

# Ciencia y política

**Fernando Cossío**

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*Donostia International Physics Center (DIPC)*

*Ikerbasque*

*Real Academia de Ciencias Exactas, Físicas y Naturales*



# Un diálogo difícil, dos visiones del mundo diferentes



## Científico

- Los hechos son sagrados, la opinión es libre.
- Búsqueda de certidumbre.
- Tiempo indefinido (en principio).
- Problemas muy concretos.
- Dominio de la naturaleza del problema.
- Variables bajo control.



## Político

- Los hechos son libres, la opinión es sagrada.
- Aspectos difíciles de demostrar.
- Tiempo muy limitado.
- Problemas con muchos componentes.
- Imposibilidad de dominar todos los aspectos del problema.
- Variables fuera de control (especialmente en democracia).

# Un diálogo difícil... (Washington, Senado, abril de 1969)

Is there anything connected in the hopes of this accelerator that in any way involves the security of the country?

No, sir; I do not believe so.

Nothing at all?

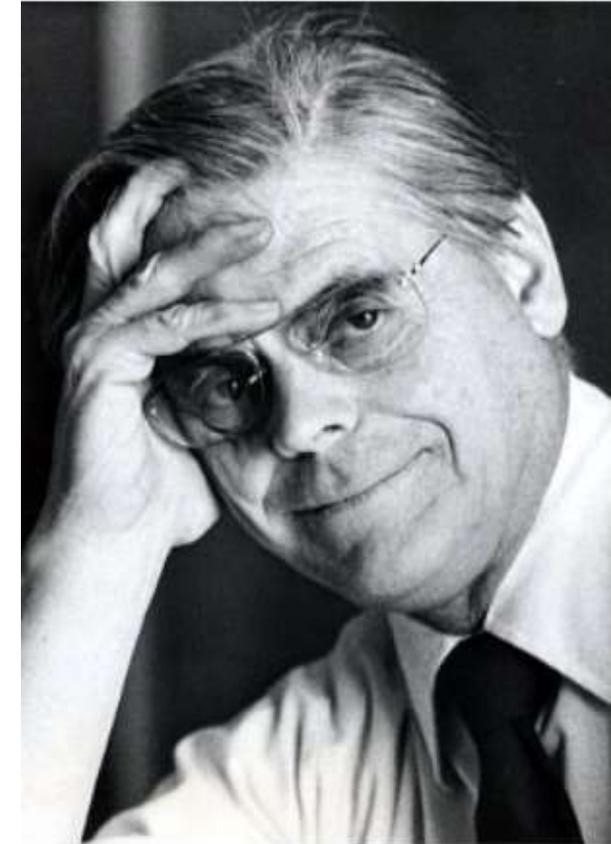
Nothing at all.

It has no value in that **respect**?

It only has to do with the **respect** with which we regard one another, the dignity of men, our love of culture. It has to do with those things. It has nothing to do with the military. I am sorry.

Don't be sorry for it. Is there anything here that projects us in a position of being competitive with the Russians, with regard to this race?

Only from a long-range point of view, of a developing technology. Otherwise, it has to do with: Are we good painters, good sculptors, great poets? I mean all the things that we really venerate and honor in our country and are patriotic about. In that sense, this new knowledge has all to do with honor and country **but it has nothing to do directly with defending our country except to help make it worth defending.**



**Robert R. Wilson**  
(1914-2000, Fermilab)



**John Pastore**  
(1907-2000, Senador)

# Un diálogo difícil... (Desastre del Challenger, enero de 1986)

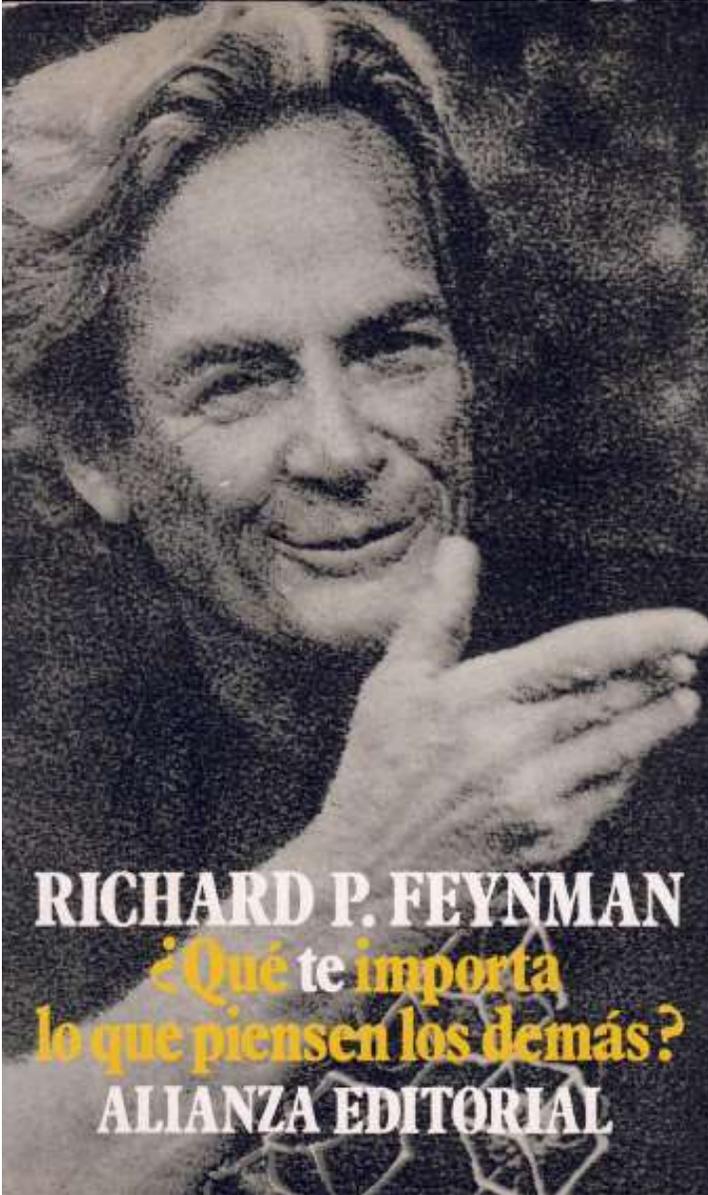
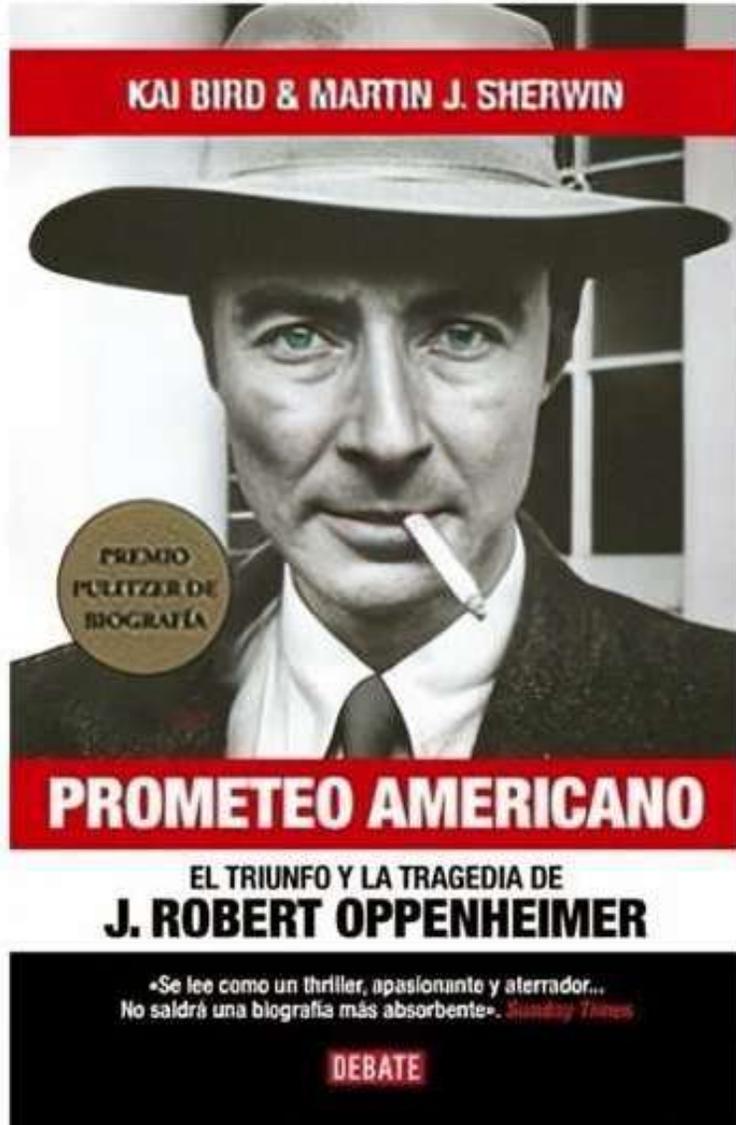


FIGURA 15A. La demostración del efecto del agua helada sobre el retén tórico (© MARILYNN K. YEE, NYT PICTURES).



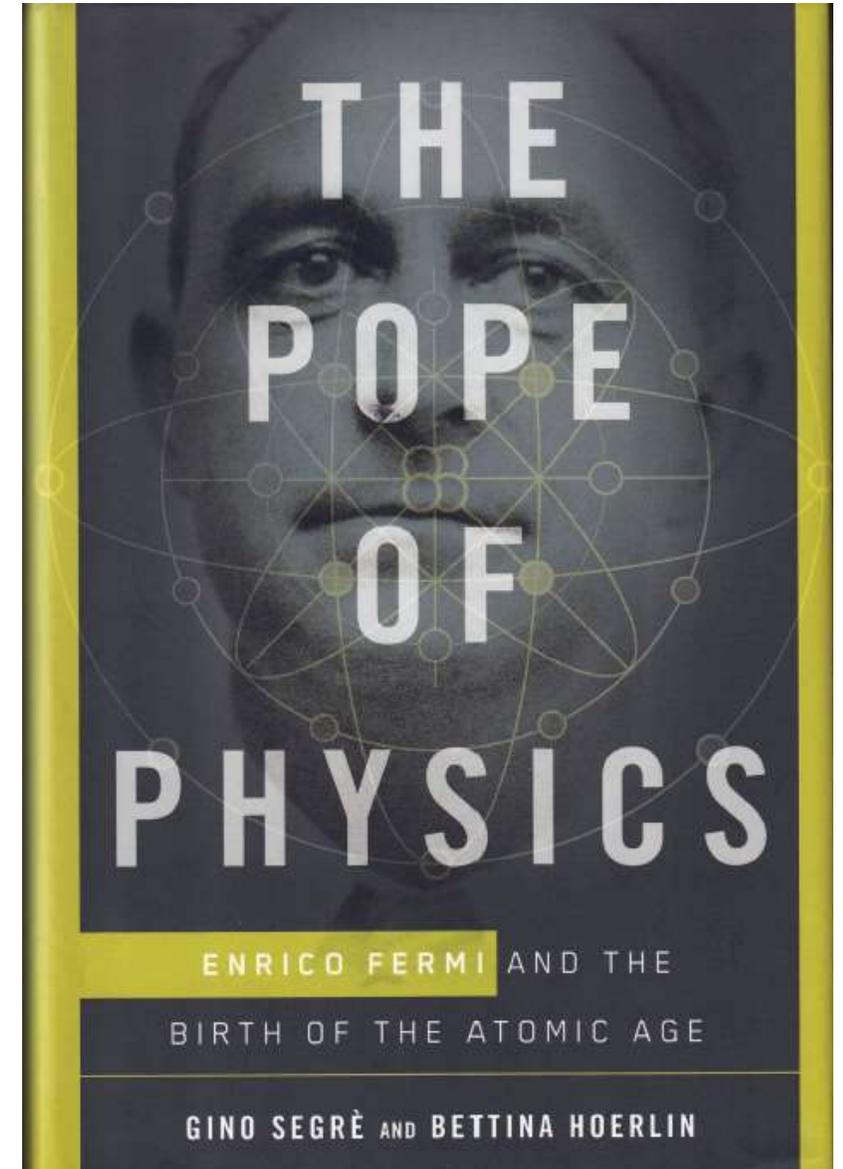
# Un diálogo difícil, actitudes opuestas



Enrico Fermi  
(1901-1954)

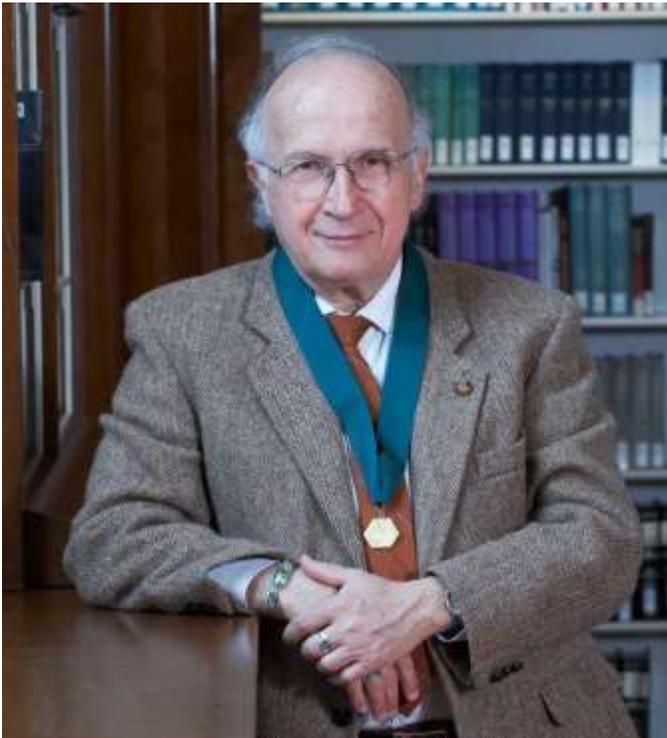


Harry S. Truman  
(1884-1962)

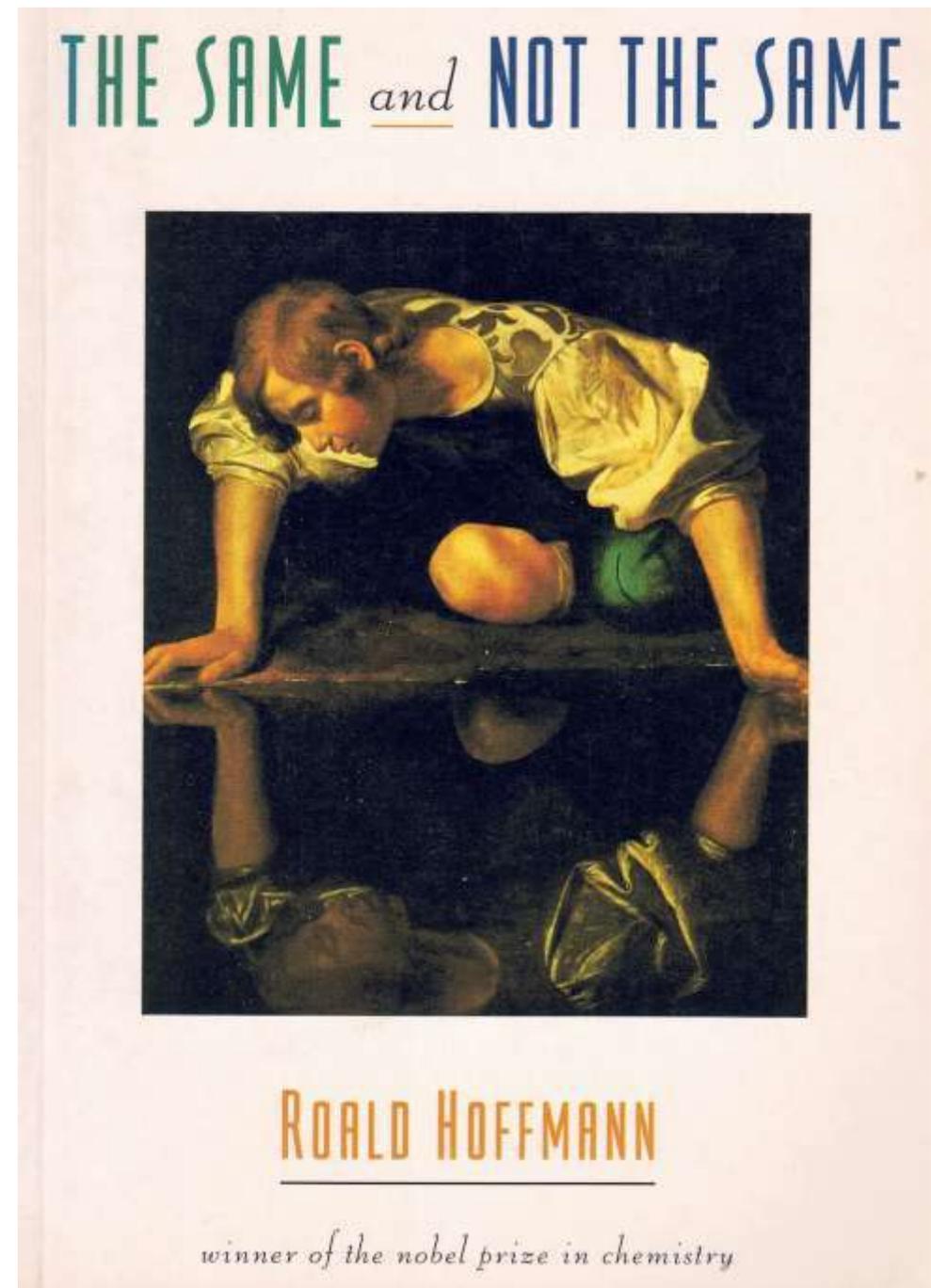


# Científicos y políticos

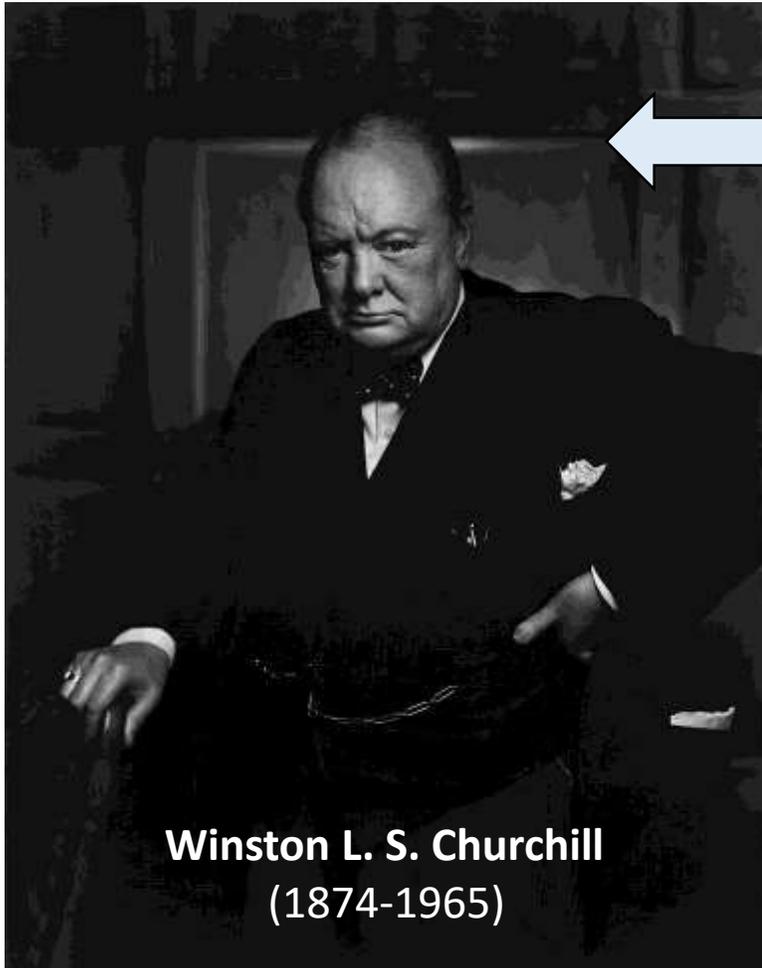
- Anti-Plato: or, why scientists (or engineers) shouldn't run the world.
  - If scientists are to be faulted, it is for their insufficient participation in the political process. Once they enter the arena, they are not better than others engaged in politics. And no worse.



**Roald Hoffmann**  
(1937-)



# Una opción en democracia: los científicos deben *asesorar* a los políticos, pero no *dictar* la política

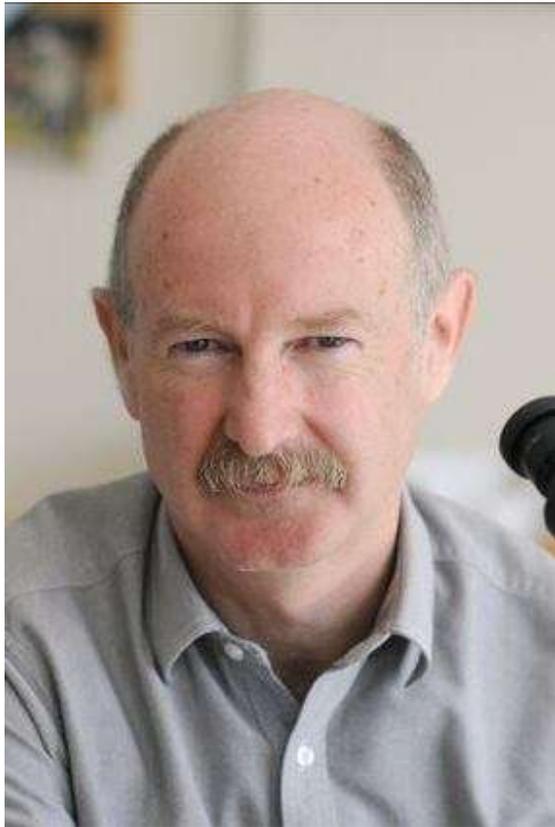


Winston L. S. Churchill  
(1874-1965)

“Scientists must be on tap,  
but not on top”

- Valorar la ciencia, sus métodos y resultados, aunque no sean definitivos.
- Apoyarse en científicos como asesores. Deben estar disponibles (**on tap**)
- Mantener el control: pese a los análisis y los consejos, es el político (democráticamente elegido) quien toma las decisiones (**on top**).
  - La ciudadanía es responsable de **a quién** elige.

# Un ejemplo: neurociencia y neuroderechos



**Rafael Yuste**  
(1963-)

## Four ethical priorities for neurotechnologies and AI

Artificial intelligence and brain–computer interfaces must respect and preserve people’s privacy, identity, agency and equality, say **Rafael Yuste**, **Sara Goering** and colleagues.

**C**onsider the following scenario. A paralysed man participates in a clinical trial of a brain–computer interface (BCI). A computer connected to a chip in his brain is trained to interpret the neural activity resulting from his mental rehearsals of an action. The computer generates commands that move a robotic arm. One day, the man

feels frustrated with the experimental team. Later, his robotic hand crushes a cup after taking it from one of the research assistants, and hurts the assistant. Apologizing for what he says must have been a malfunction of the device, he wonders whether his frustration with the team played a part.

This scenario is hypothetical. But it

illustrates some of the challenges that society might be heading towards.

Current BCI technology is mainly focused on therapeutic outcomes, such as helping people with spinal-cord injuries. It already enables users to perform relatively simple motor tasks — moving a computer cursor or controlling a motorized wheelchair, for ▶

# Consejo Vasco de Ciencia, Tecnología e Innovación

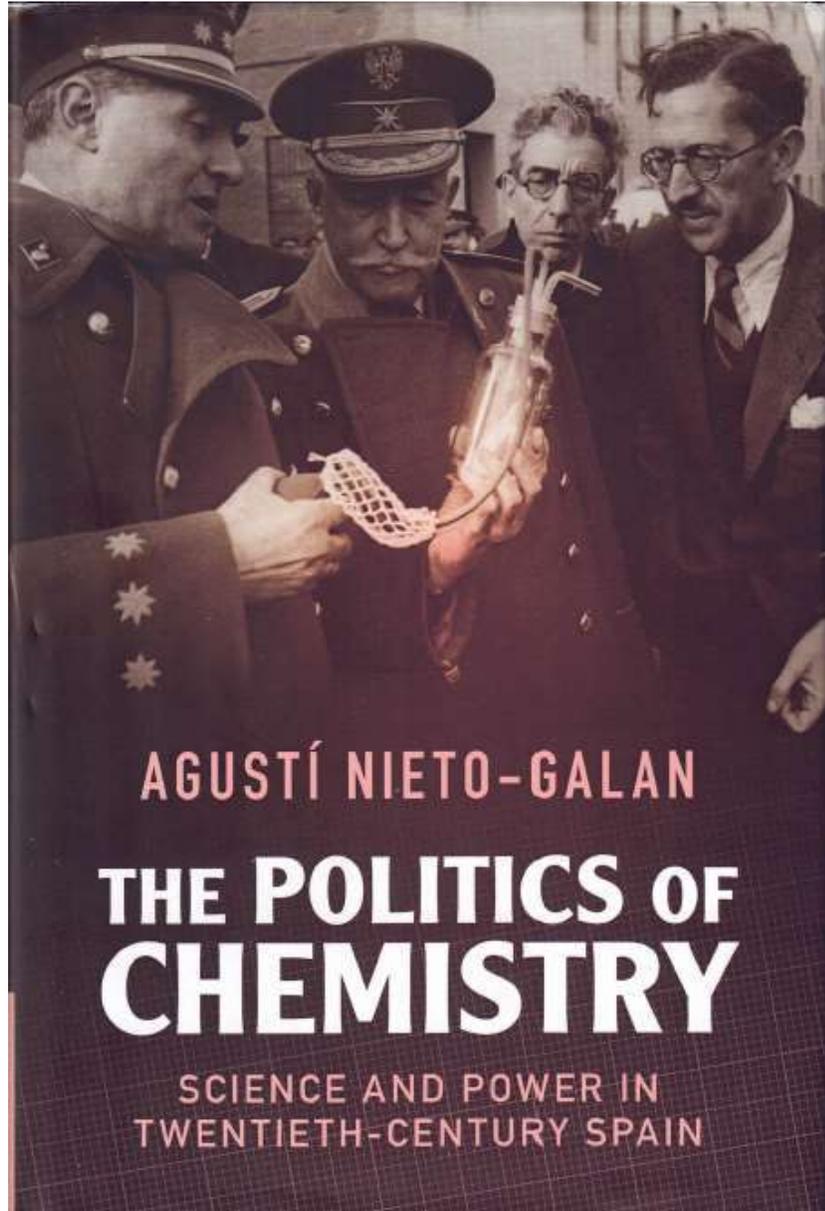


## GOBERNANZA DEL SISTEMA VASCO DE CIENCIA, TECNOLOGÍA E INNOVACIÓN

Consejo Vasco de Ciencia, Tecnología e Innovación

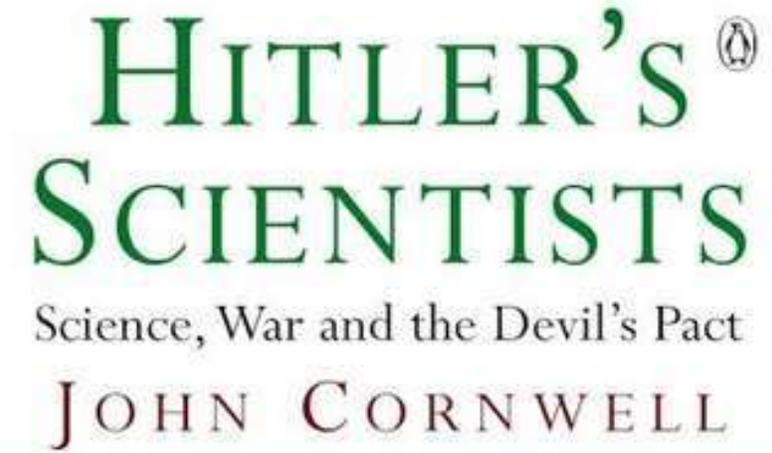
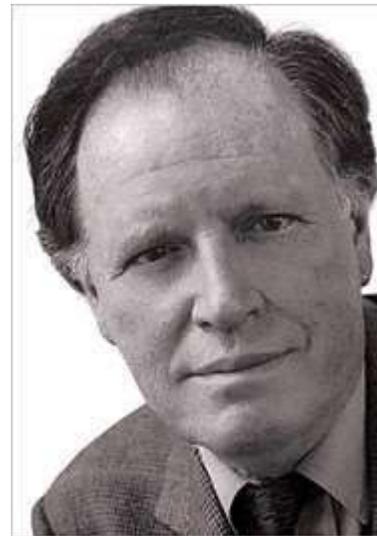


# Ciencia y dictadura: ¿una receta para el fracaso? (I)

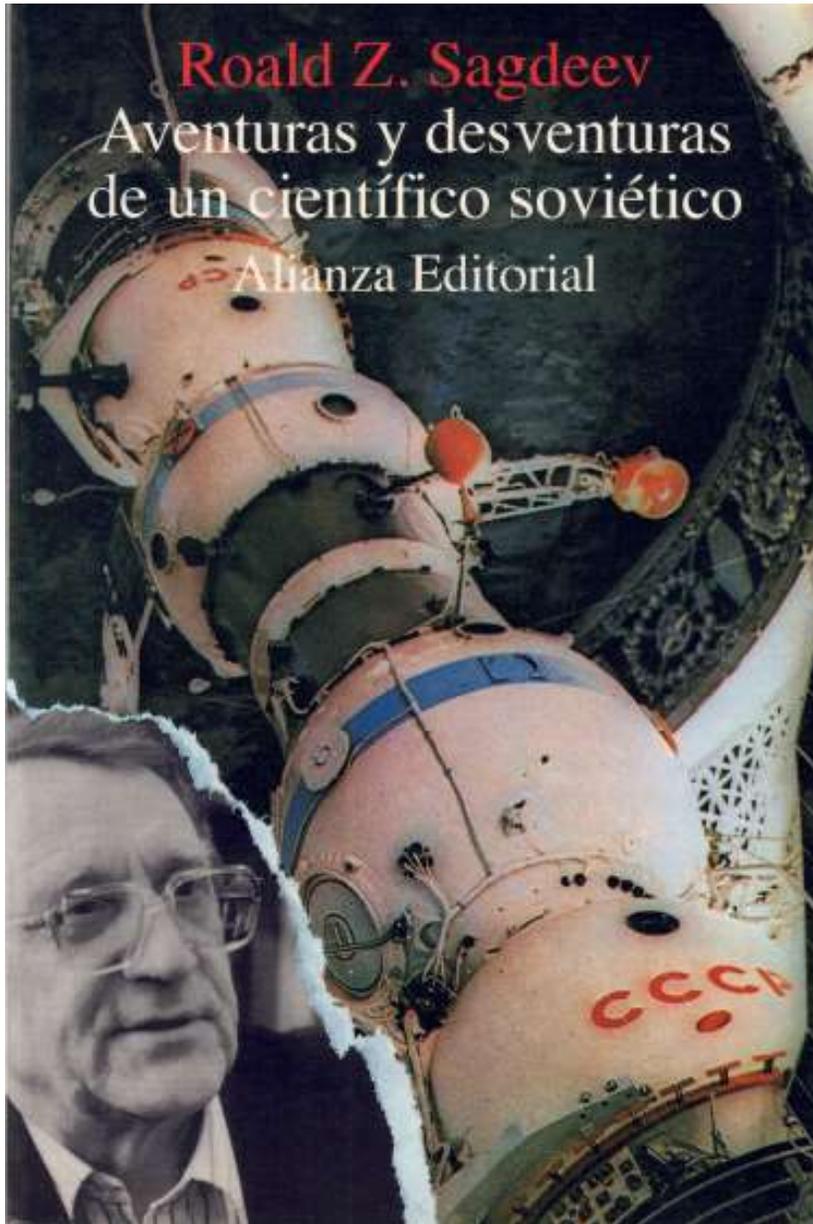


Agustí Nieto-Galán

John Cornwell  
(1940-)

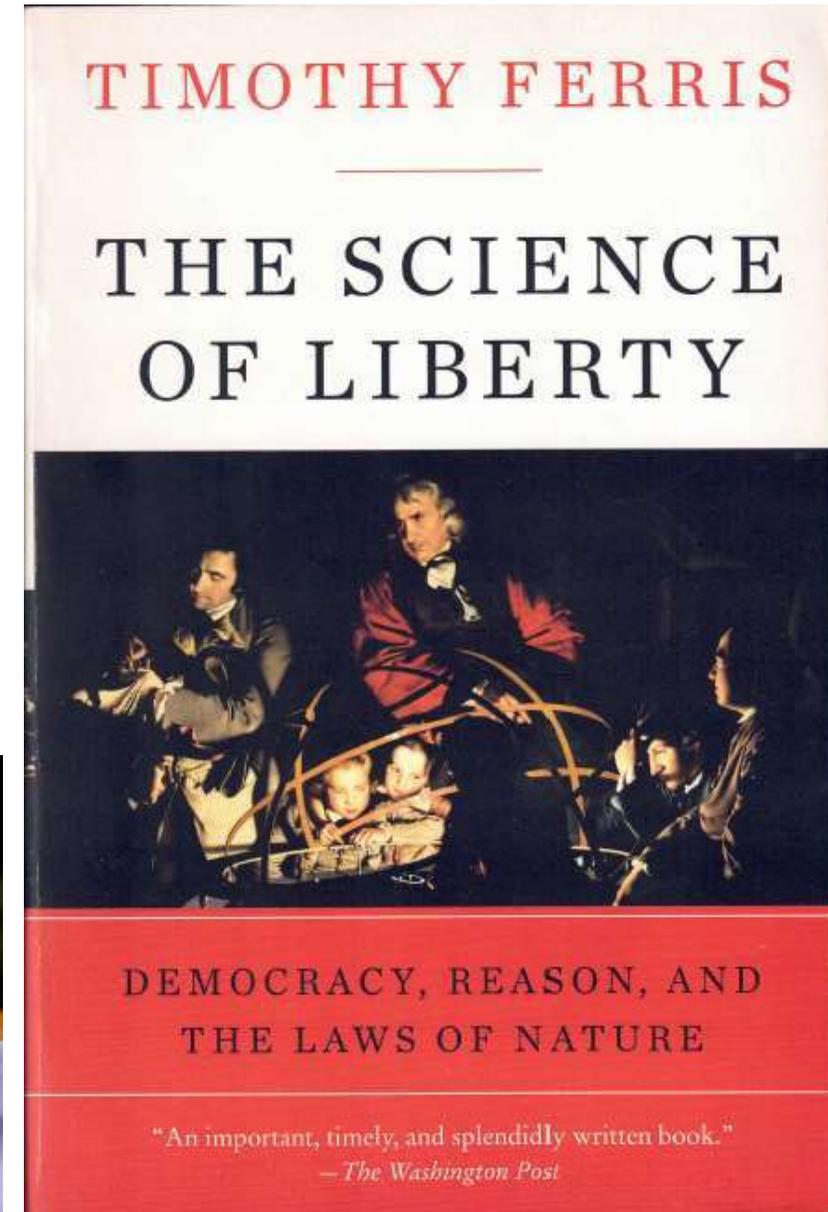


# Ciencia y dictadura: ¿una receta para el fracaso? (II)

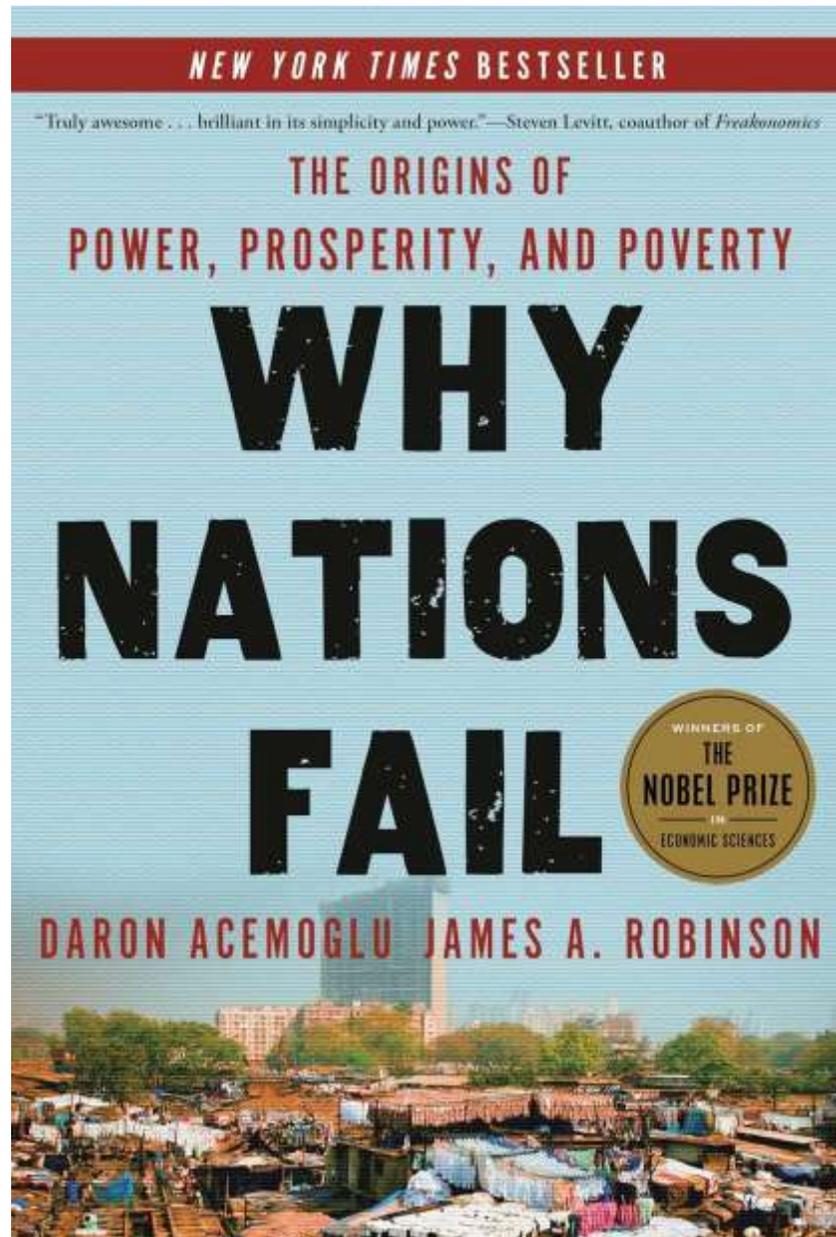


**Roald Z. Sagdeev**  
(1932-)

**Timothy Ferris**  
(1944-)



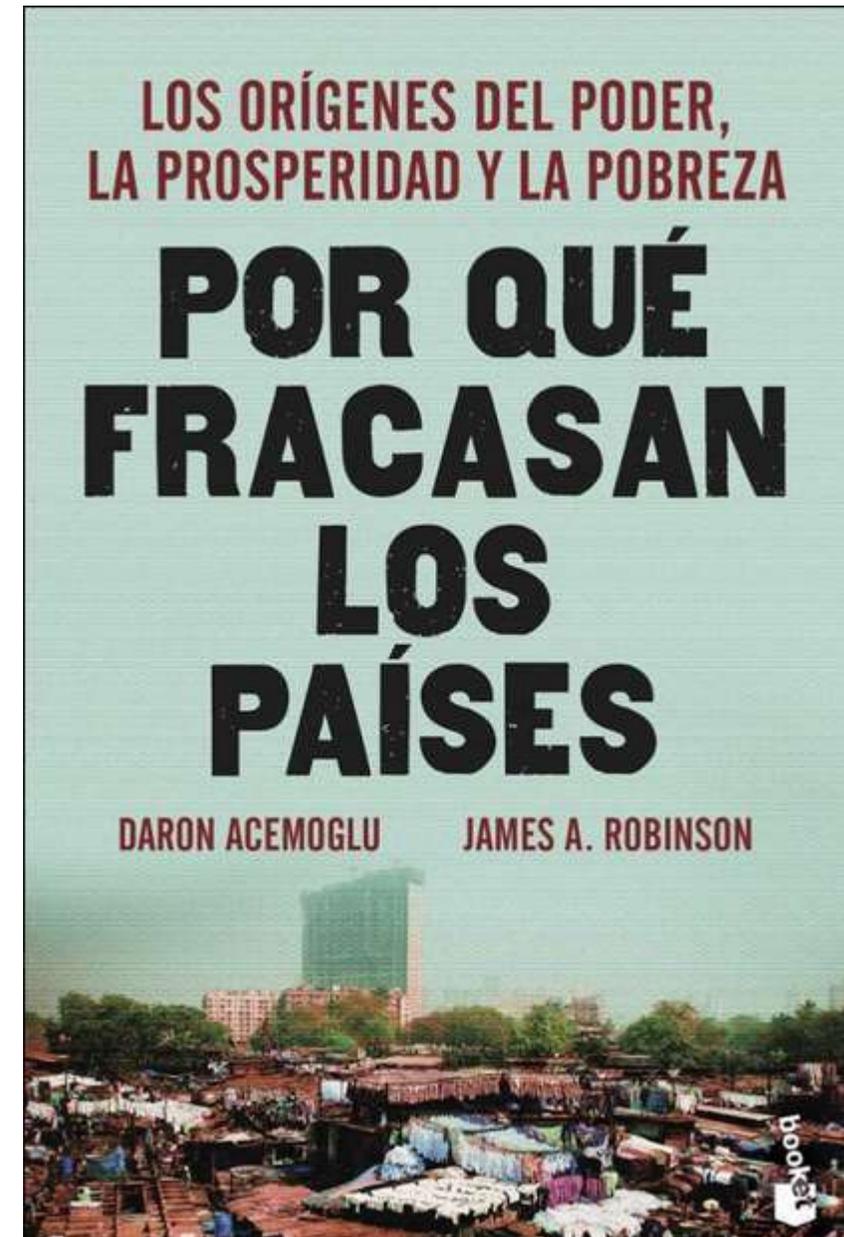
# Ciencia y dictadura: ¿una receta para el fracaso? (III)



Daron Acemoglu  
(1967-)



James A. Robinson  
(1960-)



# Sociedades apoyadas en la ciencia: utopías



AKAL / BÁSICA DE BOLSILLO

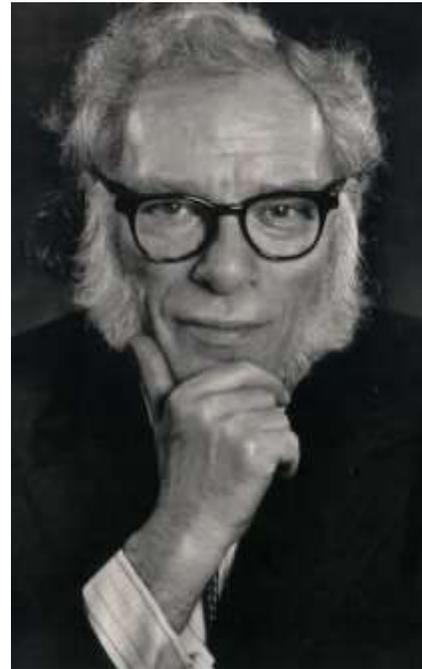
UTOPIAS

FRANCIS BACON

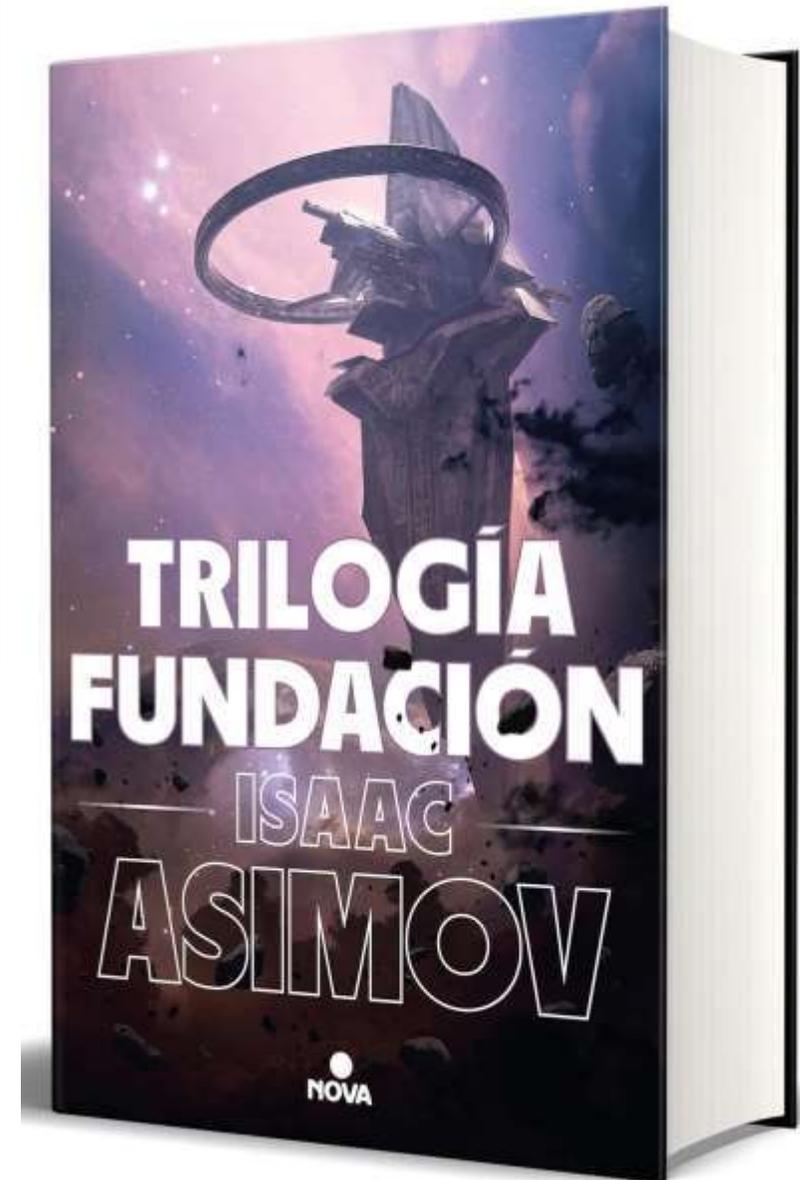
NUEVA ATLÁNTIDA

EDICIÓN DE  
EMILIO GARCÍA ESTÉBANEZ

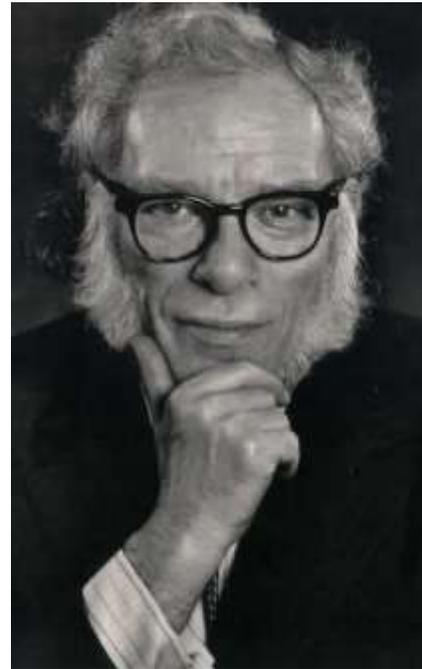
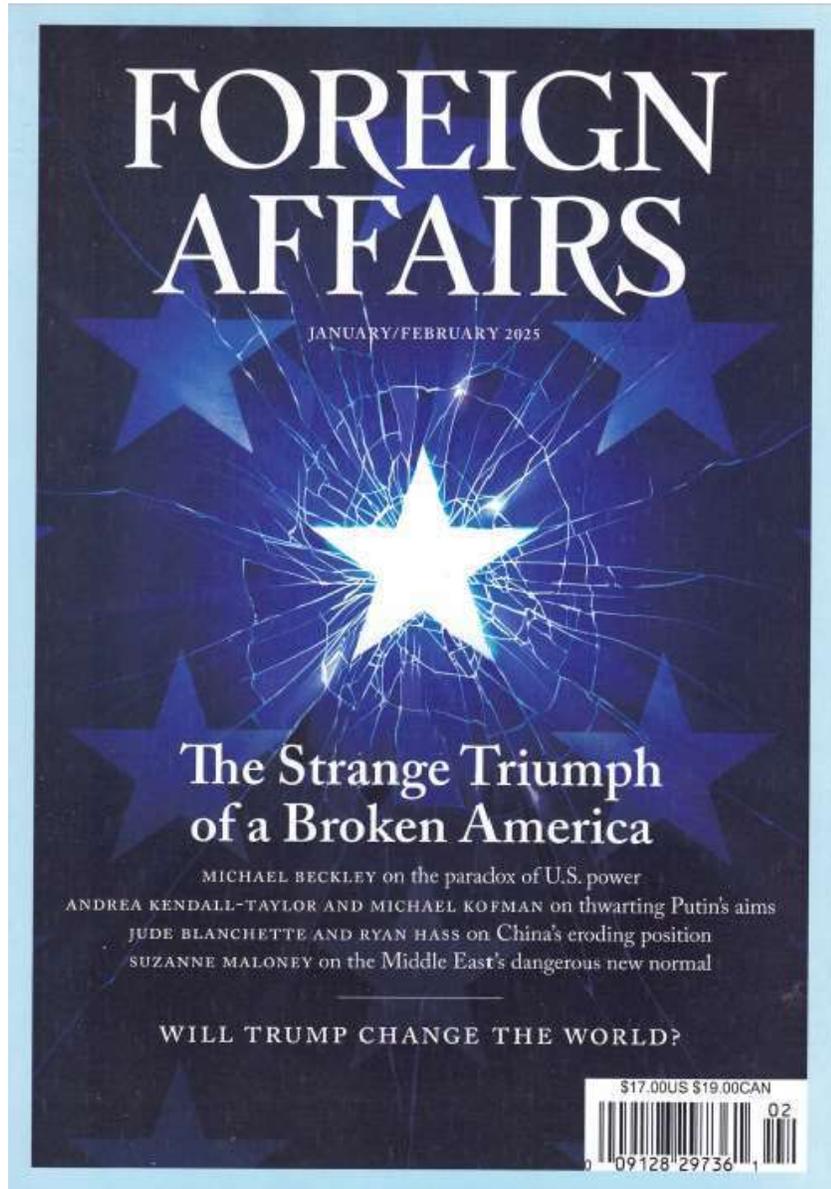
**Francis Bacon**  
(1561-1626)



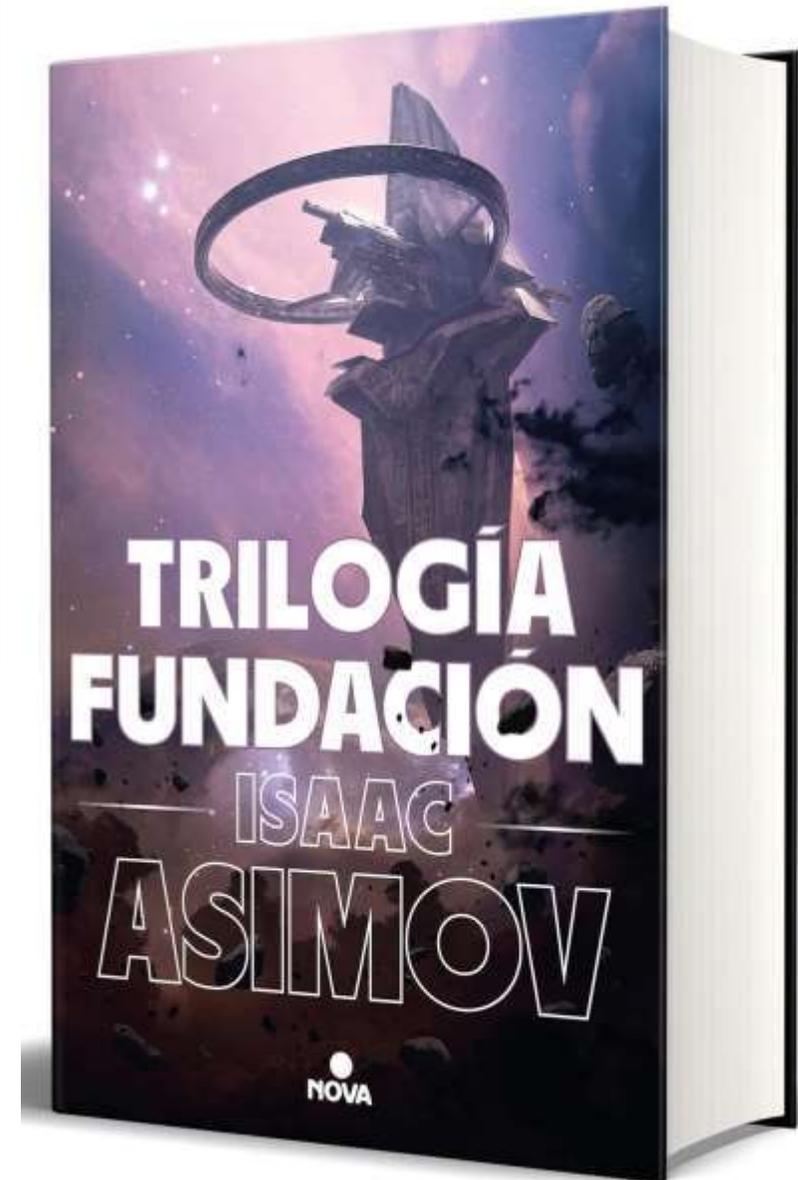
**Isaac Asimov**  
(1920-1992)



# Sociedades apoyadas en la ciencia: utopías



Isaac Asimov  
(1920-1992)



## Stress Test

### Can a Troubled Order Survive a Disruptive Leader?

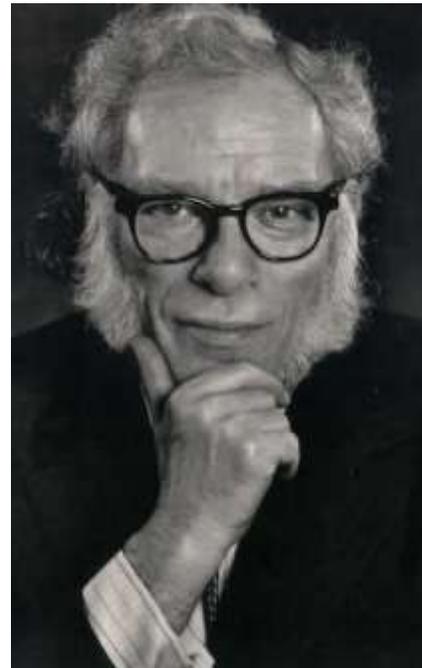
MARGARET MACMILLAN

Historians are skittish about predicting the future, and not only because there are too many variables and possibilities. It is also not always easy to grasp the significance of events when you are in the middle of them. When the Berlin Wall came down in 1989, people grasped at once that a new era had started. But few Europeans foresaw that the assassination of Austrian Archduke Franz Ferdinand in Sarajevo in June 1914 would precipitate a terrifying, continent-spanning war in which more than 16 million people would be killed, and even tech experts did not understand the significance of the iPhone when Apple's CEO, Steve Jobs, unveiled it in 2007.

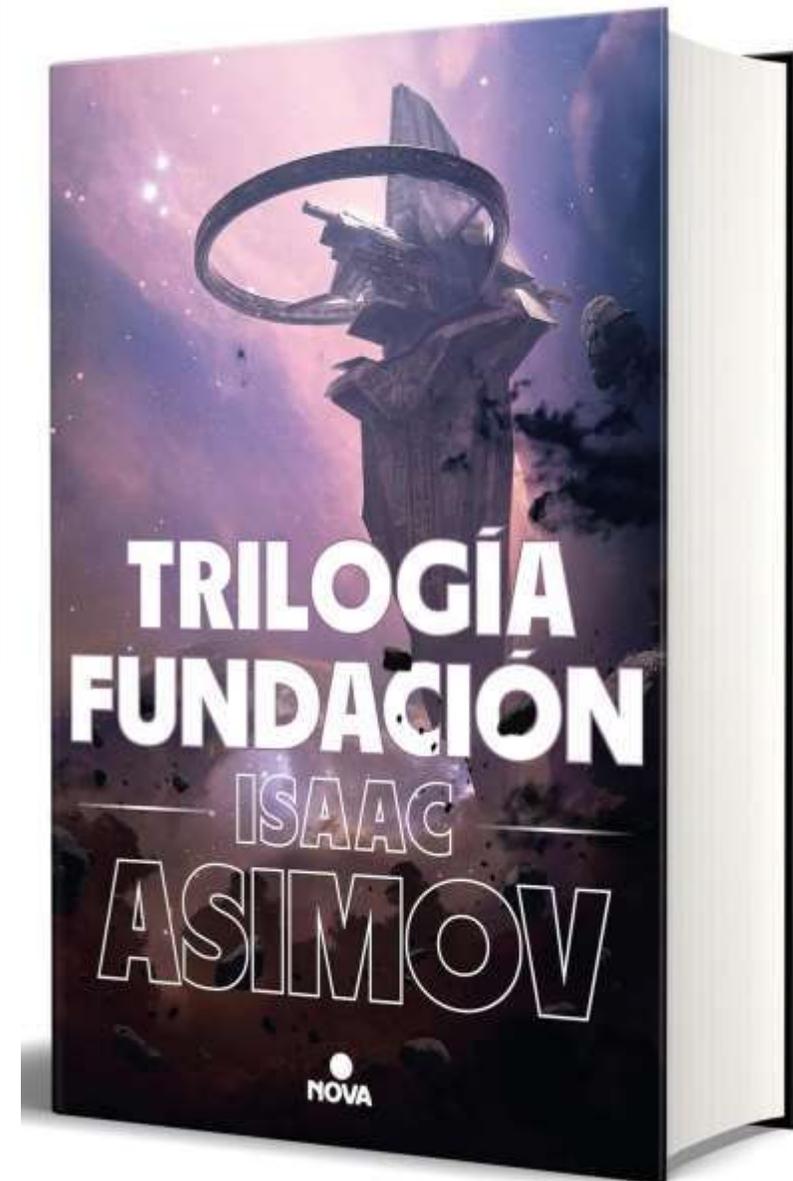
Since Donald Trump's victory in the U.S. presidential election last November, it has been hard not to think of Isaac Asimov's classic science fiction trilogy, *The Foundation*, published just at the end of World War II. In it, humanity's future has been largely tamed by a brilliant mathematician who uses statistical laws to control human behavior and protect against

catastrophic events, ensuring what is supposed to be benevolent and stable rule for centuries. But these assumptions are shattered by the appearance of the Mule, a mutant with extraordinary powers and millions of devoted followers, who threatens to overturn the order and bring back unpredictability.

Is Trump the Mule of our times? He, too, likes to see himself as the destroyer of conventions and rules and the breaker of institutions. And he, too, rose to power on the back of a personal mass following, raising the question of whether he has the potential to change the course of events and create a different United States in a different world. The presidential contest went off calmly, much to the relief of many, but if Trump and his supporters mean what they say, Republican control of the presidency and Congress, along with a pliant Supreme Court, will bring major changes to the way the United States is governed—including to the rule of law. The president-elect has threatened to do away with independent government agencies he doesn't like,



Isaac Asimov  
(1920-1992)



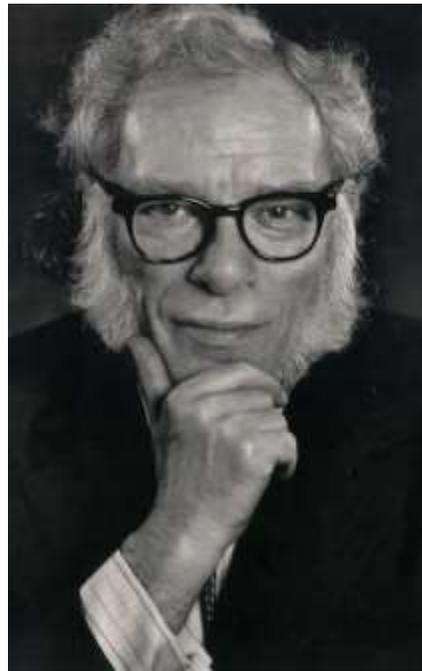
### *Will Trump Change the World?*

right-wing nationalist movements in Europe may well lead to the further erosion of support for an international order that the United States has often benefited from.

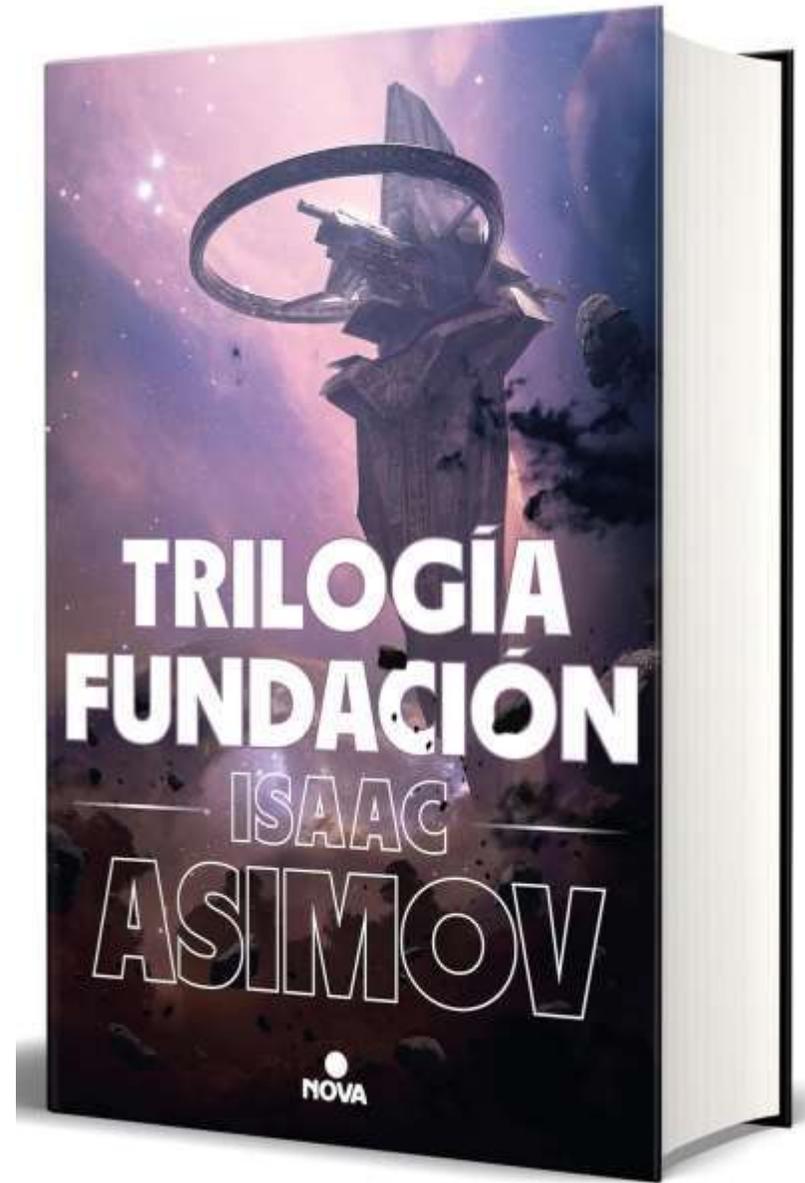
It is also unclear whether the world knows how to deal with a leader who is likely to prove still more erratic and more inclined to ignore the rules than he was in his first term. In international relations, the danger that mistakes and misunderstandings can lead to confrontations, as they did in 1914, is always present, but today that risk appears to be growing. Even as the U.S. election was unfolding, North Korean leader Kim Jong Un tested

a long-range intercontinental ballistic missile and drew closer to Putin, internationalizing the conflict in Ukraine by providing Russia with North Korean troops. For his part, Putin has announced a lower threshold for using nuclear weapons and has used a new kind of hypersonic missile against Kyiv. As Trump assumes office, it is difficult to guess whether his actions will lower the international temperature or raise it. In Asimov's trilogy, the Mule is eventually brought under control, stripped of his powers, and sent back to his own minor planet with the galactic order restored. But that is science fiction. 🌌

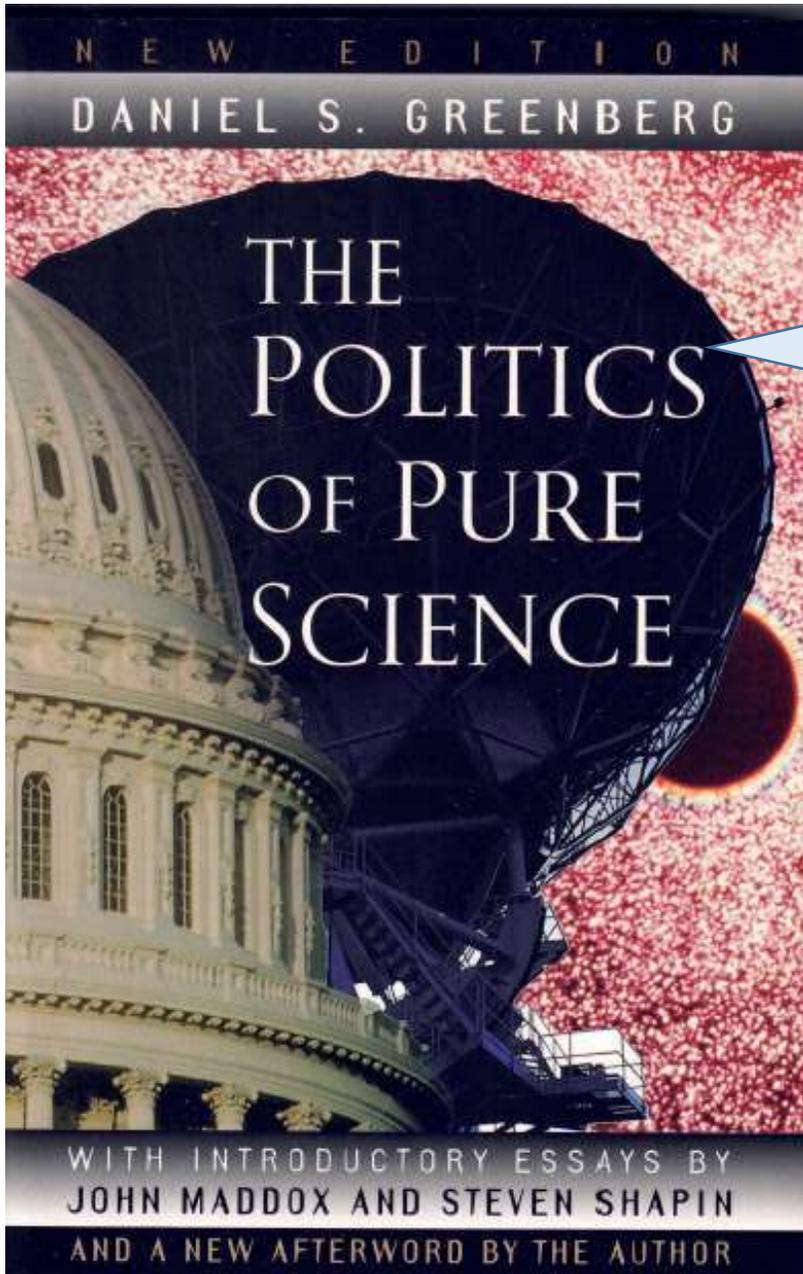
**Margaret MacMillan**  
(1943-)



**Isaac Asimov**  
(1920-1992)



# Sociedades apoyadas en la ciencia: la realidad

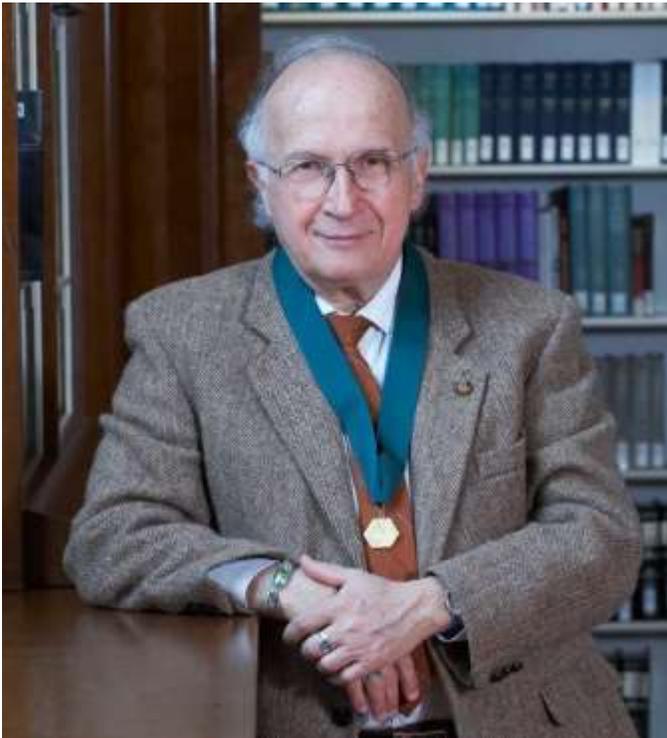


“Pure science, as distinguished from technology, remains far beyond the comprehension of the public: (...) basic research grows ever most costly, it has nothing to sell in the conventional marketplace. (...) Ultimately, though unpredictable, such findings may have great value for the public that is asked to support science.”

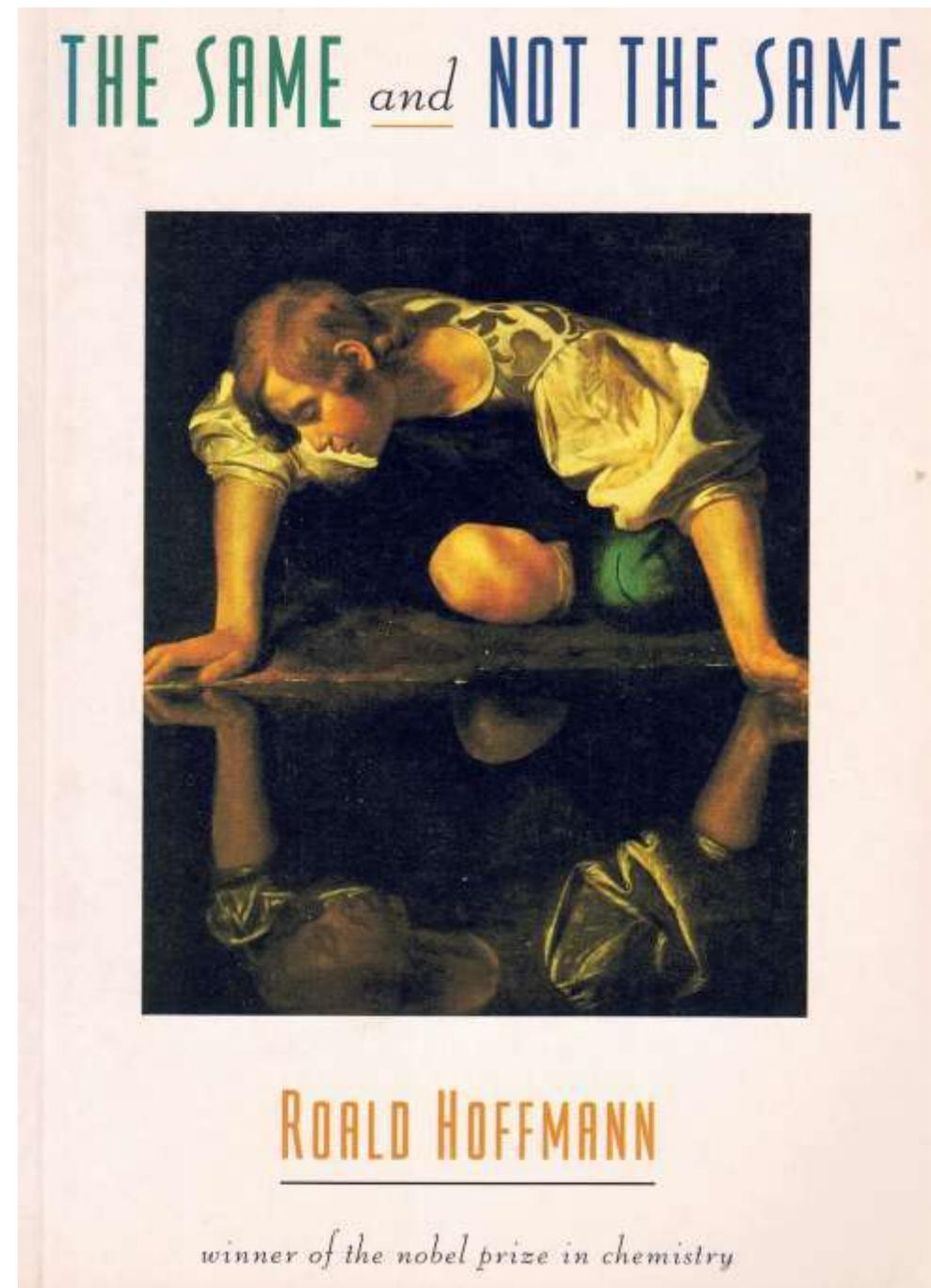
- A la ciudadanía se le pide que apoye económicamente (con sus impuestos y donaciones) una ciencia que no puede comprender (y la mayoría de los políticos, tampoco).
- La ciencia es intrínsecamente inestable.

# Científicos y políticos

- Anti-Plato: or, why scientists (or engineers) shouldn't run the world.
  - If scientists are to be faulted, it is for their insufficient participation in the political process. Once they enter the arena, they are not better than others engaged in politics. And no worse.



**Roald Hoffmann**  
(1937-)



# De la ciencia a la política

**Margaret Thatcher**  
(1925-2013)  
Primera ministra  
RU 1979-1990



**Dorothy C. Hodkin**  
(1910-1994)  
Premio Nobel de Química 1964



# De la ciencia a la política



**Angela Merkel**  
(1955-)  
Canciller RFA  
2005-2021

*J. Am. Chem. Soc.* **1988**, *110*, 8355–8359

8355

## Evaluation of the Rate Constant for the S<sub>N</sub>2 Reaction CH<sub>3</sub>F + H<sup>-</sup> → CH<sub>4</sub> + F<sup>-</sup> in the Gas Phase

Angela Merkel,<sup>†</sup> Zdeněk Havlas,<sup>\*‡</sup> and Rudolf Zahradník<sup>§</sup>

*Contribution from the Central Institute of Physical Chemistry of Academy of Sciences of GDR, 1199 Berlin-Adlershof, Rudower Chaussee 5, German Democratic Republic, Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Flemingovo nám. 2, 16610 Prague 6, Czechoslovakia, and J. Heyrovský Institute of Physical Chemistry and Electrochemistry, Czechoslovak Academy of Sciences, Dolejškova 3, 18223 Prague 8, Czechoslovakia. Received February 19, 1988*

**Abstract:** Rate constants for the title reaction are calculated within the framework of statistical theories. The input data are taken mainly from recently published ab initio quantum chemical calculations. Comparison with the experimental estimate from flowing afterglow measurements by Tanaka et al. of  $k_{\text{obs}}^{\text{exp}} = 1.5 \times 10^{-11} \text{ cm}^3 \text{ s}^{-1}$  shows that, for three of four input data sets, the experimental value can be reproduced with reasonable accuracy. Using two kinetic models, rate constants ranging from  $2.1 \times 10^{-12}$  to  $4.5 \times 10^{-11} \text{ cm}^3 \text{ s}^{-1}$  are obtained for these three data sets. Variation of the kinetic model changes the rate constants by up to one order of magnitude. The remaining uncertainties should stimulate further experiments as well as higher level quantum chemical calculations and theoretical treatment of the reaction dynamics.

# De la ciencia a la política



**Alfredo Pérez-Rubalcaba**  
(1951-2019)

Vicepresidente del Gobierno  
2010-2011

Ministro del Interior  
2006-2011

Ministro de la Presidencia  
1993-1996

Ministro de Educación y Ciencia  
1992-1993

Issue 4, 1981



From the journal:

**Journal of the Chemical Society, Perkin Transactions 2**

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## **Stereochemistry of addition to the carbonyl group. Part 17. Study of the factors affecting asymmetric induction in condensation reactions of methyl- and phenyl-magnesium bromide with chiral carbonyl compounds**

[Odon Arjona](#), [Rafael Pérez-Ossorio](#), [Alfredo Pérez-Rubalcaba](#) and [Maria L. Quiroga](#)

### **Abstract**

The dependence of the stereoselectivity upon the nature of the chiral carbonyl compound [2-methyl-3-phenylpropanal (1), 2,3,3-trimethylbutanal (2), 4,4-dimethyl-3-phenylpentanal (3), 3-phenylbutanone (4), and 2-phenylpropanal (5)], the solvent, and the concentration of the reactive species for various condensation reactions of phenyl- and methyl-magnesium bromide at 30° is reported. The stereochemical results have been interpreted on the basis of the generalized Curtin–Hammett principle and according to a trigonal-type transition state (Pérez-Ossorio model). No effect of the concentration of the reactive species on the product ratio was observed. An unexpected influence of the solvent was observed in the condensation of (4) with phenylmagnesium bromide. A good linear correlation between stereoselectivity and the  $E_T$  parameter of the solvent was obtained. The explanation offered here takes into account the steric selection of the transition states and a further differentiating effect of the solvent polarity on them. A slight influence of solvent polarity on reactions of (5) with Grignard reagents was also noticed.

# De la ciencia a la política (y viceversa)



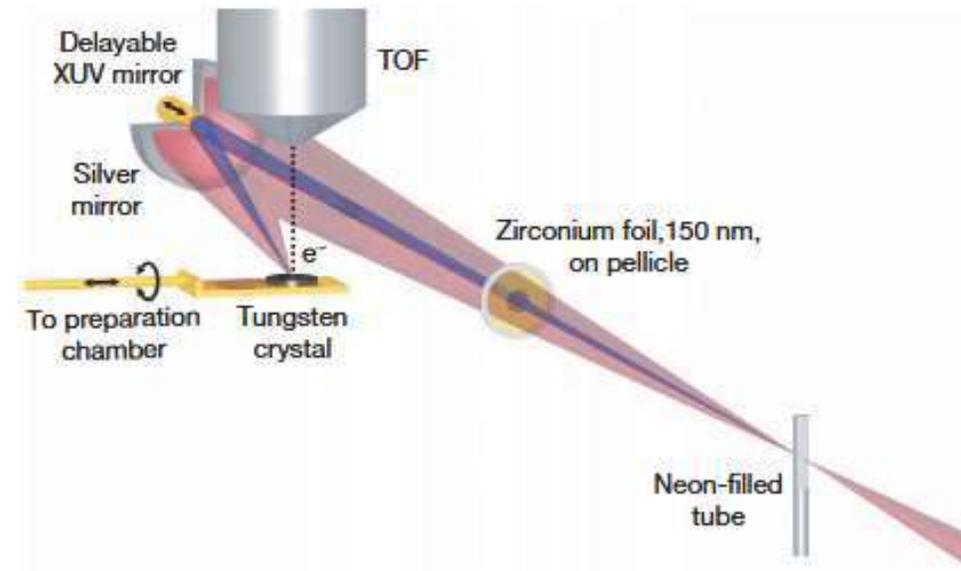
**Pedro M. Etxenike**  
(1950-)

Consejero de Educación GV/EJ  
1980-1982

Consejero de Educación  
y Cultura GV/EJ  
1982-1984

## Attosecond spectroscopy in condensed matter

A. L. Cavalieri<sup>1</sup>, N. Müller<sup>2</sup>, Th. Uphues<sup>1,2</sup>, V. S. Yakovlev<sup>3</sup>, A. Baltuška<sup>1,4</sup>, B. Horvath<sup>1</sup>, B. Schmidt<sup>5</sup>, L. Blümel<sup>5</sup>, R. Holzwarth<sup>5</sup>, S. Hendel<sup>2</sup>, M. Drescher<sup>6</sup>, U. Kleineberg<sup>3</sup>, P. M. Echenique<sup>7</sup>, R. Kienberger<sup>1</sup>, F. Krausz<sup>1,3</sup> & U. Heinzmann<sup>2</sup>



**Figure 1 | Experimental set-up.** Waveform-controlled,  $\sim 5$ -fs, 750-nm, 400- $\mu$ J laser pulses are focused with a mirror of 500-mm focal length into a  $\sim 2$ -mm-diameter tube filled with neon to generate XUV radiation by high-harmonic

<sup>1</sup>Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany. <sup>2</sup>Fakultät für Physik, Universität Bielefeld, D-33615 Bielefeld, Germany. <sup>3</sup>Department für Physik, Ludwig-Maximilians-Universität, Am Coulombwall 1, D-85748 Garching, Germany. <sup>4</sup>Institut für Photonik, Technische Universität Wien, Gußhausstr. 27, A-1040 Wien, Austria. <sup>5</sup>Menlo Systems GmbH, Am Klopferspitz 19, D-82152 Martinsried, Germany. <sup>6</sup>Institut für Experimentalphysik, Universität Hamburg, Luruper Chaussee 149, D-22761 Hamburg, Germany. <sup>7</sup>Dpto. Física de Materiales UPV/EHU, Centro Mixto CSIC-UPV/EHU and Donostia International Physics Center (DPIC), Paseo Manuel de Lardizabal 4, 20018 San Sebastian, Spain.

# Ciencia y política: una cuestión no resuelta

## CUANDO la CIENCIA CHOCA con el PODER

EL GRAN DILEMA: GOBERNAR A LA  
CIENCIA O SER GOBERNADOS POR ELLA



**GEOFF MULGAN**

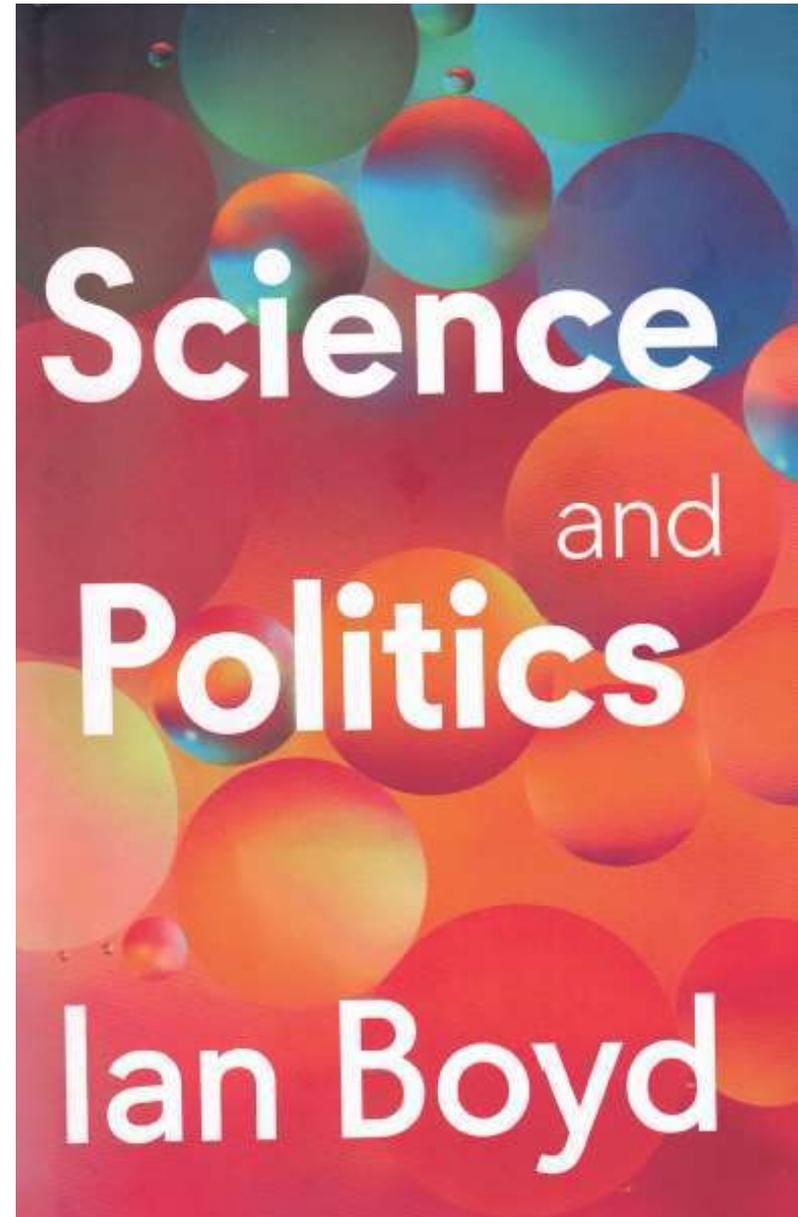
Pinolia



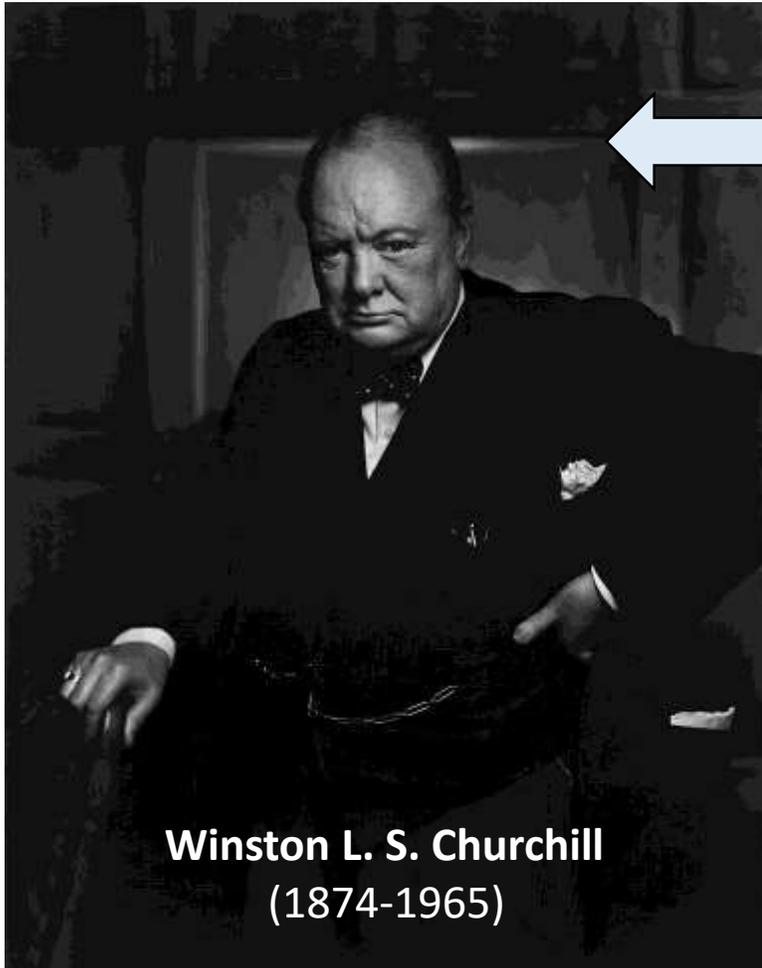
**Geoff Mulgan**  
(1961-)



**Ian Boyd**  
(1957-)



# Una opción en democracia: los científicos deben *asesorar* a los políticos, pero no *dictar* la política

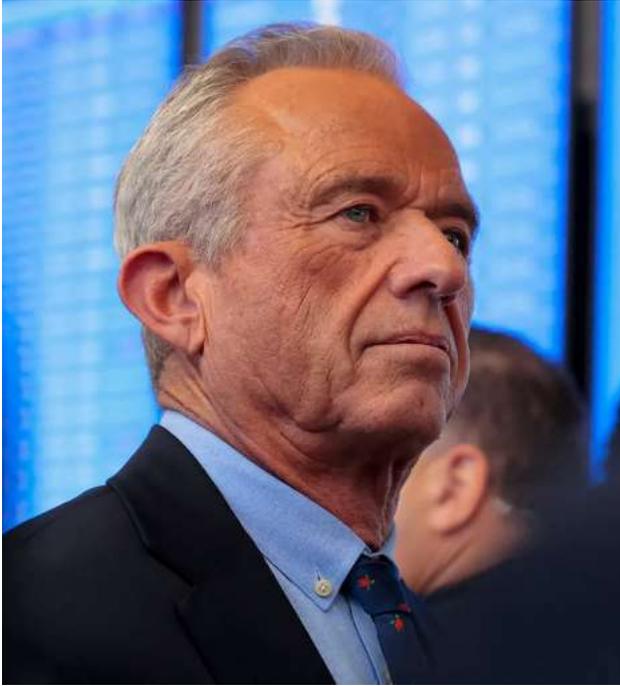


Winston L. S. Churchill  
(1874-1965)

“Scientists must be on tap,  
but not on top”

- Valorar la ciencia, sus métodos y resultados, aunque no sean definitivos.
- Apoyarse en científicos como asesores. Deben estar disponibles (**on tap**)
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# Malas noticias



RFK Jr: A 'good mother' knows not to trust experts on matters of public health

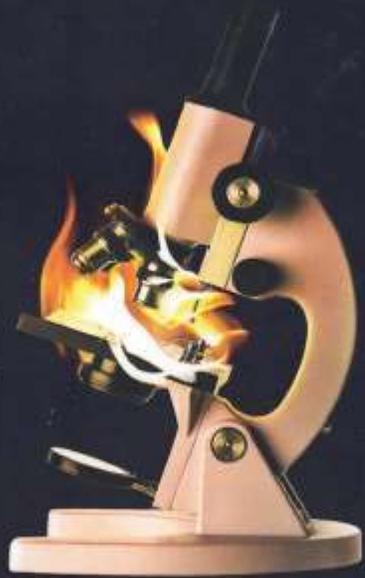
“Yo soy registradora de la propiedad, por tanto jurista, y como jurista me siento absolutamente capacitada para poder desempeñar este puesto”

Beatriz Corredor  
Presidenta REE (Redeia)



# Ciencia y política: malos tiempos

## SCIENCE UNDER SIEGE



HOW TO FIGHT THE FIVE MOST POWERFUL FORCES THAT THREATEN OUR WORLD

MICHAEL E. MANN

PETER J. HOTEZ



Michael E. Mann  
(1965-)



Peter J. Hotez  
(1958-)

*Chem. & Eng. News*, 2025, dec. 2025

“You’ve got this broad-scale attack on not just how much money goes into science but who gives the thumbs up for what science is accepted as truth.”

—Colette Delawalla, founder and CEO, Stand Up for Science



“The administration is trying to accomplish a number of various cultural goals and political goals, and science I think is caught in that crossfire because it is associated with higher education, which is viewed as woke or not aligned with the administration.”

—Ian Banks, director of the science policy team, Foundation for American Innovation

