

# FisMatEcol Boletín

Agosto y Septiembre 2024

Dr. Oliver López Corona  
Dra. Elvia Ramírez Carrillo



Eventos



# 11 CIMA

**September 2-6, 2024 | FCFM - BUAP**

The Eleventh International Conference on Mathematics and Its Applications (11 CIMA) will take place from September 2 to 6, 2024, by the Faculty of Mathematical Physical Sciences of the Benemérita Universidad Autónoma de Puebla (BUAP).

[View poster](#)





UNAM  
La Universidad  
de la Nación



30 de agosto

12:00 horas

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

Organizador:

J. Roberto Romero Arias

**Dra. Sandra Palau Calderón**

Departamento de Probabilidad y Estadística, IIMAS

**“Construcción del árbol genealógico de  
una población con reproducción asexual”**

Informes: [coloquio@iimas.unam.mx](mailto:coloquio@iimas.unam.mx)

# GERÓNIMO URIBE BRAVO

## Instituto de Matemáticas, UNAM

Miércoles 4 · septiembre 2024

17:00 hrs.

Salón 13, 1er. piso, Edificio C

IIMAS UNAM, UNAM



[seminarioproba@matem.unam.mx](mailto:seminarioproba@matem.unam.mx)



<https://www.matem.unam.mx/~seminarioproba/>



Suscripción a la lista de distribución:  
[bit.ly/3JmwVMB\\_ProcesosEstocasticos](https://bit.ly/3JmwVMB_ProcesosEstocasticos)

### Resumen

Las ecuaciones de cambio de tiempo son una generalización de las ecuaciones diferenciales ordinarias.

En contextos probabilísticos, serán conducidas por las trayectorias aleatorias irregulares y en general densamente discontinuas del proceso estocástico típico.

Pueden pensarse como una versión multiparamétrica del método de cambio de tiempo (de Volkonskii) y en esta plática nos enfocaremos en una teoría trayectorial para las mismas.

Las ecuaciones de cambio de tiempo dan lugar a resultados profundos sobre existencia y unicidad débil de ecuaciones diferenciales estocásticas y admiten una teoría de aproximación robusta.

Sin embargo, las ecuaciones de cambio de tiempo no están restringidas a contextos markovianos o de seminartingalas.

En esta plática, veremos algunos ejemplos de ecuaciones de cambio de tiempo que se pueden analizar con éxito como:

los procesos afines (multidimensionales), los procesos de Lévy pegajosos, o la propuesta (básicamente desconocida) de Doeblln para procesos de difusión.

También veremos algunos problemas abiertos que sugieren los ejemplos.



SEMINARIO DE NEUROCIENCIAS • • •



## ESPECTROSCOPIA POR RESONANCIA MAGNÉTICA EN RECUPERACIÓN DE LESIÓN DE MÉDULA ESPINAL

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Viernes 30 de agosto de 2024 • 10 -12 horas • Auditorio del C3 • Transmisión por YouTube del C3

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**Sonora, México 2024**  
11-15 Noviembre

# ECOLOGÍA, CRISIS SOCIOAMBIENTAL Y SUSTENTABILIDAD

SAN CRISTÓBAL DE  
LAS CASAS, CHIAPAS

OCTUBRE  
6 al 11



- SIMPOSIOS
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- CONVERSATORIOS
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- TALLERES
- CURSOS

Inicio de recepción de propuestas de actividades y resúmenes: 15 de marzo  
Informes: [congreso.ecologia@ecosur.mx](mailto:congreso.ecologia@ecosur.mx)

<https://ixcongresoecologia.ecosur.mx/>





Oportunidades

**Programa de Divulgación del Instituto de Ecología, UNAM**  
**Convocatoria a becas en el marco del**  
***Convenio entre el Instituto de Ecología y el Instituto de Geología***  
***Proyecto TERRAMÓVIL***

El Instituto de Ecología de la Universidad Nacional Autónoma de México (UNAM) invita a su comunidad estudiantil a concursar por una beca en el marco de las bases de colaboración celebradas entre el Instituto de Ecología y el Instituto de Geología (UNAM), para enriquecer y extender el programa de divulgación Proyecto *Terramóvil* (<http://www.terramovil-igl.unam.mx/>).

**I.- Objetivo:**

Apoyar a la divulgación de la Ecología y las Ciencias de la Sostenibilidad como tallerista en el marco del Proyecto *Terramóvil* del Instituto de Geología, bajo la supervisión del Comité Técnico del Instituto de Ecología. Las funciones de la persona becaria incluyen el diseño e implementación de actividades de ciencia recreativa en diversas escuelas primarias de la Ciudad de México.

**II. Condiciones generales:**

1. La selección de la persona aspirante, así como el otorgamiento del apoyo económico mensual (\$2,300.00 M.N) en esta convocatoria, se harán con base en el Reglamento del Programa de becas del Instituto de Geología.
2. Las personas interesadas en participar deberán enviar su solicitud a [secacad@iecologia.unam.mx](mailto:secacad@iecologia.unam.mx) [sergio.ancona@iecologia.unam.mx](mailto:sergio.ancona@iecologia.unam.mx) a partir de la publicación de esta convocatoria hasta las 12:00 horas (hora del centro de México) del 21 de agosto de 2024.

RETO NACIONAL DE  
**S**OSTENIBILIDAD  
BBVA




## University of Connecticut, Department of Earth Sciences

**Position ID:** [UConn-Department of Earth Sciences-498003](#) [#26468, 498003]  
**Position Title:** Assistant, Associate or Full Professor in Artificial Intelligence/Machine Learning  
**Position Type:** Tenured/Tenure-track faculty  
**Position Location:** [Storrs, Connecticut 06269, United States](#) [map] #  
**Subject Area:** [Earth and Environmental Sciences](#) / [Earth science](#)  
**Appl Deadline:** (posted 2023/11/01, listed until 2024/11/22)  
**Position Description:** [Apply](#)

### Linking human alteration of biogeochemical cycles to water quality and habitat health

We study how aquatic ecosystems cycle elements such as nitrogen, carbon, phosphorus, and oxygen. We're especially interested in how human activities impact these cycles and lead to socially-relevant outcomes such as water quality and habitat degradation, or increased aquatic green-house gas emissions.

 Boston, MA (Main Campus)

 Full time

 Posted 30+ Days Ago

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### About the Opportunity

#### SUMMARY

The lab of Professor Albert-László Barabási is looking for Postdoctoral Research Associates in the area of network science, nutrition, biological networks, machine learning/AI, and science of science, as well as quantifying art. The BarabásiLab's current work spans the applications of networks toward understanding food and nutrition, human diseases, disease progression, biomarker discovery, and drug repurposing, as well as understanding the emergence of impact in art and science. The BarabásiLab is also looking for Postdoctoral Research Associates in the areas of network medicine, complex disease mechanism, systems pharmacology, bioinformatics, and network science/statistical physics. This position at Northeastern University may include opportunities to collaborate with the Harvard Medical School and Brigham and Women's Hospital.

#### RESPONSIBILITIES

The Postdoctoral Research Associate will

- Assist with initiating, executing, and completing clinical research and experiments
- Prepare and write research papers, presentations, grant proposals, etc.

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**Who is eligible:**

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August 25th, 2024

Positions are available on projects focusing on understanding transcriptional and epigenetic mechanisms controlling fibroblast activation as well as RNA translational mechanisms controlling cardiomyocyte differentiation and maturation. The specific projects will include analyses of mouse models, induced pluripotent stem cells and primary cell culture using a variety of molecular, biochemical and functional techniques. Projects funded by an ERC starting grant and a PRIN PNRR 2022 grant.

[Download Job Posting >](#)

## Lab Manager/Technician position available

August 25th, 2024

We are looking for a Lab Manager to help us run the lab. Specific tasks include mouse colony management, cell culture, cloning, ordering and organizing consumables and reagents

[Download Job Posting >](#)

## Bioinformatician position available

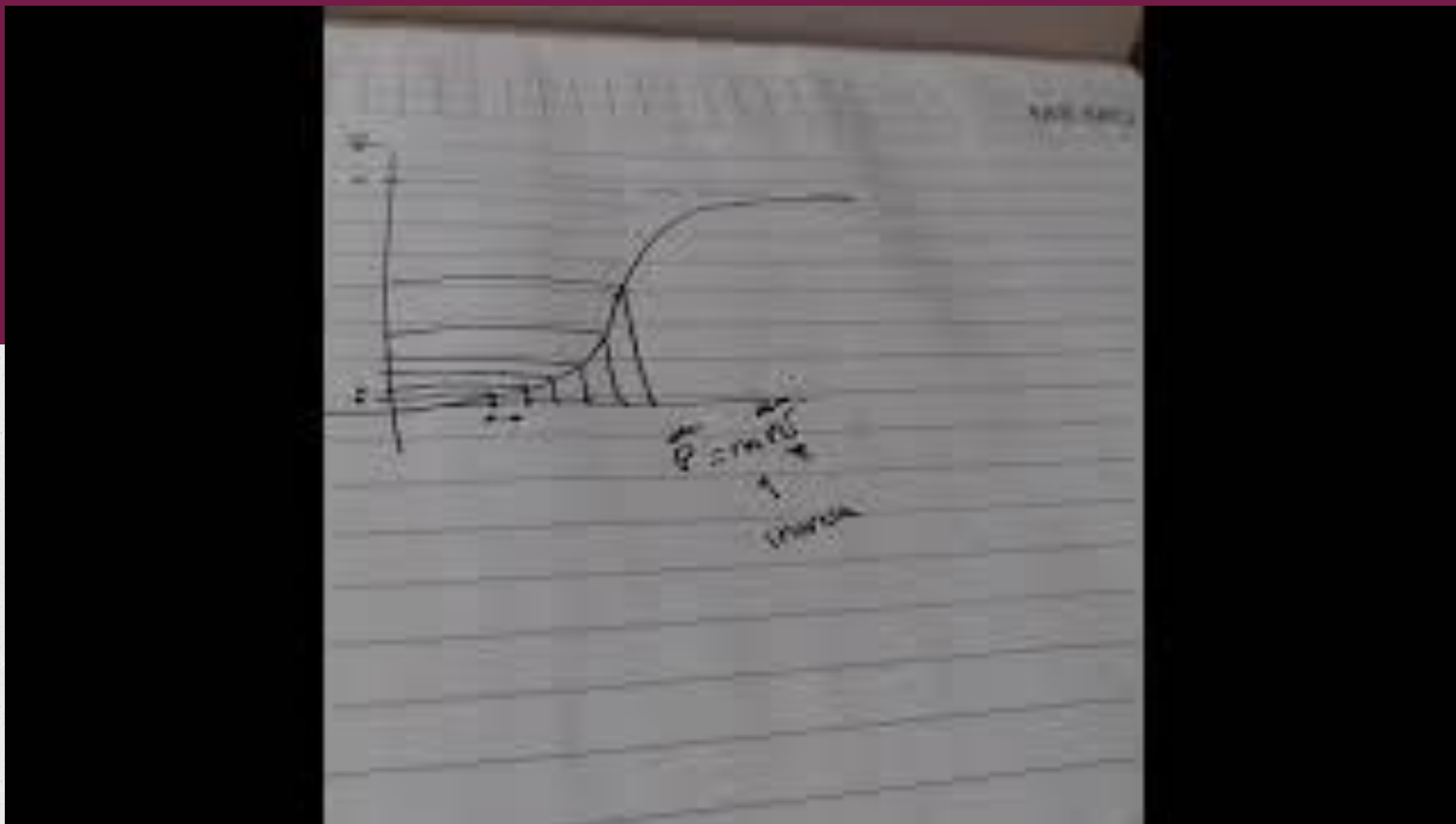
August 25th, 2024

We are looking for a bioinformatician to conduct analysis of next generation sequencing in bulk and single cell. These include but are not limited to: RNA-seq, ATAC-seq, ChIP-seq, TRAP-seq, Ribo-seq. Project funded by an ERC starting grant.

Conceptos



# Momento de una intervención









# Self Organized Criticality

Laura Pérez  
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Cursos



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# Introducción a la sostenibilidad

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Organiza: IIMAS, Fac de Psicología, IxM-CONACyT

Comité: Dr. Oliver López-Corona, Dra. Elvia Ramírez-Carrillo, Dr. Pablo Padilla

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



Cultura



# THE MATH PROBLEM









MATH

TWED

&

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"THE STARRY NIGHT"




Raised  
Ambitions

Artículo

## Antifragility in complex dynamical systems

[Cristian Axenie](#), [Oliver López-Corona](#), [Michail A. Makridis](#), [Meisam Akbarzadeh](#), [Matteo Saveriano](#),

[Alexandru Stancu](#) & [Jeffrey West](#) 

*npj Complexity* **1**, Article number: 12 (2024) | [Cite this article](#)

**21k** Accesses | **125** Altmetric | [Metrics](#)

### Abstract

Antifragility characterizes the benefit of a dynamical system derived from the variability in environmental perturbations. Antifragility carries a precise definition that quantifies a system's output response to input variability. Systems may respond poorly to perturbations (fragile) or benefit from perturbations (antifragile). In this manuscript, we review a range of applications of antifragility theory in technical systems (e.g., traffic control, robotics) and natural systems (e.g., cancer therapy, antibiotics). While there is a broad overlap in methods used to quantify and apply antifragility across disciplines, there is a need for precisely defining the scales at which antifragility operates. Thus, we provide a brief general introduction to the properties of antifragility in applied systems and review relevant literature for both natural and technical systems' antifragility. We frame this review within three scales common to technical systems: intrinsic (input–output nonlinearity), inherited (extrinsic environmental signals), and induced (feedback control), with associated counterparts in biological systems: ecological (homogeneous systems), evolutionary (heterogeneous systems), and interventional (control). We use the common noun in designing systems that exhibit antifragile behavior across scales and guide the reader along the spectrum of fragility–adaptiveness–resilience–robustness–antifragility, the principles behind it, and its practical implications.

## Towards an antifragility framework in past human–environment dynamics

[Yitzchak Jaffe](#) , [Ari Caramanica](#)  & [Max D. Price](#) 

*Humanities and Social Sciences Communications* **10**, Article number: 915 (2023) | [Cite this article](#)

1282 Accesses | 3 Altmetric | [Metrics](#)

### Abstract

Scholarship on human–environment interactions tends to fall under two headings: collapse or resilience. While both offer valid explanatory frameworks for human–environment dynamics, both view stress as a net negative that, if unchecked, disrupts systems in equilibrium. Societies either succumb to stress (and collapse) or overcome stress and persist (demonstrate resilience). We re-evaluate the role of stress and advocate for a non-equilibrium approach to the study of past human–environment interactions. We draw inspiration from Nasim Taleb's concept of 'antifragility', which posits a positive role of stress for increasingly complex systems. We apply antifragility as an explanatory framework to pre-Hispanic coastal Peru, where indigenous farmers adapted to the stresses of highly variable El Niño events through a variety of water management systems. Finally, we note that an antifragility approach highlights the beneficial role of stressors, and that avoiding stress altogether makes a system more fragile.

# The Ising model celebrates a century of interdisciplinary contributions

[Michael W. Macy](#) , [Boleslaw K. Szymanski](#) & [Janusz A. Hołyst](#)

*npj Complexity* **1**, Article number: 10 (2024) | [Cite this article](#)


**1374** Accesses | **26** Altmetric | [Metrics](#)

## Abstract

The centennial of the Ising model marks a century of interdisciplinary contributions that extend well beyond ferromagnets, including the evolution of language, volatility in financial markets, mood swings, scientific collaboration, the persistence of unintended neighborhood segregation, and asymmetric hysteresis in political polarization. The puzzle is how anything could be learned about social life from a toy model of second order ferromagnetic phase transitions on a periodic network. Our answer points to Ising's deeper contribution: a bottom-up modeling approach that explores phase transitions in population behavior that emerge spontaneously through the interplay of individual choices at the micro-level of interactions among network neighbors.

Article | [Open access](#) | Published: 07 June 2024

## Epidemic forecast follies

[P. L. Krapivsky](#) & [S. Redner](#) 

*npj Complexity* **1**, Article number: 7 (2024) | [Cite this article](#)

**754** Accesses | **9** Altmetric | [Metrics](#)

### Abstract

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We introduce a simple multiplicative model to describe the temporal behavior and the ultimate outcome of an epidemic. Our model accounts, in a minimalist way, for the competing influences of imposing public-health restrictions when the epidemic is severe, and relaxing restrictions when the epidemic is waning. Our primary results are that different instances of an epidemic with identical starting points have disparate outcomes and each epidemic temporal history is strongly fluctuating.

## The path of complexity

[Laurent Hébert-Dufresne](#) , [Antoine Allard](#), [Joshua Garland](#), [Elizabeth A. Hobson](#) & [Luis Zaman](#)

[npj Complexity](#) **1**, Article number: 4 (2024) | [Cite this article](#)

**4807** Accesses | **1** Citations | **51** Altmetric | [Metrics](#)

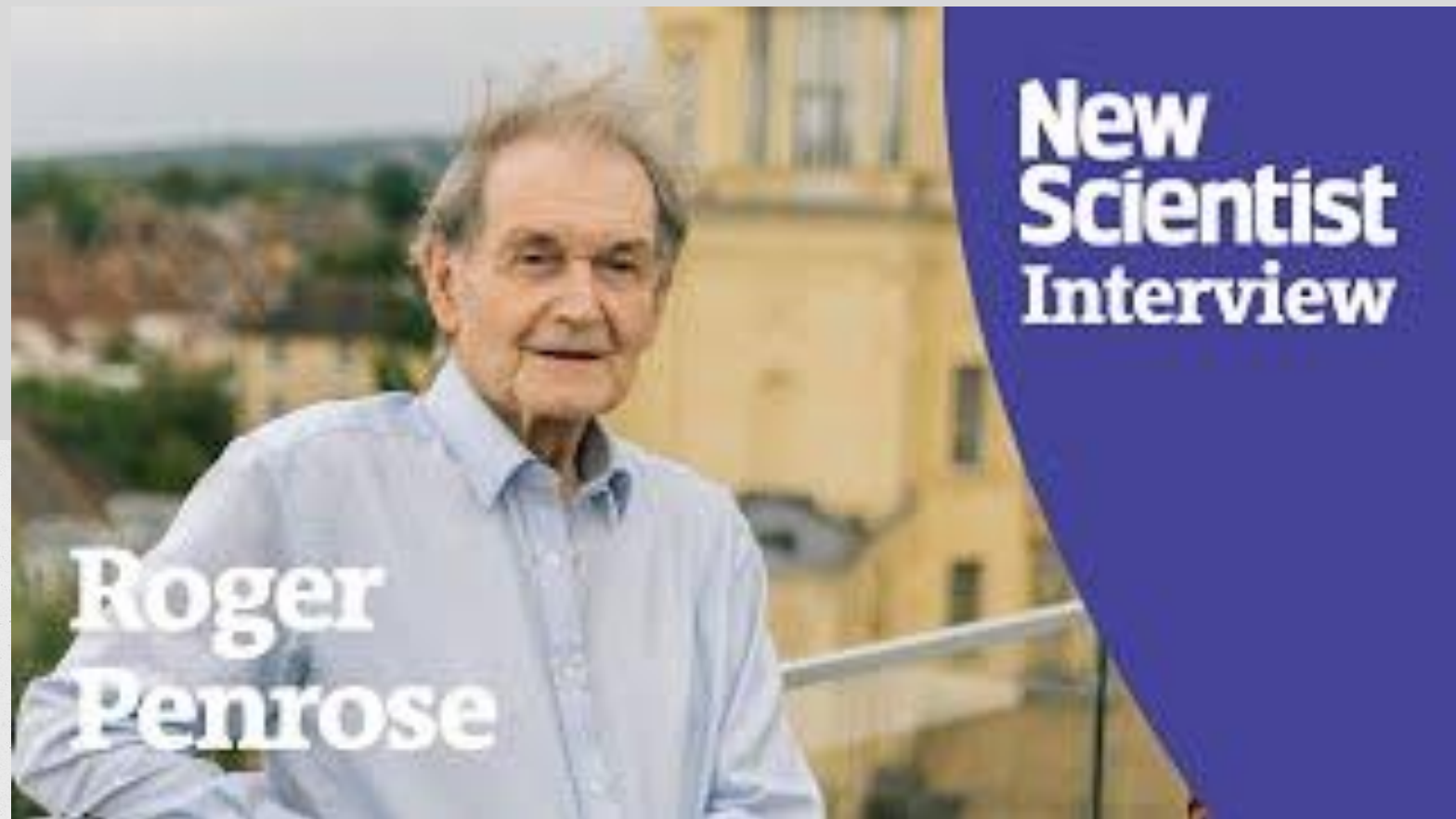
| *"I think the [21st] century will be the century of complexity"* - Stephen Hawking

Complexity science studies systems where large numbers of components or subsystems, at times of a different nature, combine to produce surprising emergent phenomena apparent at multiple scales. It is these phenomena, hidden behind the often deceptively simple rules that govern individual components, that best define complex systems. Since these behaviors of interest arise from interactions between parts, complex systems are not counterparts to simple systems but rather to separable ones. Their study therefore often requires a collaborative approach to science, studying a problem across scales and disciplinary domains. However, this approach introduces challenges into the ways collaborations function across traditionally-siloed disciplines, and in the publication of complexity science, which often does not fall cleanly into disciplinary journals. In this editorial, we provide our view of the current state of complex systems research and explain how this new journal will fill an important niche for researchers working on these ideas.



Videos





**New  
Scientist  
Interview**

**Roger  
Penrose**



THE  
MAN  
WHO  
BROKE  
MATH





**Escuela de Gobierno** @EGobiernoTP · 30 ago.

...

Hoy en [@TheDataPub](#), el Dr. Oliver López-Corona ([@otrasenda\\_AC](#)) habló del peligro de las narrativas falsas basadas en datos; se refirió a los límites de la inferencia en sistemas complejos, así como a las fallas típicas en el razonamiento estadístico y probabilístico.



Libros

**Encyclopaedia of  
Mathematical Sciences**

Volume 45

Yu. V. Prokhorov  
A. N. Shiryaev (Eds.)

**Probability  
Theory  
III**



Springer



# An introduction to measure theory

Terence Tao

DEPARTMENT OF MATHEMATICS, UCLA, LOS ANGELES, CA  
90095

*E-mail address:* `tao@math.ucla.edu`

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*Art of Problem Solving*

# Precalculus

Richard Rusczyk





FOUNDATIONAL PAPERS  
IN COMPLEXITY SCIENCE

*Volume One*

1922–1962

DAVID C. KRAKAUER  
*editor*



FOUNDATIONAL PAPERS  
IN COMPLEXITY SCIENCE

*Volume Two*

1962–1973

DAVID C. KRAKAUER  
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FOUNDATIONAL PAPERS  
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*Volume Three*

1973–1988

DAVID C. KRAKAUER  
*editor*

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IN COMPLEXITY SCIENCE

DAVID C. KRAKAUER  
*editor*

Notas

# Premio Federico Sescosse 2023 a José Sarukhán

— Ago 29, 2024

Compartir



# RANITA FISGONA O SILBADORA

Esta especie, de 2 cm,  
fue *descubierta* en Xochimilco



# Ratificación de Ramsés H. Mena Chávez como **Director del IIMAS**





**Jack** @Jac5Connor · 7min

And our 1,000 year reel data is submitted!

Thank you all who donated. We now have a whole library of donor-suggested literature that I think is an incredible addition to this project.

I cannot believe all of the support you all gave. I'll be posting the contents soon.



**Jack** @Jac5Connor · 26 ago.

I have an announcement – I'm going to the Arctic Circle for our first deposit into our language vault at the Arctic World Archive in Norway.

Our fundraiser to make our first deposit at the AWA went so incredibly well that a few things happened...

[Mostrar más](#)





# Baby boom prompts call to boost wild beaver population

18 hours ago

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**Helen Briggs**

Environment correspondent, BBC News • [@hbriggs](#)



## 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.**

**V**ideo 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*.

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<sup>1</sup>. 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, including limiting the number of items on to-do lists and project teams setting aside time to complete tasks that

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

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.

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<sup>2</sup>. 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* 619, 138–144 (2022).  
3. Mellor, F. & Webster, S. *The Silences of Science: Gaps and Pauses in the Communication of Science* (Routledge, 2016).