISTENCIA PARA PERSONAS TETRAPLÉJICAS
Jorge Gamez
T&C Chen Brain-Machine Interface Center-California Institute of Technology
Jueves 21
ENFOQUES ANALÍTICOS EN LAS NEUROCIENCIAS
Modera:
Enrique Hernández Lemus
Programa:
COGNICIÓN MEDIANTE UNA ARQUITECTURA DE RETROALIMENTACIÓN MIXTA
Alessio Franci
University of Liege
UNA NUEVA PROPUESTA DEL ANÁLISIS NO LINEAL
Markus Müller
Universidad Autónoma del Estado de Morelos
CUANDO LA FORMA ES FONDO: EFECTO DE LA TOPOLOGÍA EN LA SINCRONIZACIÓN DE REDES NEURONALES
Jesús Espinal Enríquez
INMEGEN
ENTRADA LIBRE
Donceles 104, Centro Histórico, CDMX
Además, transmisión en línea
Consulta cartelera en colnal.mx
ColegioNacional.mx
elcolegionacionalmx
@ColegioNal_mx
elcolegionacional
EL COLEGIO NACIONAL

UNAM · Centro de Ciencias de la Complejidad · iimas · CONAHCYT

LENGUAJES EN PELIGRO DE EXTINCIÓN

Y EL POTENCIAL DE LA TECNOLOGÍA PARA SU PRESERVACIÓN

19 NOVIEMBRE
12 hrs

AUDITORIO C3-UNAM

Evento presencial con transmisión en vivo por YouTube y Facebook

MESA REDONDA

Sergio Mendoza Ramos/ INSTITUTO DE ASTRONOMÍA, UNAM.
Exploración del lenguaje matemático mexica y el calendario mesoamericano.

Jimena de Gortari/ COORDINACIÓN DE INVESTIGACIÓN, IBERO.
Análisis del "lenguaje de la ciudad" y la transformación del espacio sonoro por la contaminación ambiental.

Juan Carlos Reyes (POR CONFIRMAR) / RECTOR, UNIVERSIDAD DE LAS LENGUAS INDÍGENAS DE MÉXICO.
Impacto del proyecto de la Universidad para la preservación de lenguas en riesgo de extinción.

Elvia Ramírez Carrillo
"Círculos de danza" como espacios para preservar los lenguajes mexicas (Náhuatl, danza, música, lenguaje ritual).

Invitado especial: Jack Connor/ CEO DE LINGUA AETERNA.
Estrategias innovadoras para documentación de lenguas en peligro y el uso de Inteligencia Artificial para "hablantes artificiales"

Coordina: Oliver López Corona/ IXM-IIMAS.

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Género | Tecnología | Capitalismo | Economía | Mentes y máquinas | Algoritmos | Cognición | Epistemología
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¿Nuevas Fronteras?
2° Simposio de Filosofía de la computación
Amoxcalli - Facultad de Ciencias, UNAM
25 a 29 Noviembre, 2024
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Ética digital | Cuerpo y consciencia | Virtudes | Ciencia actual | Futuro del trabajo | Cómputo frontera | Epistemología
Humanismo digital | Arte | Educación | Vida artificial
Filosofía tecnológica | Cibernética | Leyes | Transhumanismo | Complejidad | Robert Rosen | Emergencia Lenguaje

Inferencia bayesiana vía métodos predictivos

Dr. Ramsés Humberto Mena Chávez

Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, UNAM

Resumen

Después de una breve introducción al enfoque bayesiano al problema de la inferencia estadística, se presentarán algunos métodos innovadores para explorar la distribución posterior. En particular, se abordará el enfoque no paramétrico, junto con simplificaciones recientes y resultados destacados para obtener muestras de la distribución posterior mediante estimadores que cumplen con la propiedad de martingala.

14 NOVIEMBRE 2024

14:00 HORAS

Auditorio IIMAS

CONFERENCIA

SOCIAL IMPLICATIONS OF THE ADOPTION OF AUTOMATIC PREDICTION SYSTEMS

Dentro del Taller de IA, PCIC

DR. JOSÉ ANTONIO LOZANO
Universidad del País Vasco, España

15 noviembre 2024 - 11:00 horas

Auditorio IIMAS · Edificio B
Circuito Escolar, Ciudad Universitaria. Cd. Mx.

UNAM
Nuestra gran Universidad

Resumen:


iimas
UNAM
Nueva época
Universidad
Hypolimnetic warming rate
0.1136 ± 0.0001 °C y⁻¹
T (°C)
22.5
22.4
22.3
22.2
11-2014
03-2015
11-2015
03-2016
SEMINARIO
HÍBRIDO
UNIDAD ACADÉMICA
DEL IIMAS EN EL
ESTADO DE YUCATÁN
20 noviembre 2024
13:00 horas
ORGANIZADORA
Dra. María de Carmen Jorge y Jorge
mcj@mym.iimas.unam.mx
VIENDO EL CAMBIO
CLIMÁTICO DESDE LA
OSCURIDAD DE UN
LAGO PROFUNDO
Dr. José Gilberto Cardoso Mohedano
Laboratorio de Modelado Ecológico,
Estación del Carmen, ICML, UNAM
https://cuaieed-unam.zoom.us/s/84494117060
zoom

Oportunidades


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Consultoría para analizar el impacto potencial en la conectividad del paisaje de los subproyectos RÍOS y CONECTA con sensores remotos
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Fulvio Eccardi

Centre for Integrative Omics Data Science (CIODS)

4TH FLOOR, YENEPOYA AYURVEDA MEDICAL COLLEGE,
YENEPOYA (DEEMED TO BE UNIVERSITY)
NARINGANA, DERALAKATTE, MANAGLORE – 575018
EMAIL: CIODS@YENEPOYA.EDU.IN

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- Strong record of scholarly achievements

DATA SCIENTIST
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- B.E. in Computer Science considered
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- Strong scientific writing skills and a proven research track record

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- A strong research background
- Candidates with a submitted thesis are also eligible to apply

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HOW TO APPLY?

- Cover letter (highlighting qualifications and research experience)
- Curriculum Vitae (CV)
- Statement of research interests and future plans

Email: ciods@yenepoya.edu.in
Website: ciods.in

ABOUT US

CIODS is dedicated to advancing integrative omics research with a mission to harness AI for translational health research. Supported by YenVision-2025, our focus areas include:

- Building comprehensive global datasets
- Developing tools for integrated omics analysis
- Research in areas such as cancer drug resistance, infections, and cell signaling


MEDIO AMBIENTE
CONANP
BANQROO
Fundación Cozumel
CONVOCATORIA
PUESTO: COORDINADOR(A) DE PROYECTO
"Administración adecuada en 4 áreas de protección marino costeras en Isla Cozumel, en el contexto de la conectividad y salud de los ecosistemas, para mejorar la efectividad de manejo en beneficio de la conservación y uso sostenible de la biodiversidad"
UBICACIÓN: Cozumel, Quintana Roo
Consulta la convocatoria y aplica
Fecha Límite 11 de noviembre del 2024 a las 18:00 horas (Quintana Roo)

UAEH

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Presenta tu solicitud a partir del: **7 de octubre del 2024**

Escanea el **código QR** y consulta la convocatoria

The University of Hawaii Water Resources Research Center is hiring a:

Postdoc in Variable Density Groundwater Modeling

We are Seeking: a post-doctoral level researcher with experience in Variable-Density groundwater modeling using codes such as SEAWAT, FEFLOW or other similar software. Experience working in and knowledge of volcanic island hydrogeology is desired.

Project Description: We will work with local agencies to conduct an assessment of water resources availability in American Samoa. American Samoa relies on groundwater for all uses, and due to the thin nature of aquifers on volcanic islands there are risks of saltwater intrusion. The successful candidate will apply density-dependent groundwater models to simulate the effects of pumping and future climate scenarios on groundwater availability **and will work directly with water managers in the U.S.' most southern, remote, tropical, and beautiful territory.**

Details: This position will be based at University of Hawaii at Manoa on Oahu. The successful candidate can be based in, or relocate to, the island of Oahu, Maui, or American Samoa. Compensation will be competitive, and commensurate with experience. Starting summer 2025.

For more information please contact
Chris Shuler, cshuler@hawaii.edu

Postdoctoral Scholar in Ocean Sciences

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Job #JPF01832

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POSITION OVERVIEW

Position title: Postdoctoral Scholar in Ocean Sciences
Salary range: Commensurate with qualifications and experience. The posted UCSC salary scales set the minimum pay based on the individual's **Experience Level**, which is determined by the number of months of postdoctoral service at any institution. See the salary scale titled, *Postdoctoral Scholar-Employee /Postdoctoral Scholar-Fellow / Postdoctoral Scholar-Paid Direct -Fiscal Year*. A reasonable estimate for this position is $66,737 - $72,000.
Percent time: Full-time (100%)
Anticipated start: Start date is negotiable, but it cannot be later than September 1, 2025.
Position duration: Maximum Duration of Service in a Postdoctoral Title: Postdoctoral Scholar appointments are full-time and the initial appointment is for a minimum of two years, with the possibility of reappointment. The total duration of an individual's postdoctoral service may not exceed five years, including postdoctoral service at any institution.

APPLICATION WINDOW

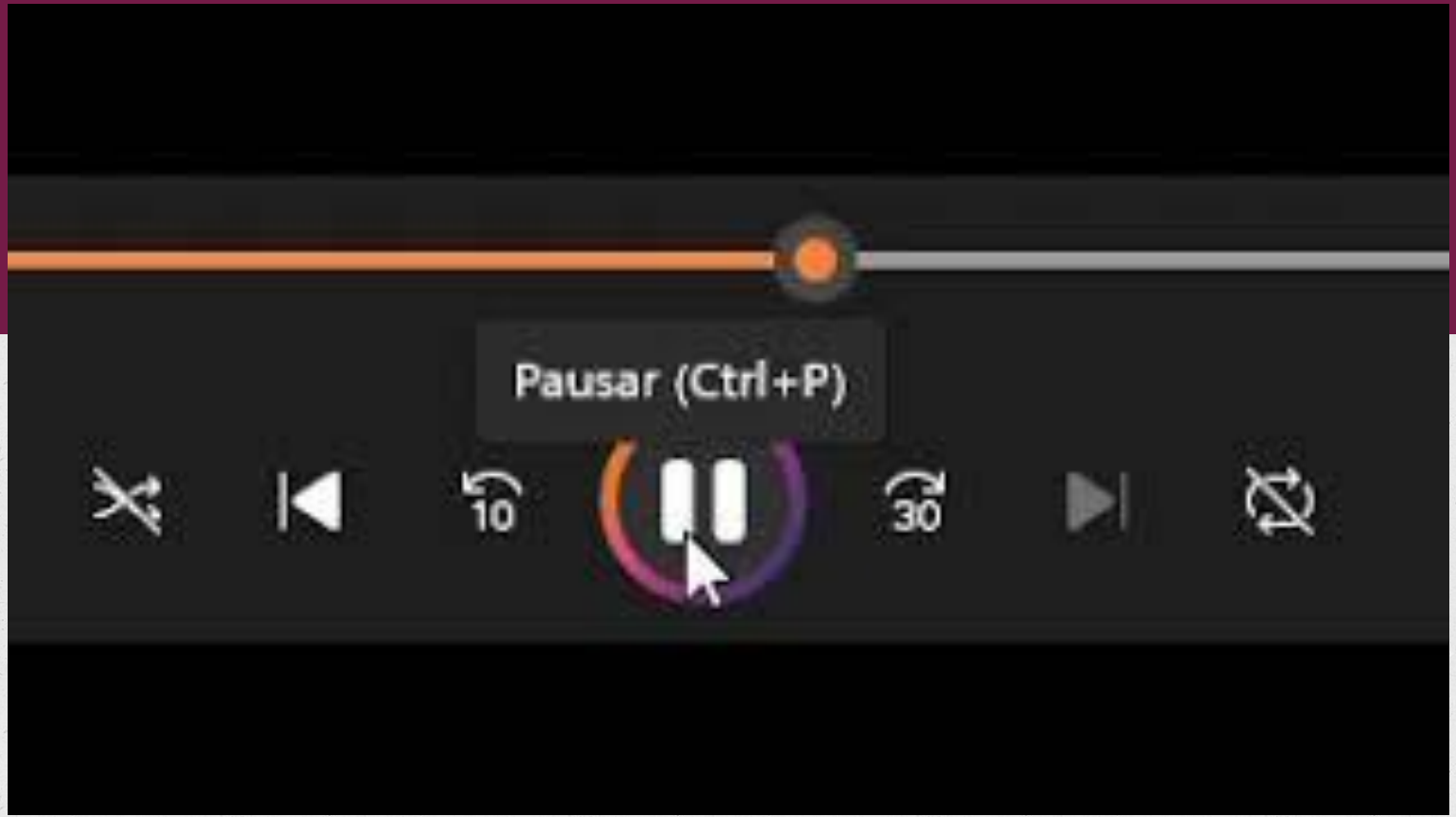
Open date: October 17, 2024

Next review date: Monday, Nov 18, 2024 at 11:59pm (Pacific Time)
Apply by this date to ensure full consideration by the committee.

Final date: Friday, Oct 17, 2025 at 11:59pm (Pacific Time)
Applications will continue to be accepted until this date, but those received after the review date will only be considered if the position has not yet been filled.

Conceptos

Antifragilidad y complejidad



Antropoceno

MINI REVIEW article

Front. Ecol. Evol., 29 June 2020

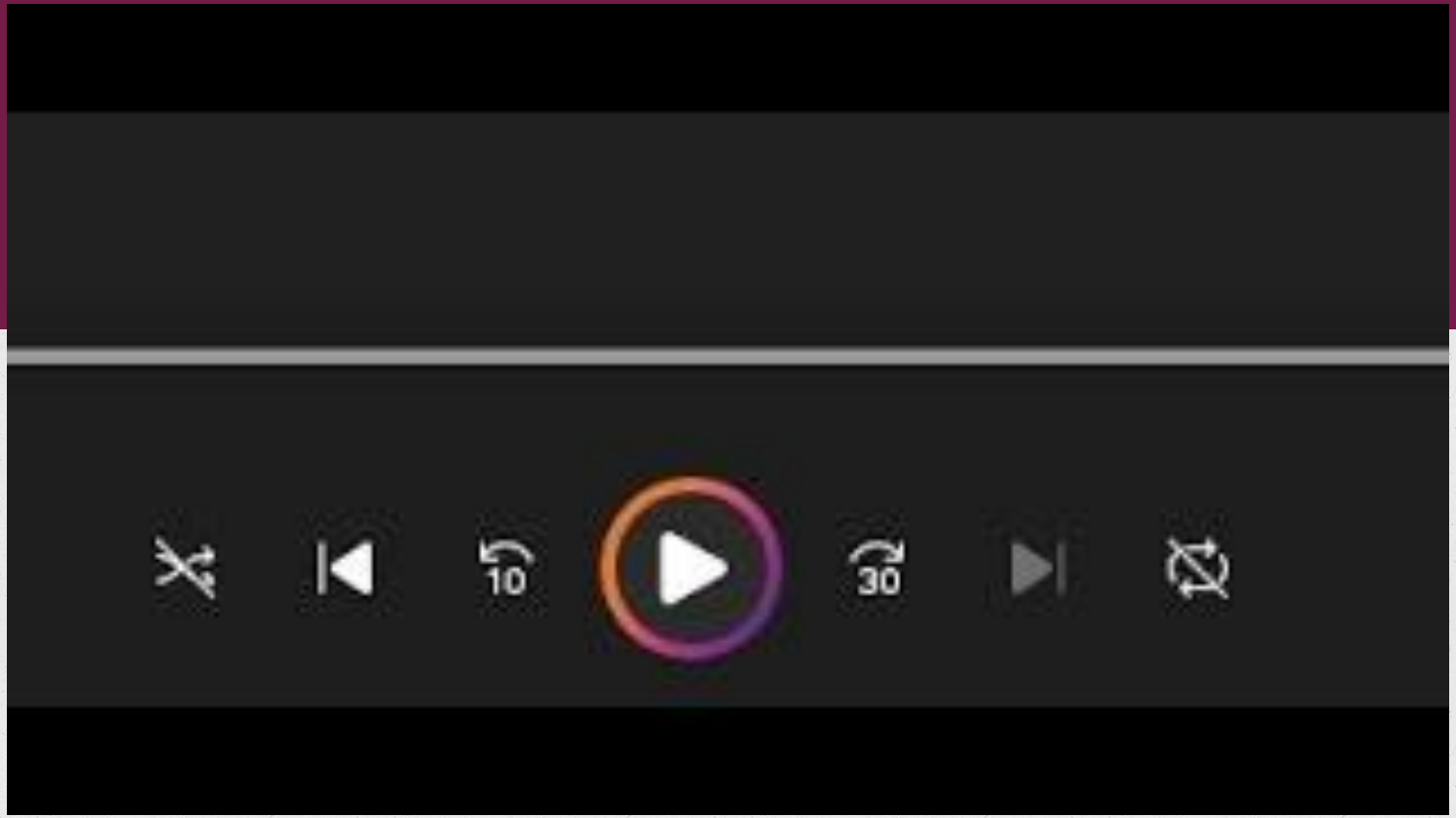
Sec. Coevolution

Volume 8 - 2020 | https://doi.org/10.3389/fevo.2020.00214

It Is Not an Anthropocene; It Is Really the Technocene: Names Matter in Decision Making Under Planetary Crisis

Oliver López-Corona[1,2]* Gustavo Magallanes-Guijón[3]*

Milpa



Especie

THE JOY OF WHY

Why Is It So Hard to Define a Species?

2 |

The idea of a species is fundamental to the way that many people understand the structure of life on Earth. But ask 10 specialists how they define the concept and you might get 10 answers. In this episode, co-host Janna Levin speaks with evolutionary biologist Kevin de Queiroz about what makes defining and delineating species such a slippery process, and why it matters to our understanding of both evolution and conservation.

Suelo

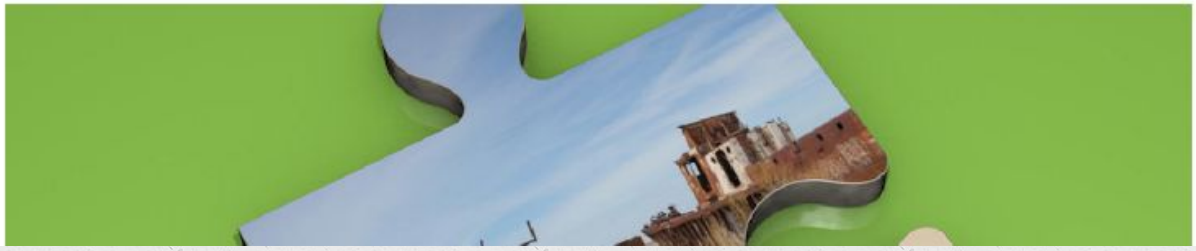
Cursos

UNIVERSITY OF LEEDS

Environmental Challenges: Scarcity and Conflict in the Natural Environment

War and conflict can severely disrupt the governance of the environment. What is the impact on both people and the environment?

★★★★★ 4.8 (12 reviews) **24,199** enrolled on this course



Environmental Challenges: Scarcity and Conflict in the Natural Environment

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- 2 weeks
- 5 hours per week
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- Open level

Join course

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9 weeks
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Instructor-paced
Instructor-led on a course schedule

Free
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Massachusetts Institute of Technology

MITx: Introduction to Biology - The Secret of Life

Explore the secret of life through the basics of biochemistry, genetics, molecular biology, recombinant DNA, genomics and rational medicine.

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Instructor-led on a course schedule

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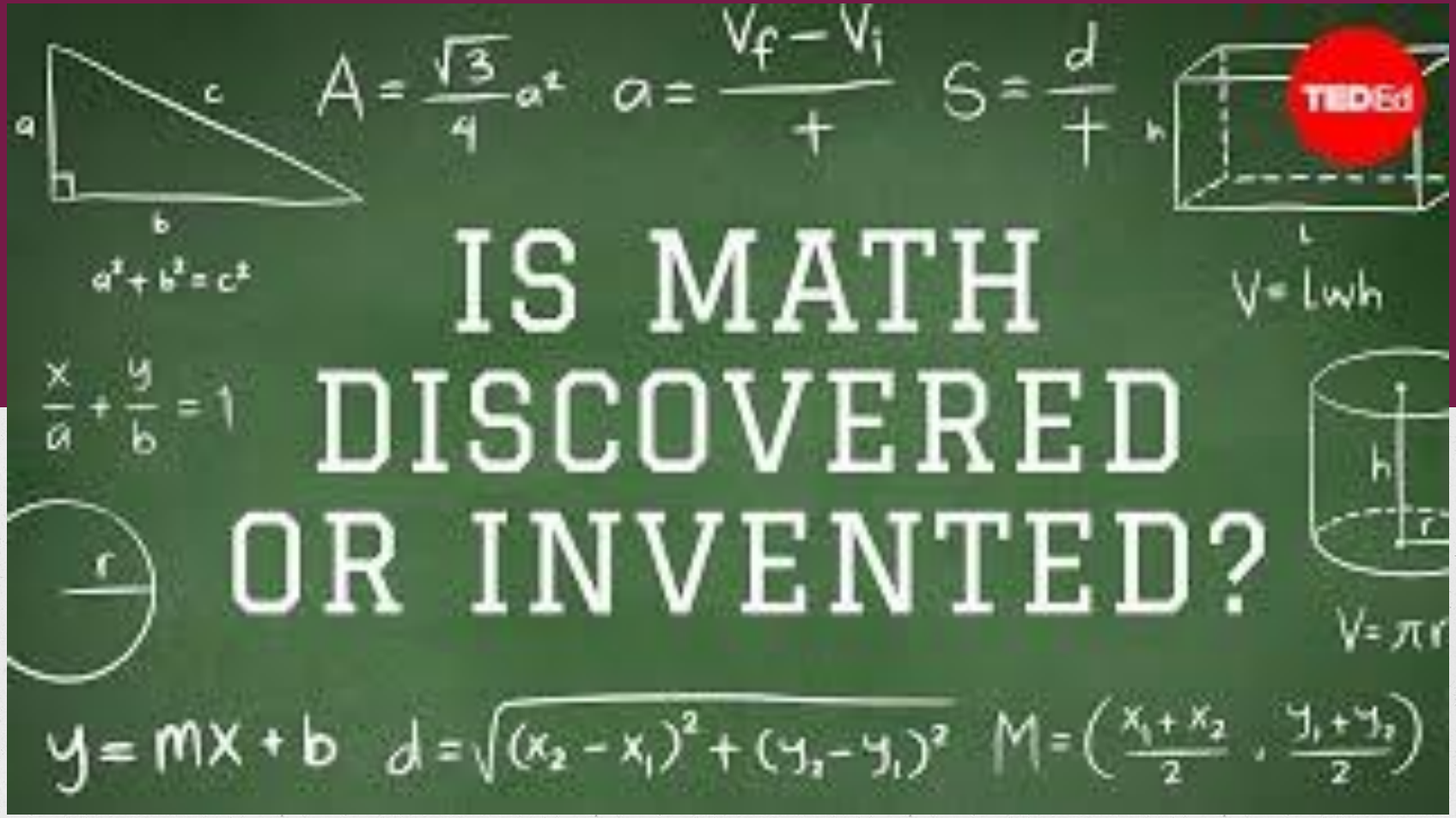
Introducción a la sostenibilidad

MEMORIA DE LA ESCUELA

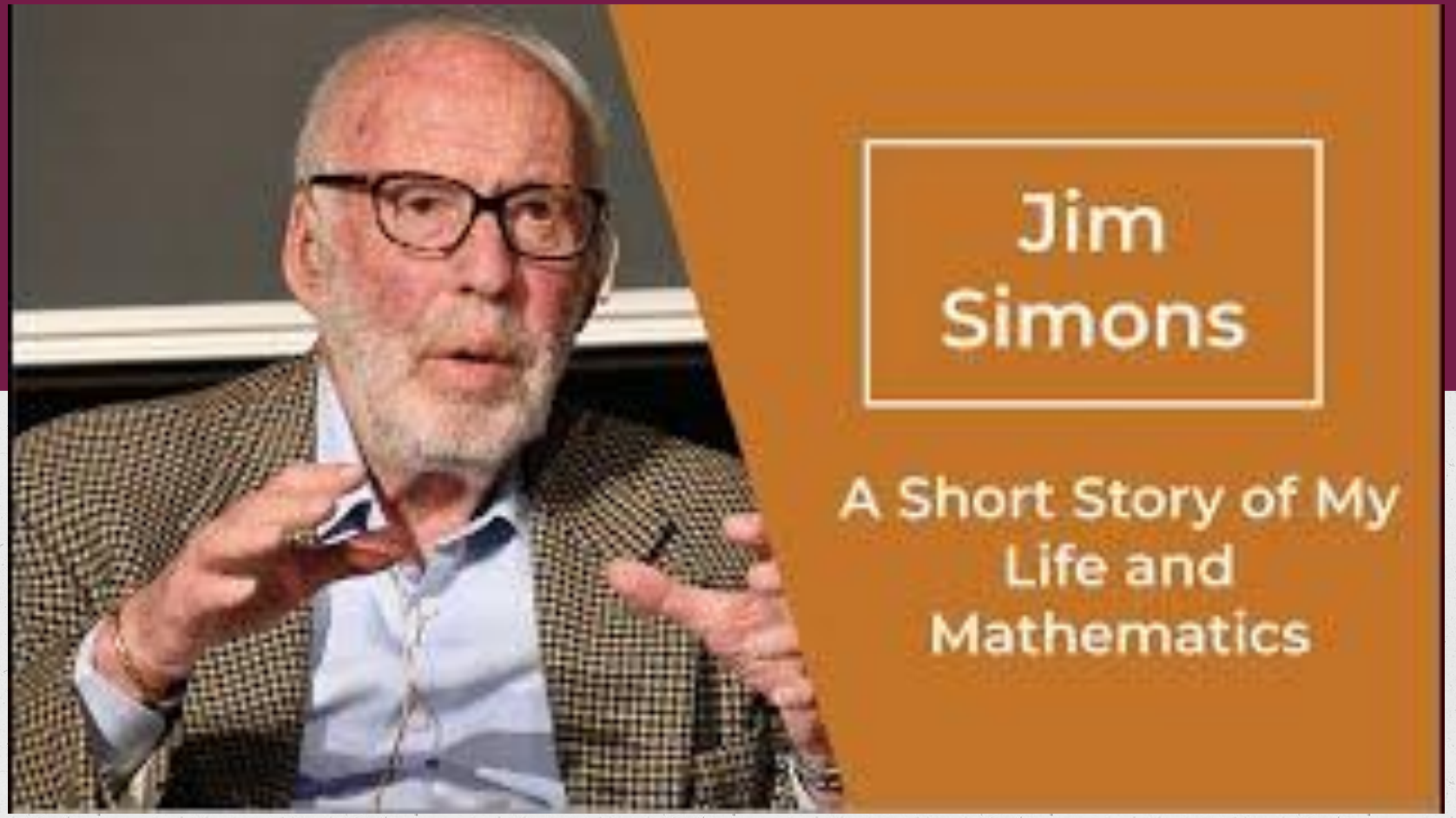

Game Theory
Collective Behavior
Nonlinear Dynamics
Emergence
Networks
Complex Systems
Self-Organization
Systems Theory
Pattern Formation
Evolution & Adaptation

Mi propuesta de que es lo que debería enseñarse y cómo.

Cultura


IS MATH
DISCOVERED
OR INVENTED?
TEDEd


6, 28, 496 ...?


Jim
Simons
A Short Story of My
Life and
Mathematics


Terence Tao
IMO 2024
AI and
Mathematics

Artículo

frontiers in
ROBOTICS AND AI

REVIEW ARTICLE
published: 10 October 2014
doi: 10.3389/frobt.2014.00008

The past, present, and future of artificial life

Wendy Aguilar[1], Guillermo Santamaría-Bonfil[1], Tom Froese[1,2] and Carlos Gershenson[1,2]*

[1] Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Nacional Autónoma de México, Mexico City, Mexico
[2] Centro de Ciencias de la Complejidad, Universidad Nacional Autónoma de México, Mexico City, Mexico

Edited by:
Joseph T. Lizier, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Reviewed by:
Mario Giacobini, University of Turin, Italy
Tim Taylor, Monash University, Australia

***Correspondence:**
Carlos Gershenson, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Nacional Autónoma de México, Ciudad Universitaria, A.P. 20-126, Mexico City 01000, Mexico
e-mail: cgg@unam.mx

For millennia people have wondered what makes the living different from the non-living. Beginning in the mid-1980s, artificial life has studied living systems using a synthetic approach: build life in order to understand it better, be it by means of software, hardware, or wetware. This review provides a summary of the advances that led to the development of artificial life, its current research topics, and open problems and opportunities. We classify artificial life research into 14 themes: origins of life, autonomy, self-organization, adaptation (including evolution, development, and learning), ecology, artificial societies, behavior, computational biology, artificial chemistries, information, living technology, art, and philosophy. Being interdisciplinary, artificial life seems to be losing its boundaries and merging with other fields.

Keywords: artificial life, cognitive science, robotics, artificial intelligence, philosophy, adaptation, self-organization, synthetic biology

1. THE PAST

Google's Ngram Viewer (Michel et al., 2011) allows users to search the relative frequency of n-grams (short-words combinations, $n \leq 5$) in time, exploiting the large database of Google Books that includes about 4% of all books ever written. Hiroki Sayama did a search for "artificial life"[1], and the curve showed how the frequency jumps from 1986 and reaches a peak in 1997 before stabilizing. However, there is an even higher peak around 1821. "What were they doing in those days?" Hiroki tweeted. Well, Frankenstein, or The Modern Prometheus by Mary Shelley was published in 1818. That created a wave in literature until the end of the 1820s and had an impact for the rest of the nineteenth century, as people debated

says that Juanelo Turriano created an automata called "The Stick Man." It begged in the streets, and when someone gave him a coin, he bowed. Through the modern age, automata became more and more sophisticated, based on and leading to advances in clockwork and engineering (Wood, 2002). Perhaps the most impressive of this period were the automata of Vaucanson. His first workshop was destroyed because the androids he wanted to build were considered profane. He later built a duck, which appeared to eat, drink, digest, and defecate. Other examples of modern automata are those created by Pierre Jaquet-Droz: the writer (made of 2500 pieces), the musician (made of 2500 pieces), and the draughtsman (made of 2000 pieces).

Multistability and unpredictability FREE

In numerous physical systems, from tossed coins to black holes, the complexity arising from the coexistence of different outcomes limits our ability to make predictions.

Álvar Daza; Alexandre Wagemakers; Miguel A. F. Sanjuán

Physics Today **77** (11), 44–50 (2024);
https://doi.org/10.1063/pt.kcxv.poxf

Decision making can be tough. Transferring the choice to an unbiased authority, like a coin or a die, may help to relieve the pressure. Indeed, for just a few dollars, you can buy a decision-making toy (see figure 1), consisting of a rigid rod and three magnets typically labeled with different outcomes: yes, no, and maybe. Just pull the rod away from equilibrium and let it swing erratically until it points to the answer. The whimsical pendulum makes the choice for you.

Volume 187, Issue 21, 17 October 2024, Pages 5809-5813

Voices

Future views on neuroscience and AI

Ilana Witten, Daniel L.K. Yamins, Claudia Clopath, Matthias Bethge, Yi Zeng, Ann Kennedy, Abeba Birhane, Doris Tsao, Been Kim, Ila Fiete

https://doi.org/10.1016/j.cell.2024.09.031 ↗

Referred to by The expanding world of neuroscience
Cell, Volume 187, Issue 21, 17 October 2024, Pages 5797-5798

The relationship between neuroscience and artificial intelligence (AI) has evolved rapidly over the past decade. These two areas of study influence and stimulate each other. We invited experts to share their perspectives on this exciting intersection, focusing on current achievements, unsolved questions, and future directions.

Measuring Complexity using Information

12 Pages • Posted: 29 Oct 2024

Klaus Jaffe
Universidad Simon Bolivar

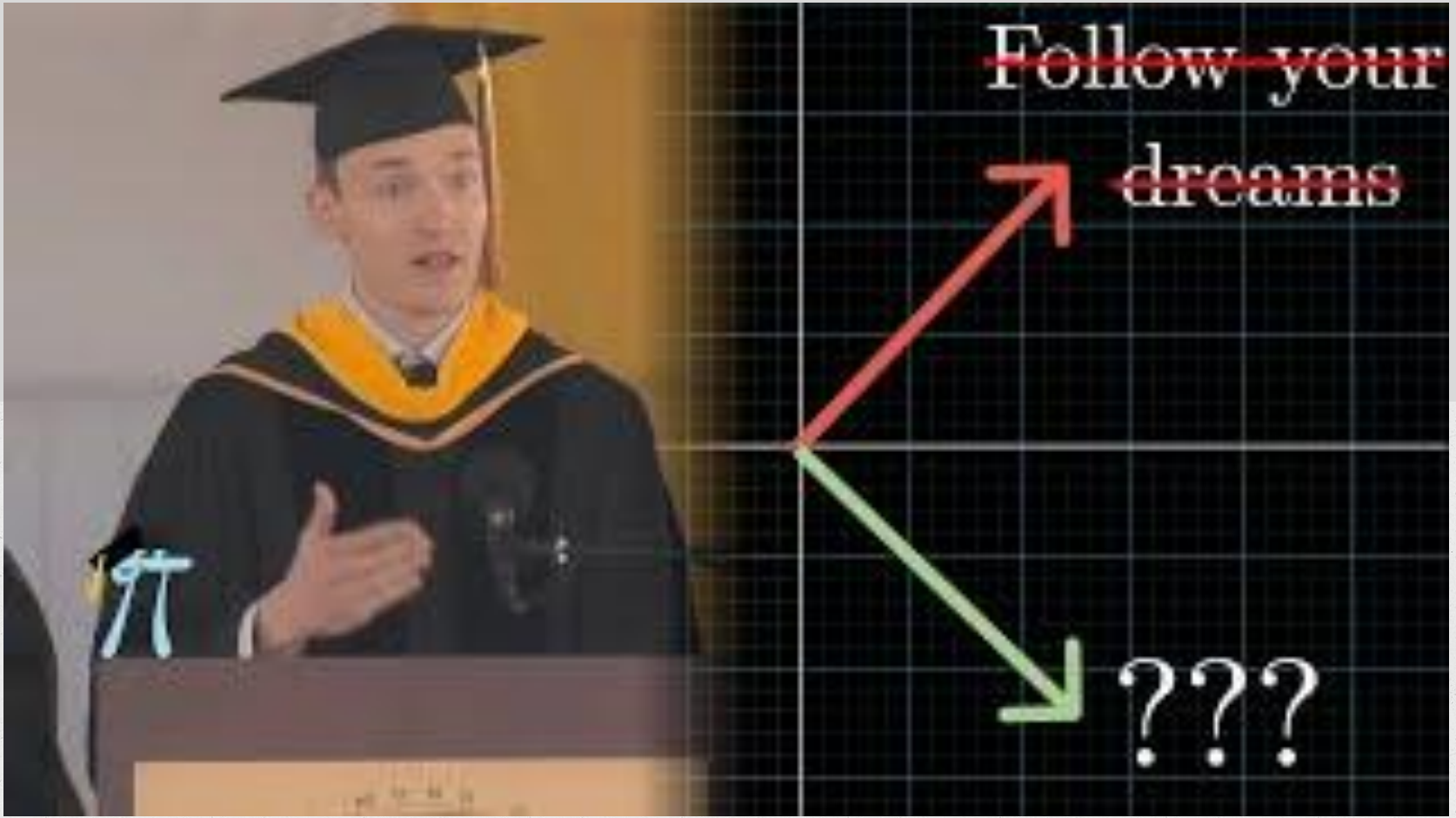
Date Written: July 26, 2024

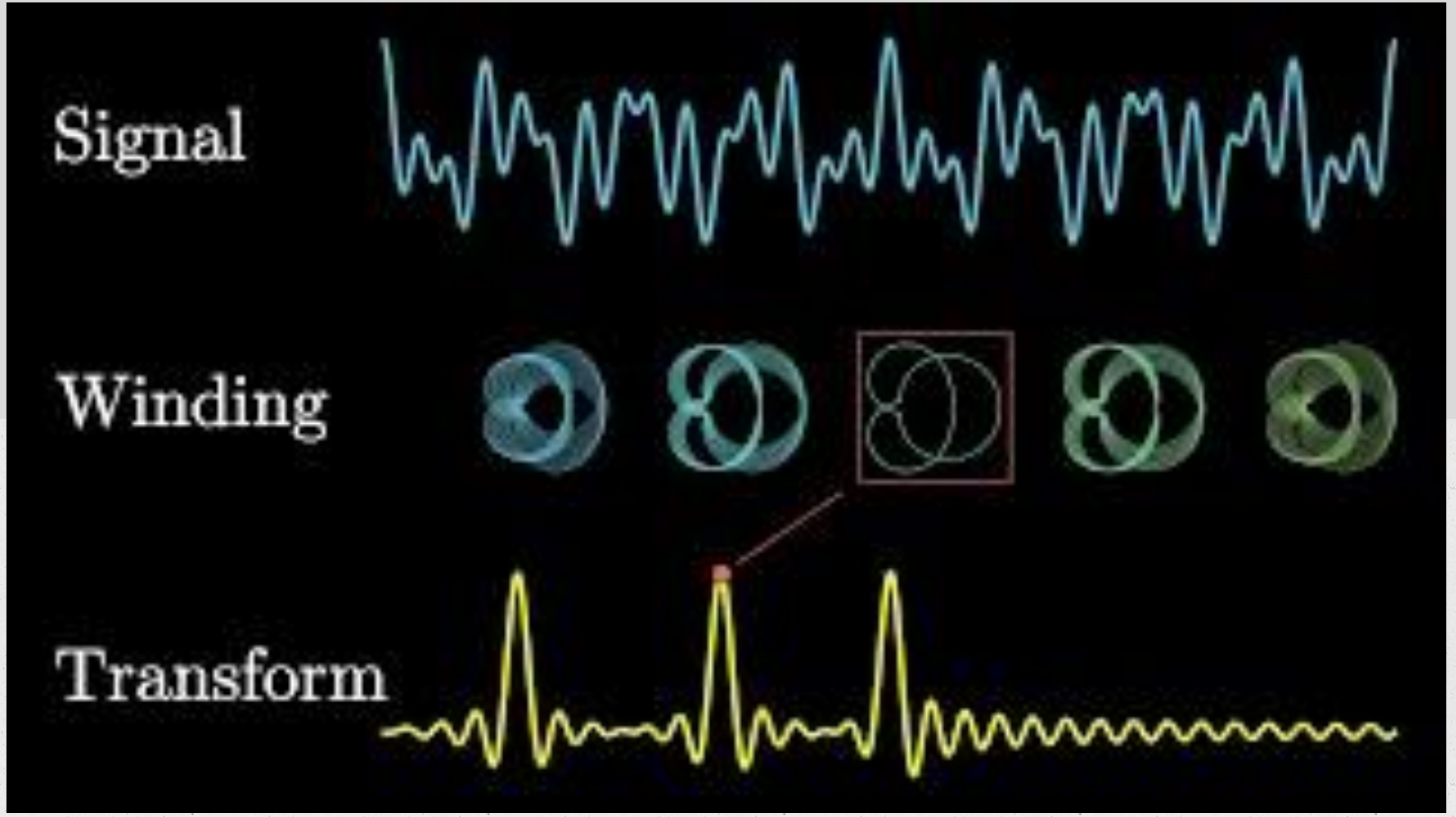
Abstract

Measuring complexity in multidimensional systems with high degrees of freedom and a variety of types of information, remains an important challenge. The complexity of a system is related to the number and variety of components, the number and type of interactions among them, the degree of redundancy, and the degrees of freedom of the system. Examples show that different disciplines of science converge in complexity measures for low and high dimensional problems. For low dimensional systems, such as coded strings of symbols (text, computer code, DNA, RNA, proteins, music), Shannon's Information Entropy (expected amount of information in an event drawn from a given distribution) and Kolmogorov's Algorithmic Complexity (the length of the shortest algorithm that produces the object as output), are used for quantitative measurements of complexity. For systems with more dimensions (ecosystems, brains, social groupings), network science provides better tools for that purpose. For highly complex multidimensional systems, none of the former methods are useful. Here, information related to complexity can be used in systems, ranging from the subatomic to the ecological, social, mental and to AI. Useful Information Φ (Information that produces thermodynamic free energy) can be quantified by measuring the thermodynamic Free Energy and/or useful Work it produces. Complexity can be measured as Total Information I of the system, that includes Φ, useless information or Noise N, and Redundant Information R. Measuring one or more of these variables allows quantifying and classifying complexity. Complexity and Information are two windows overlooking the same fundamental phenomenon, broadening out tools to explore the deep structural dynamics of nature at all levels of complexity, including natural and artificial intelligence.

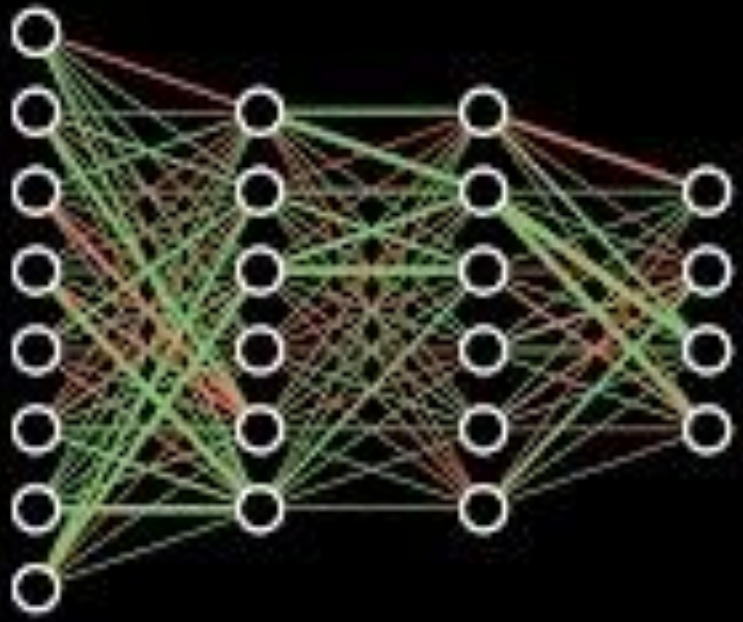
Keywords: Thermodynamics, Infodynamics, Complexity, Information

Videos

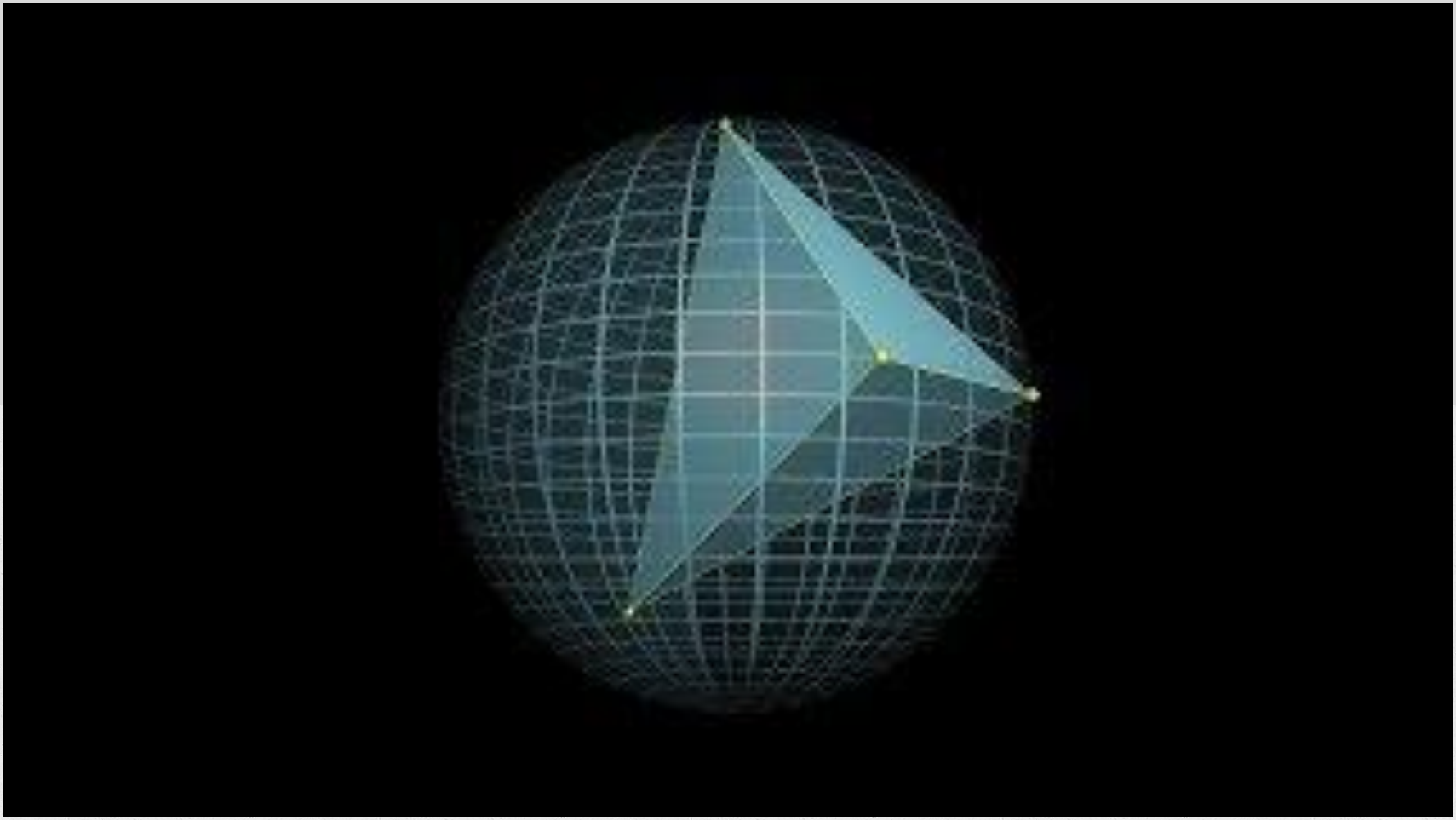

Follow your
dreams
???

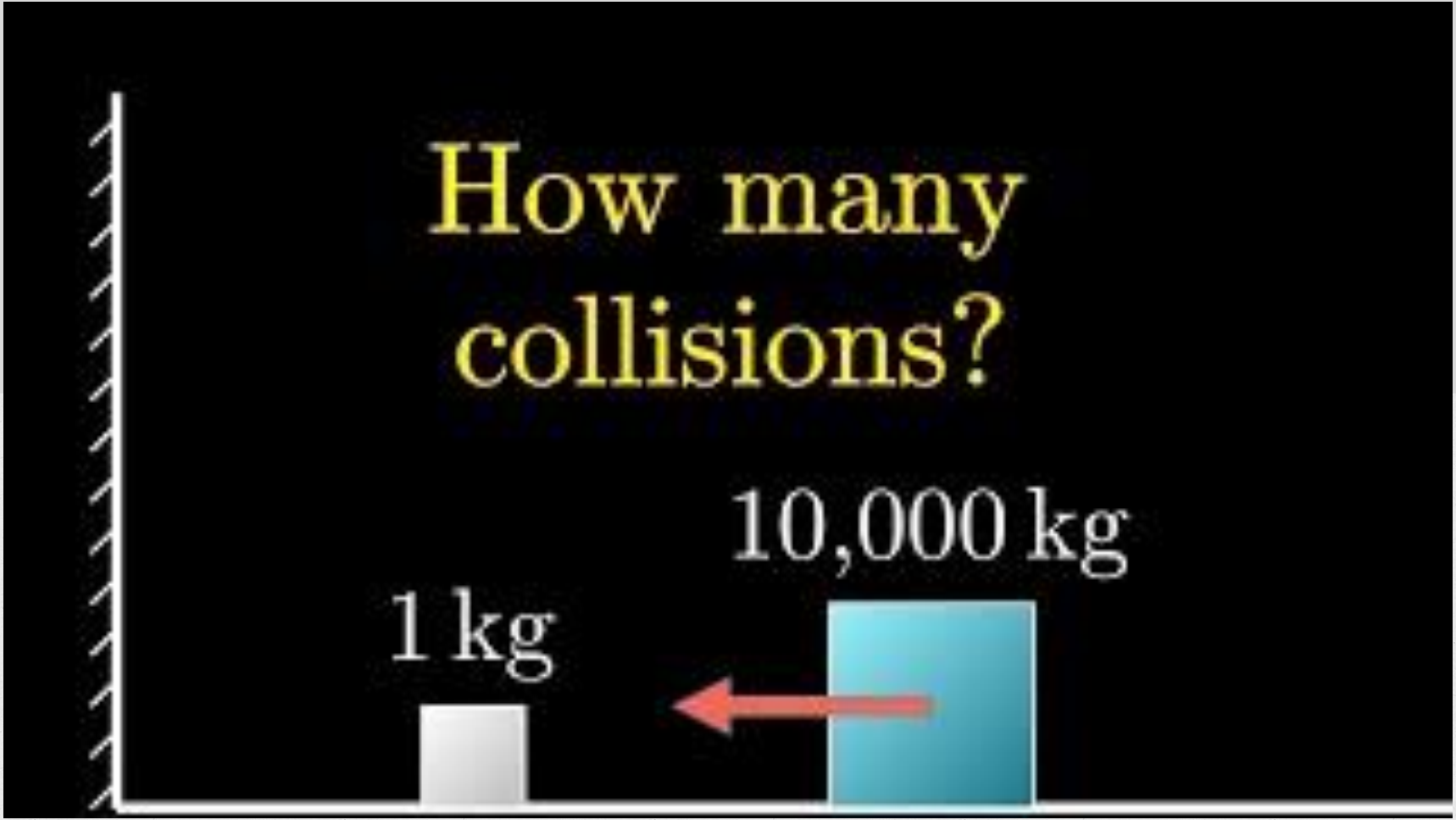

Signal
Winding
Transform

Neural Networks

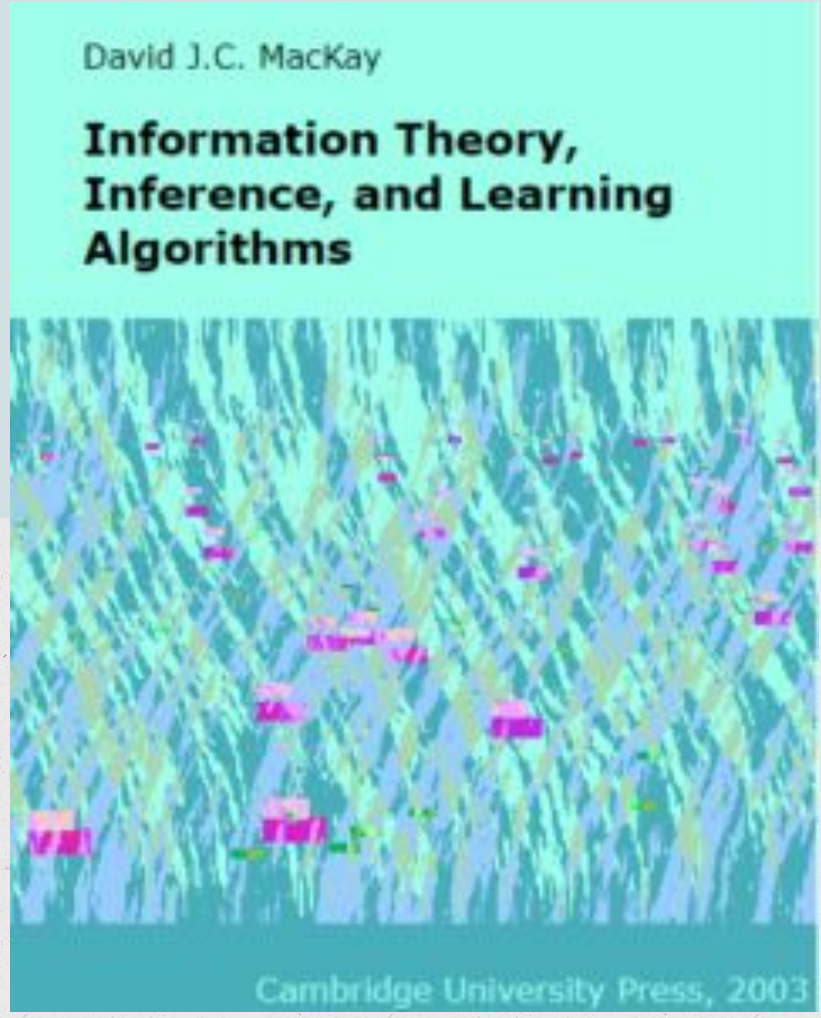


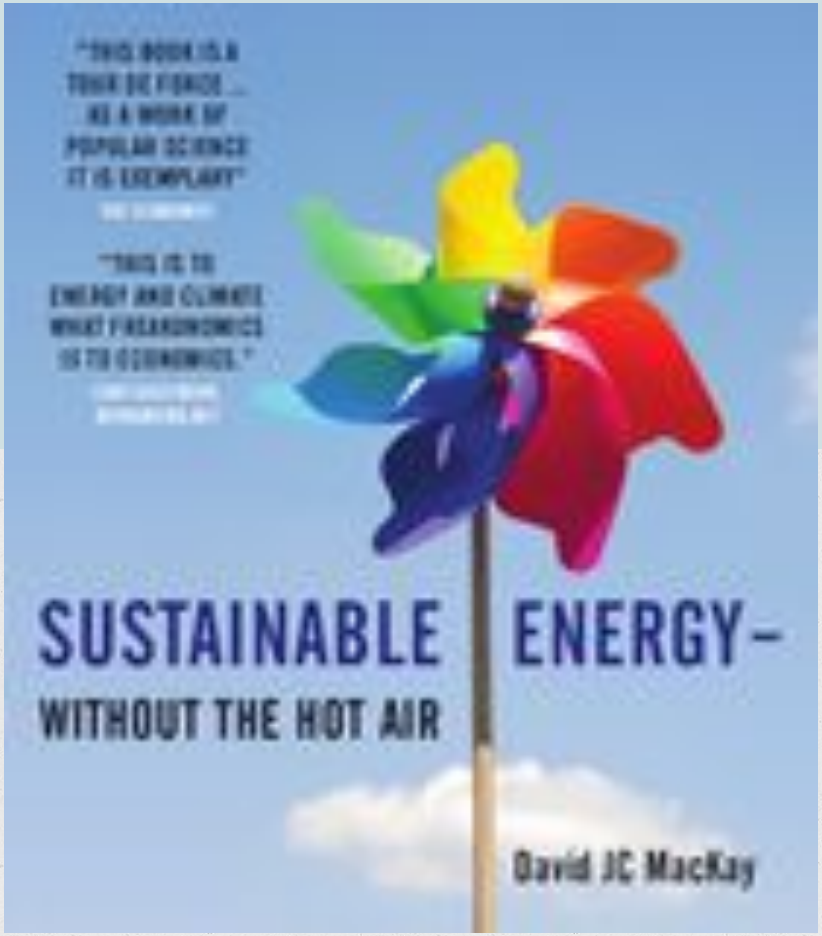
From the ground up

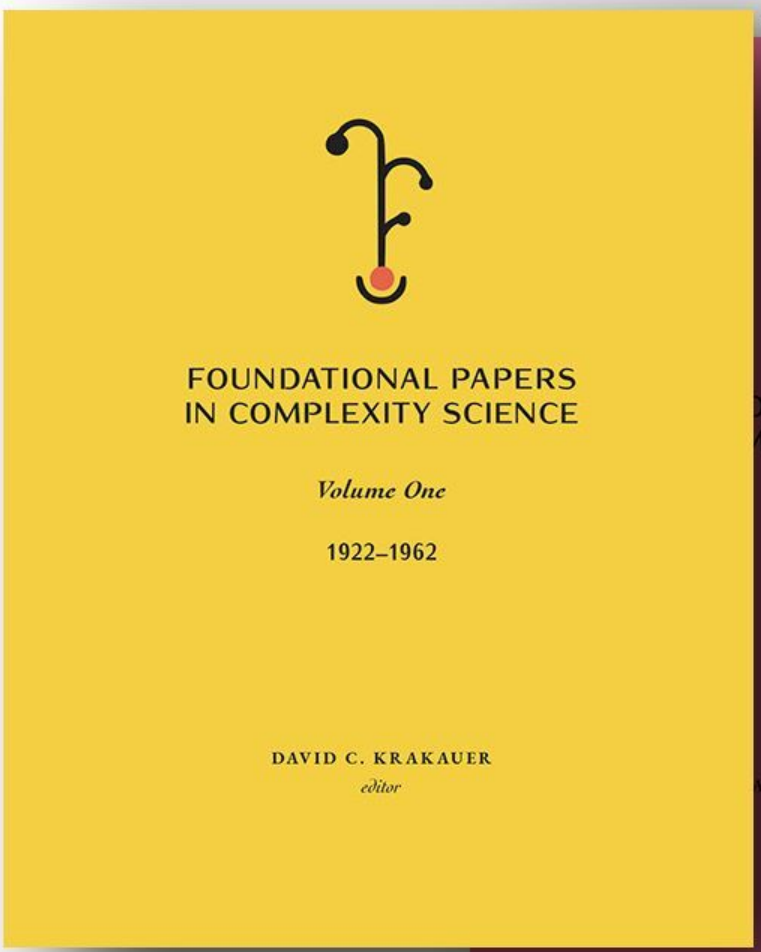



How many collisions?
10,000 kg
1 kg

Libros


David J.C. MacKay
Information Theory, Inference, and Learning Algorithms
Cambridge University Press, 2003


SUSTAINABLE ENERGY –
WITHOUT THE HOT AIR
David JC MacKay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DAVID C. KRAKAUER
editor


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Notas

Health

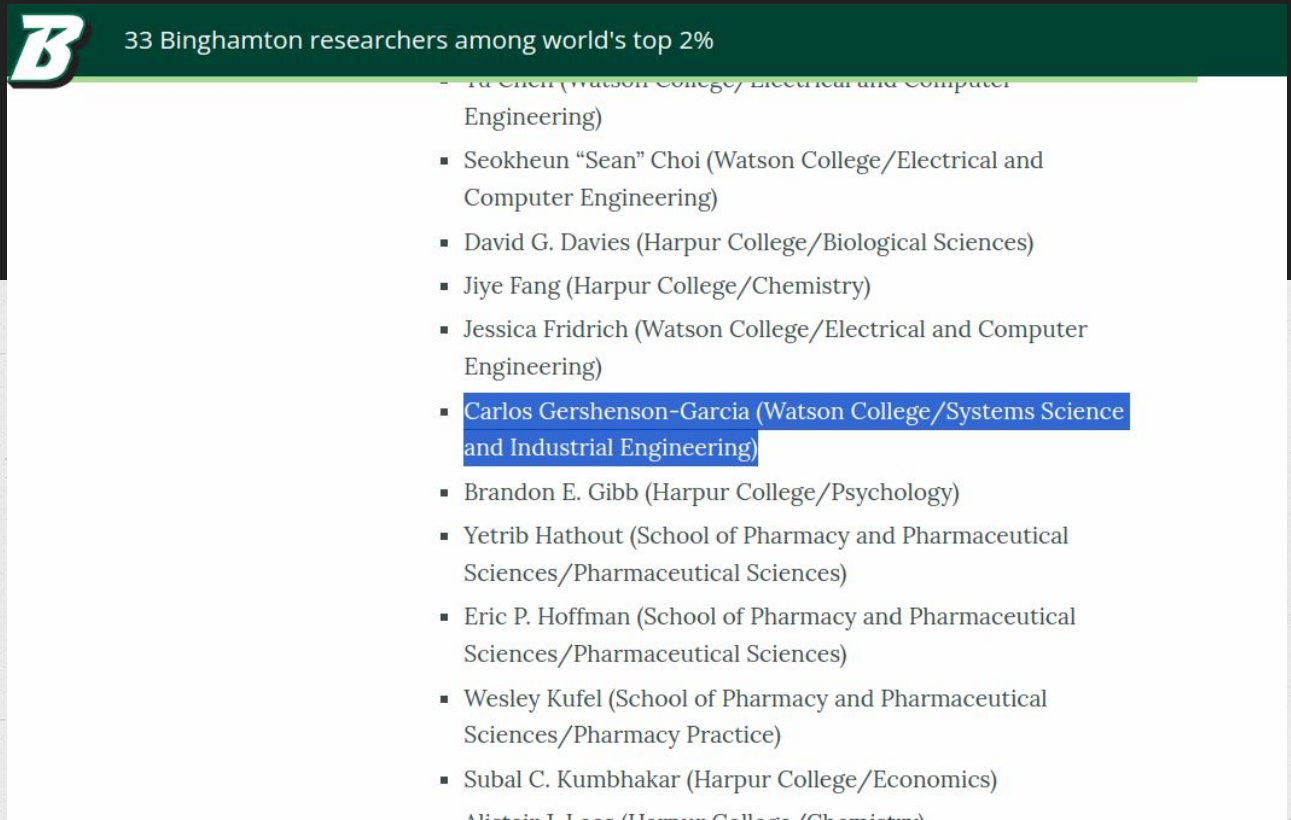
Is personalised nutrition better than one-size-fits-all diet advice?

Our metabolism's response to food is highly idiosyncratic and there are hints that tailoring our diet to these personal differences can deliver health benefits

By Graham Lawton

30 October 2024 , updated 8 November 2024

Nuestro Amigo y colega, Carlos Gershenson (quien estuvo en la FisMatEcol) esta en el top 2% mundial de cientificos



33 Binghamton researchers among world's top 2%

- Engineering)
- Seokheun “Sean” Choi (Watson College/Electrical and Computer Engineering)
- David G. Davies (Harpur College/Biological Sciences)
- Jiye Fang (Harpur College/Chemistry)
- Jessica Fridrich (Watson College/Electrical and Computer Engineering)
- Carlos Gershenson-Garcia (Watson College/Systems Science and Industrial Engineering)
- Brandon E. Gibb (Harpur College/Psychology)
- Yetrib Hathout (School of Pharmacy and Pharmaceutical Sciences/Pharmaceutical Sciences)
- Eric P. Hoffman (School of Pharmacy and Pharmaceutical Sciences/Pharmaceutical Sciences)
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- Subal C. Kumbhakar (Harpur College/Economics)

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2.- En el encabezado, cambia el idioma de Language **"en"** a Lenguaje **"es"** (español).
3.- Los nombres comunes NO se traducen automáticamente para cada país, para ello debes: ir a tu perfil de usuario, buscar "mis preferencias" y cambiar a nombre común en tu idioma (**Mx**).

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Jimena de Gortari
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Análisis del "lenguaje de la ciudad" y la transformación del espacio sonoro por la contaminación ambiental.

Juan Carlos Reyes (POR CONFIRMAR)
RECTOR, UNIVERSIDAD DE LAS LENGUAS INDÍGENAS DE MÉXICO
Impacto del proyecto de la Universidad para la preservación de lenguas en riesgo de extinción.

Elvia Ramírez Carrillo
"Círculos de danza" como espacios para preservar los lenguajes mexicas (Náhuatl, danza, música, lenguaje ritual).

Invitado especial: Jack Connor
CEO DE LINGUA AETERNA
Estrategias innovadoras para documentación de lenguas en peligro y el uso de Inteligencia Artificial para "hablantes artificiales".

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The international journal of science / 25 July 2024

nature

Scientists need more time to think

E-mails and instant messaging are core to research — but also a distraction. Researchers should study their impact on science, and how they can claw back time to concentrate.

Video calls. Instant messaging. Voice calls. E-mails. Social media. Smartphones. Tablets. Laptops. Desktops. More digital devices equals less time to concentrate and to think. The negative effects of this on researchers are tackled by computer scientist Cal Newport in his latest book, *Slow Productivity*[1].

The book's title challenges the idea, common to many workplaces, that productivity must always increase. A study has shown that science is becoming less disruptive, even though there are now more papers being published and grants awarded than ever before[2]. Newport, who studies technology in the workplace at Georgetown University in Washington DC, says that researchers and other knowledge workers need to slow down and spend more time thinking, to focus on maintaining and improving quality in their work.

Newport does the research community a service by shining a spotlight on an overburdened workforce. Institutions should already be accessing the expertise that exists within their walls in the search for answers, but are not doing so. Newer communications technologies have enormous benefits, including speeding up research, as was necessary during the COVID-19 pandemic. But they are also squeezing out thinking time. Newport's book reminds us that there are researchers who will know how to help.

Stop, drop and think

Thinking time — the time needed to concentrate without interruptions has always been central to scholarly work. It is essential to designing experiments, compiling data, assessing results, reviewing literature and, of course, writing. Yet, thinking time is often undervalued; it is rarely, if ever, quantified in employment practices.

One way to think about the practice of juggling research with e-mail and instant messaging is to visualize someone working next to a physical letterbox. Imagine opening and reading every letter as soon as it arrives, and starting to compose a reply, even as more letters drop through the box — all the while trying to do your main job. Researchers say that their to-do lists tend to lengthen, in part because colleagues can contact them instantly, often for good reasons. Researchers also often have to choose what to prioritize, which can cause them to feel overwhelmed.

Newport gives suggestions on reclaiming thinking time, include limiting the number of items on to-do lists and project teams setting aside time to complete tasks that require all members, thus avoiding individual members sending e-mails to each other. For institutions, Newport recommends a transparent workload management system — a way for managers to see everything that a colleague is expected to do — and then to adjust the workload if there are more tasks than there is available time.

> “Thinking time is often undervalued; it is rarely, if ever, quantified in employment practices.”

Undoubtedly good advice, this might be easier to implement in industrial settings than in academic ones. In many academic research laboratories, researchers report to a single principal investigator, with little management structure. This is partly because it is hard to justify to academic funders the budget for paying for management and administration roles.

But Felicity Mellor, a science-communication researcher at Imperial College London, is sceptical about giving managers a role in thinking time. In many cases, researchers are already feeling the weight of their institution's monitoring and evaluation systems. Mellor argues that including yet another box in an evaluation form might not go down well. She also thinks that institutions will not accept this. "Can you imagine the response if a scientist filled out a time sheet where it says 'eight hours spent thinking'?" Ultimately, she says, creating a more supportive research culture needs a much more fundamental change. That suggests an even more radical rethink of the current funding model for academic research, as we wrote last month (see *Nature* **630**, 793; 2024) , along with changes to other aspects of academic science.

Quality check

Newport's thesis raises a much more fundamental question: what is the impact of lost concentration time on science — not just on the structure and process of science, but also on the content and quality of research?

In 2014, Mellor co-led a research project, funded by the UK Arts and Humanities Research Council, called The Silences of Science, published as a book two years later[3]. Researchers discussed this question, and others in a series of workshops, but the work did not continue after the grant expired. Such explorations need to be revived, but they also need to incorporate the impact of artificial-intelligence technologies. These tools are being implemented at pace around the world to automate many routine administrative tasks. Researchers need to evaluate whether such tools can free up more thinking time for researchers; or whether they could have the opposite effect.

Communications technologies are sure to evolve further and to continue distracting researchers from their work. More studies investigating the effect of these technologies on science are needed urgently, as are studies on how thinking time can be protected in a world of instant communication. This knowledge will help researchers and institutional leaders to make better decisions about the technologies' deployment — and, hopefully, allow researchers to carve out that all-important space and time to think.

1. Newport, C. *Slow Productivity: The Lost Art of Accomplishment Without Burnout* (Portfolio, 2024).
2. Park, M. et al. *Nature* **613**, 138–144 (2023).
3. Mellor, F. & Webster, S. *The Silences of Science: Gaps and Pauses in the Communication of Science* (Routledge, 2016).