



UNIVERSITY OF SILESIA  
IN KATOWICE

**Gabriela Woźniak, Teresa Nowak, Agnieszka Kompała-Bąba, Zbigniew Wilczek,  
Agnieszka Błońska, Agnieszka Hutniczak, Wojciech Bierza, Franco Magurno  
Jacek Kasztowski, Bartosz Jendrzejek, Kamila Adamik, Szymon Kaul, Jawdat Bakr**

# **The environment and natural processes as a source of innovative solutions for biodiversity protection**

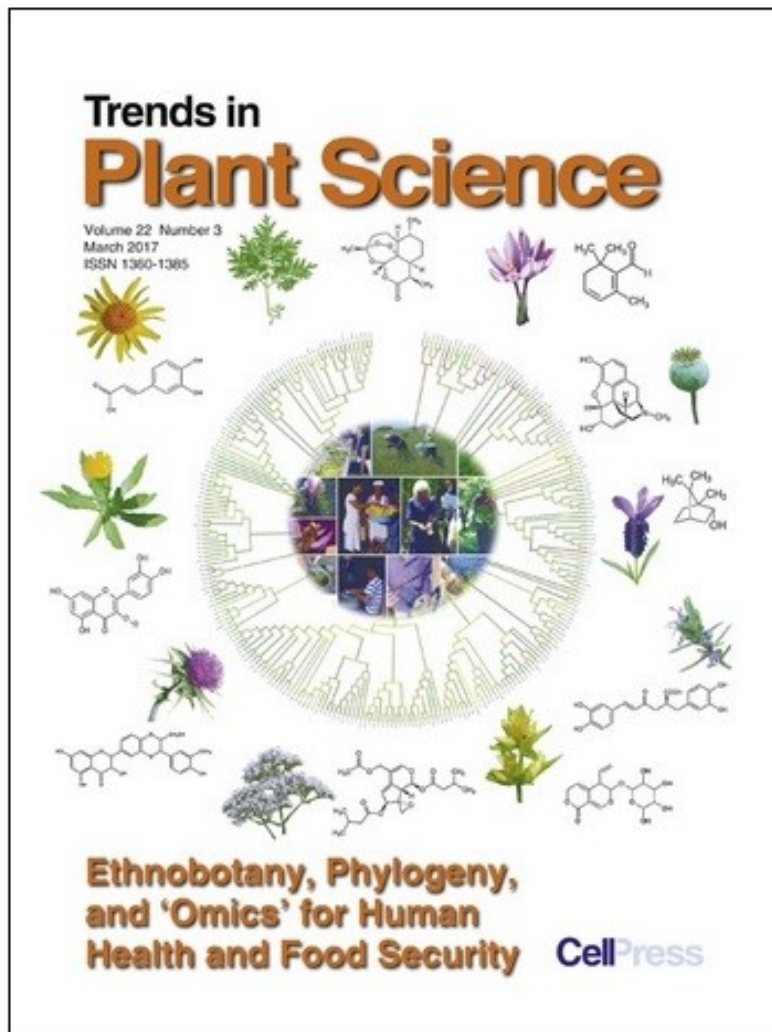
**Środowisko i procesy naturalne jako źródło innowacyjnych rozwiązań  
dla ochrony różnorodności biologicznej**

*Institute of Biology, Biotechnology and Environmental Protection, Faculty of Natural Sciences,  
University of Silesia in Katowice, 28 Jagiellonska Str., 40-032 Katowice, Poland*



- **The biodiversity and natural processes are the inspiration and a source of innovative solutions**
- **Human can survive only due to resources and services provided by nature**

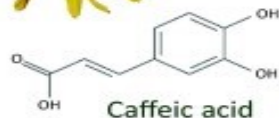




*Arnica montana*



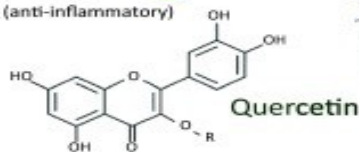
(anti-inflammatory)



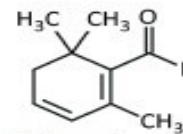
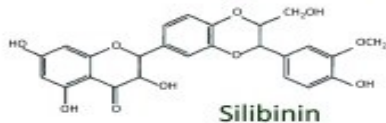
*Calendula arvensis*



(anti-inflammatory)

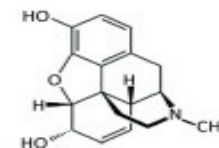


*Silybum marianum*  
(antitumour)

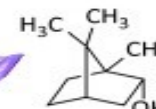


**Safranal**

*Papaver somniferum*



**Morphine** (analgesic)

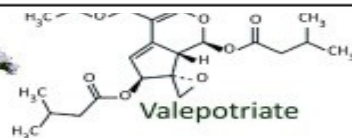
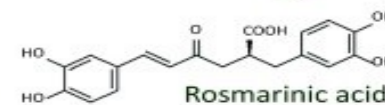


**Borneol**

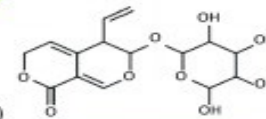


*Lavandula stoechas*  
(insect repellent)

*Rosmarinus officinalis*  
(anti-oxidant)



*Gentiana burseri*  
(aperitive stimulant)



**Gentiopicroside**



nia, Fot. A.Kobus

*Cannabis sativa*, cannabis, hemp, marihuana,  
Cannabaceae



*Papaver somniferum*, opium poppy or breadseed  
poppy  
Papaveraceae

*Juniperus communis*, common juniper  
Cupressaceae



Kora27, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons  
<http://www.pro-apteka.pl/ziola/jalowiec-pospolity-juniperus-communis-l-32.html>  
<https://www.farmer.pl/produkcja-roslinna/inne-uprawy/konopie-siewne-wczesne-odmiany-rozpoczely-kwitnienie,96780.html>



*Artemisia vulgaris*,  
common mugwort  
Asteraceae



*Artemisia abrotanum*, Asteraceae



*Artemisia absinthium*,  
wormwood, grand wormwood, absinthe,  
absinthium, absinthe wormwood, mugwort,  
wermout, wermud, wormit, wormod  
Asteraceae





# History of identifying food and medicine in the world

**Pedanius Dioscorides** – I w. n.e., the Greek doctor  
*De Materia Medica* – was his most important work describing  
the healing and nutritional properties of 600 plant species from  
the Mediterranean area.

**Hildegard of Bingen** (1098-1179) – Benedictine, German visionary,  
mystic, composer, healer, reformer religious.  
The church recognized her as a saint.

<https://www.youtube.com/watch?v=SOveUzIMO10>

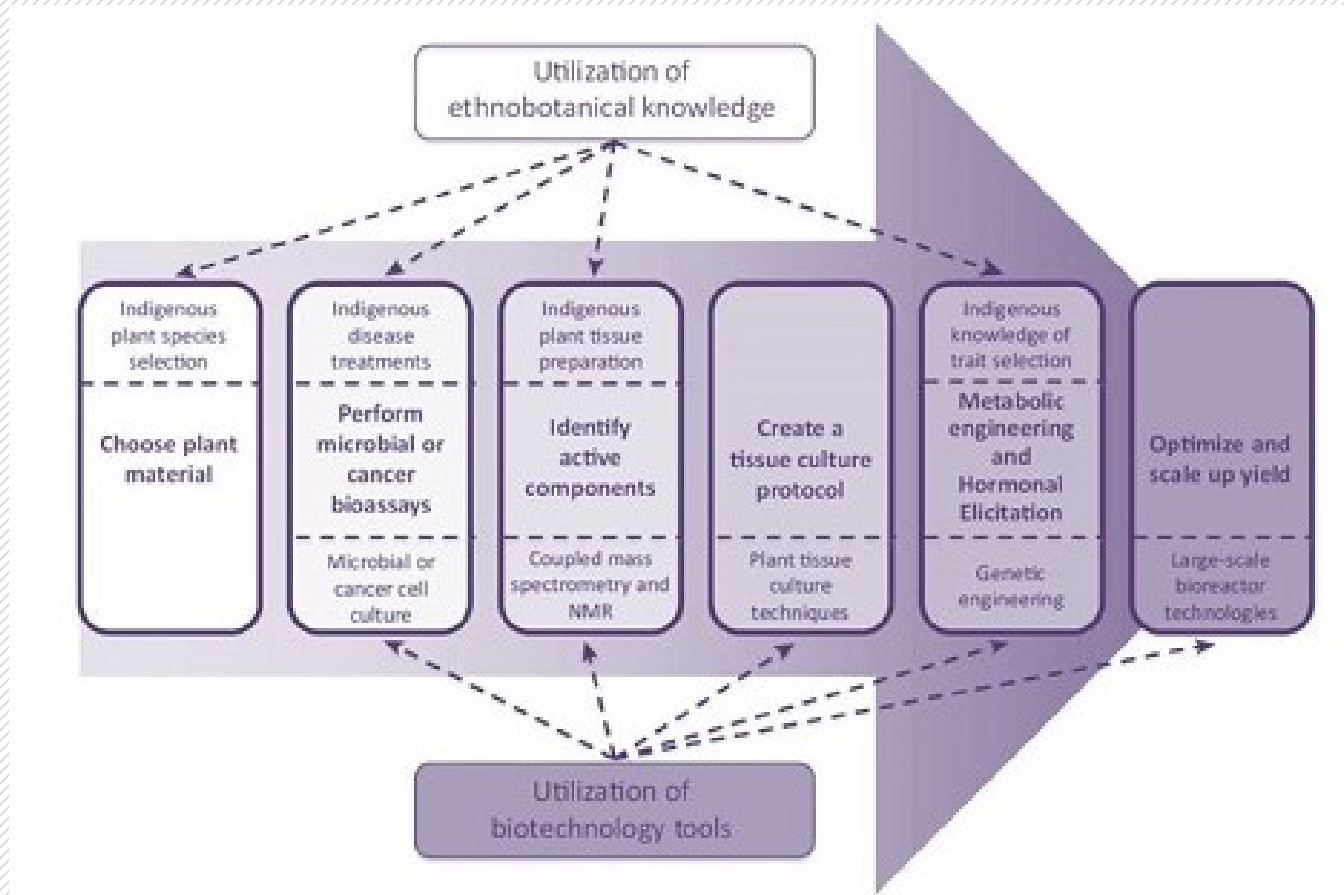
**Gardens at monasteries and places of religious worship  
have gained considerable importance, among other things,  
due to the cultivation of medicinal plants.**

**Jacques Cartier** (1491-1557) – a French explorer, who made  
the first European trip to North America.  
He learned from the Iroquois to prepare a cure for scurvy.

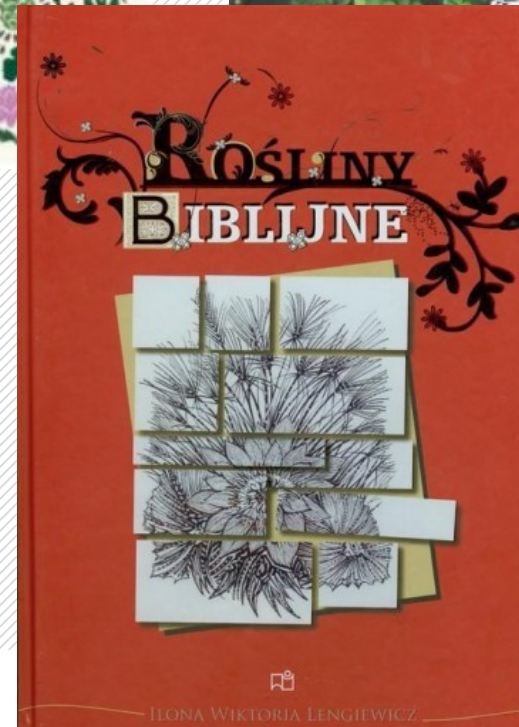
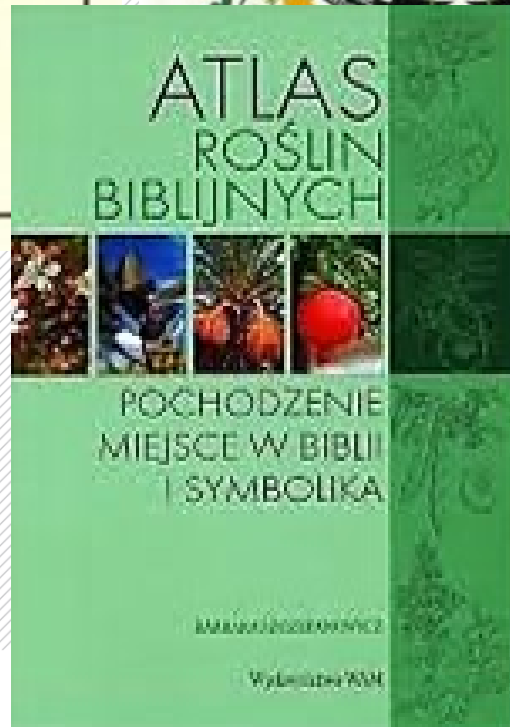
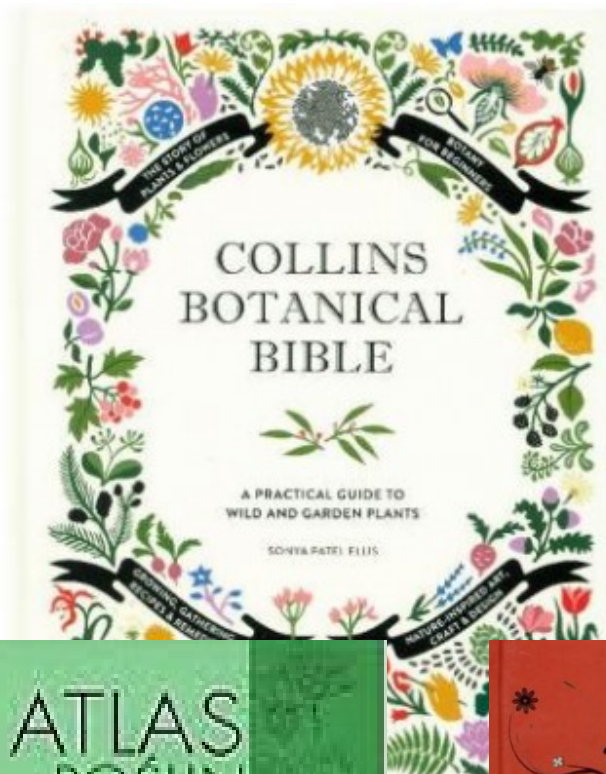
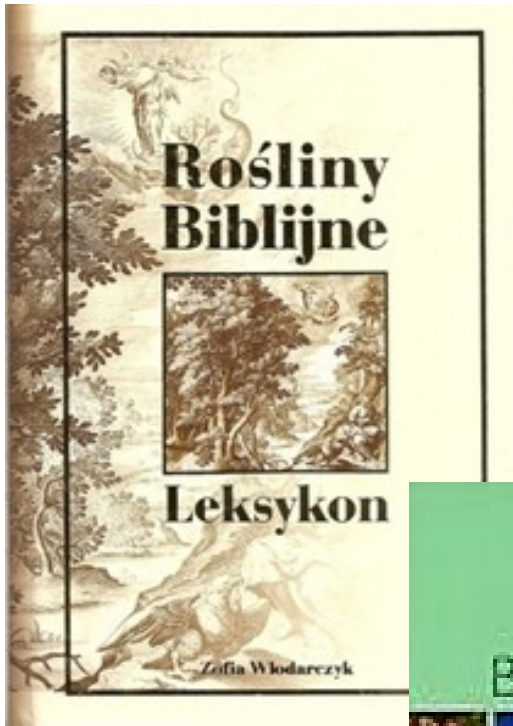
[www.us.edu.pl/en](http://www.us.edu.pl/en)



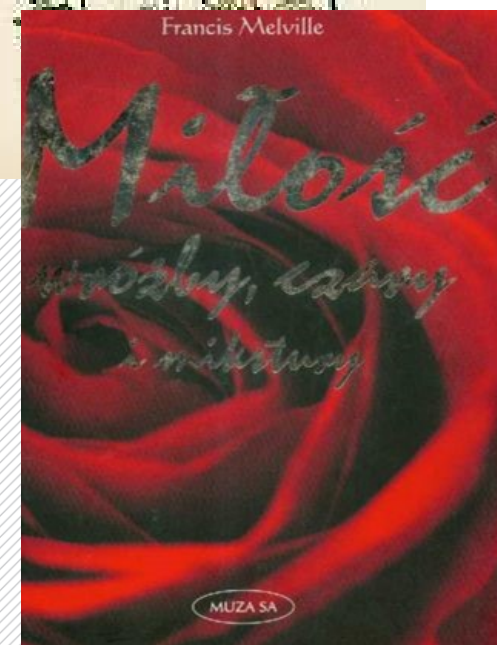
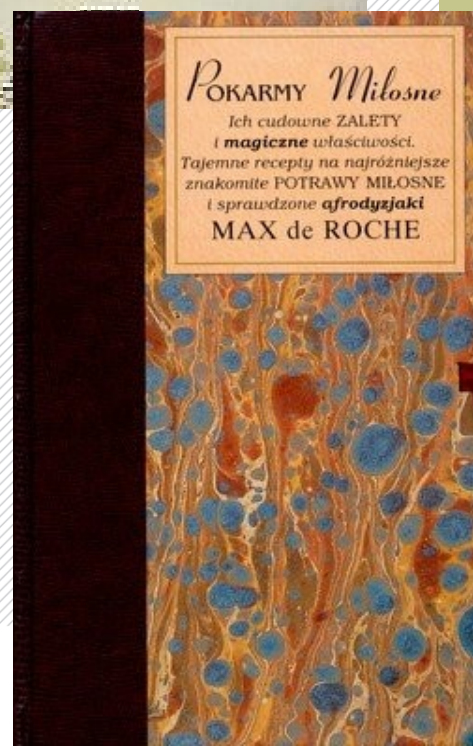
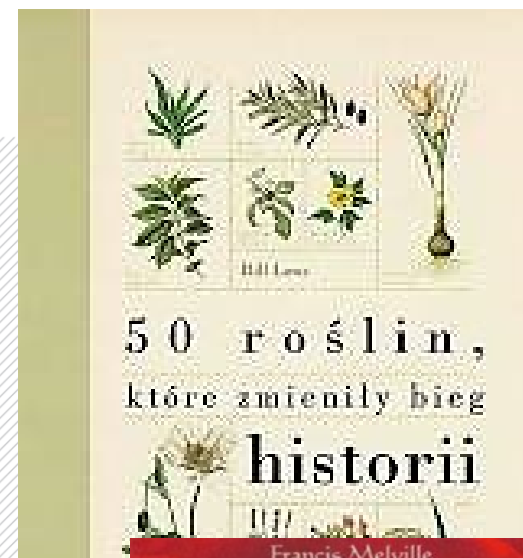
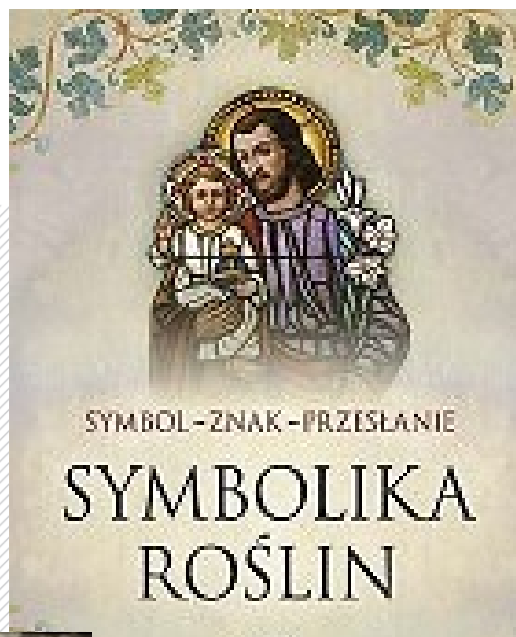
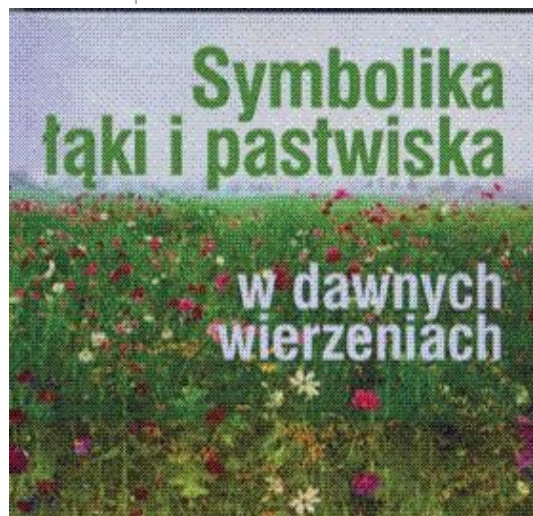
## From the very beginning, humans applied innovative technology to utilize the biotic and abiotic chemical compounds available in nature



*Trends Biotechnol.* 10.1016 / j.tibtech.2017.07.003







# Essential compounds contained in plants that determine their classification as spices

## Essential oils

- *Zingiber officinale*
- *Cinnamomum zeylanicum*
- *Lamiaceae* family – selected species
- *Artemisia absinthium*

## Alkaloids with a sharp taste

- *Piper nigrum*
- *Capsicum annum*

## Glycosides giving mustard oils

- *Armoracia rusticana*
- *Capparis spinosa*
- *Brassica nigra*
- *Sinapis alba*

*Essential oils* – a mixture of aldehydes, alcohols, esters, ketones, organic acids, hydrocarbons, phenols and others.





## Aromatic sulfur compounds

- *Allium* sp.:  
*A. cepa*  
*A. sativum*  
*A. schoenoprasum*  
*A. ascalonicum*

## Bitter substances (alkaloids)

- *Cinchona* sp.
- *Humulus lupulus*

## Coumarin

- *Hierochloë odorata*
- *Asperula odorata*





Culinary wild cooking workshops





## STUDIA PODYPŁOMOWE ZIOŁOZNAWSTWO

*„Studia kierowane są do wszystkich mądrych ludzi, którzy chcą  
być jeszcze mądrzejsi”*

Łukasz Łuczaj

### Postgraduate studies

*Herbal studies*

- ❑ Studies addressed all wise people who want to be even more brilliant



*"The results of ethnobotanical studies are of interest to scientists and pharmaceutical concerns, seed traders, and companies involved in acquiring new raw materials for industrial and food purposes."*

*Kujawska M. 2008*





Human is part of nature

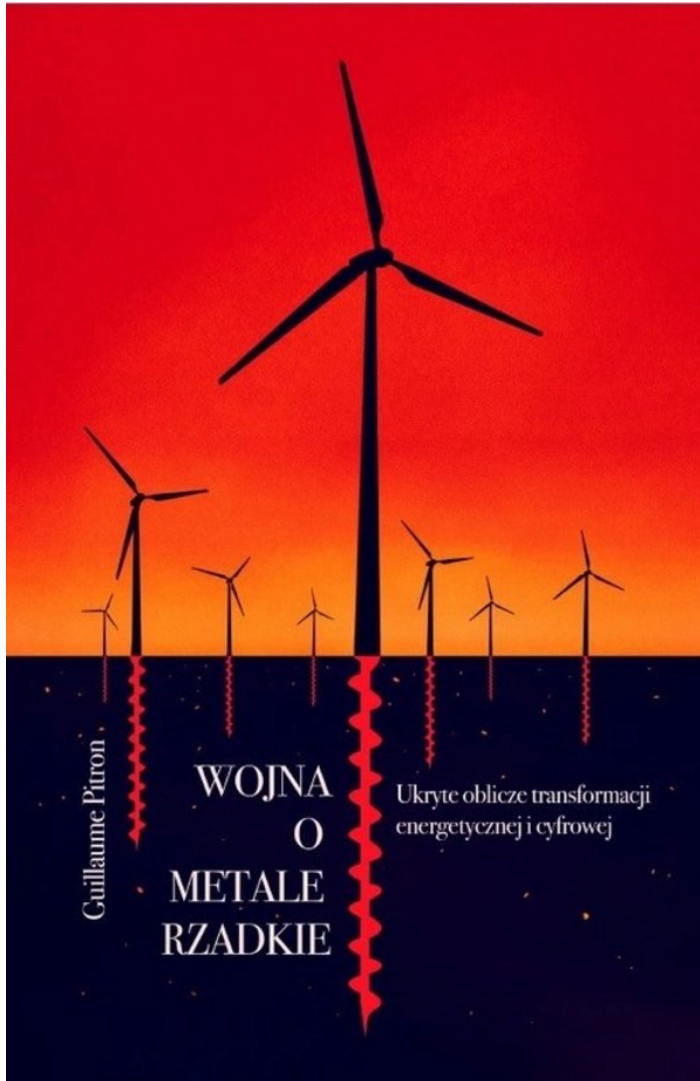
We need to reconsider  
the meaning of the  
concept of  
innovative solutions





## Human is part of nature

We need to reconsider  
the meaning of the  
concept of  
**innovative solutions**







WALL STREET JOURNAL BESTSELLER

# Unsettled



WHAT CLIMATE SCIENCE  
TELLS US, WHAT IT DOESN'T,  
AND WHY IT MATTERS

Steven E. Koonin

FORMER UNDERSECRETARY FOR SCIENCE,  
U.S. DEPARTMENT OF ENERGY  
UNDER THE OBAMA ADMINISTRATION

**Human is part of nature**

**We need to reconsider  
the meaning of the  
concept of  
innovative solutions**

