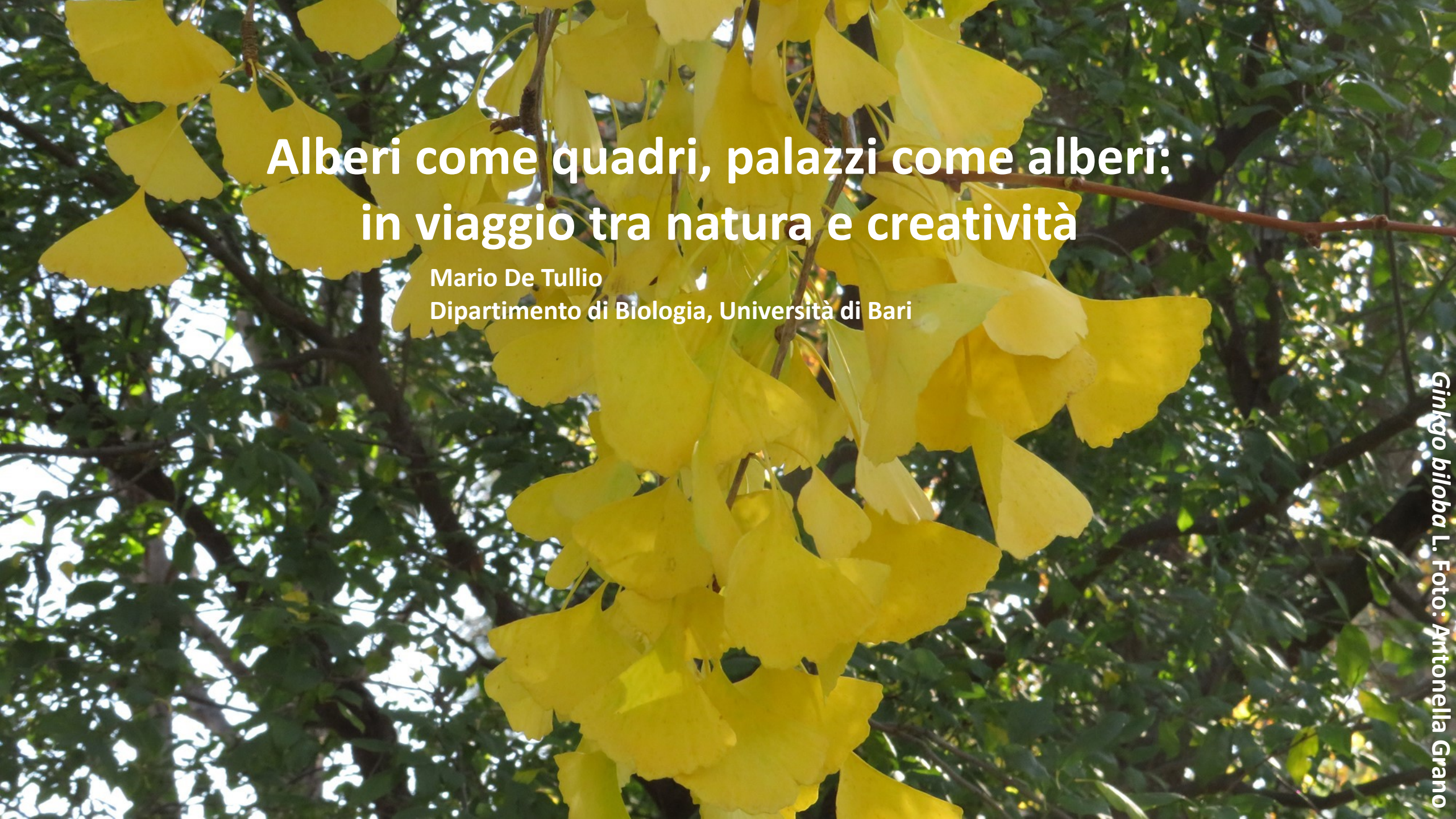




Alberi come quadri, palazzi come alberi: in viaggio tra natura e creatività

Mario De Tullio

Dipartimento di Biologia, Università di Bari

In un incontro precedente...

https://www.youtube.com/watch?v=YSuh-ZGplBU&ab_channel=Art%26ScienceacrossItaly

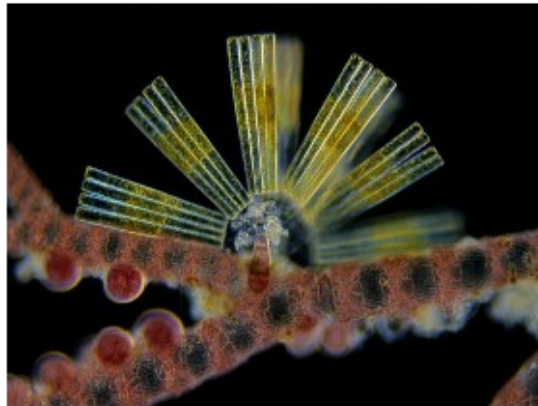
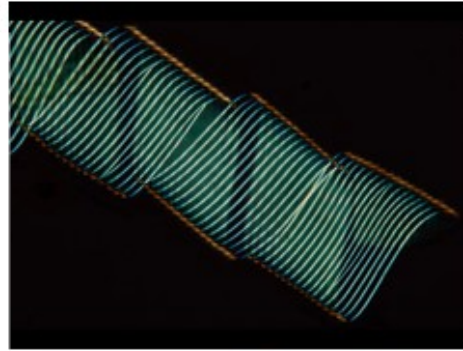


**La rappresentazione delle piante,
tra scienza e arte**

Mario De Tullio, Dipartimento di Biologia
mario.detullio@uniba.it

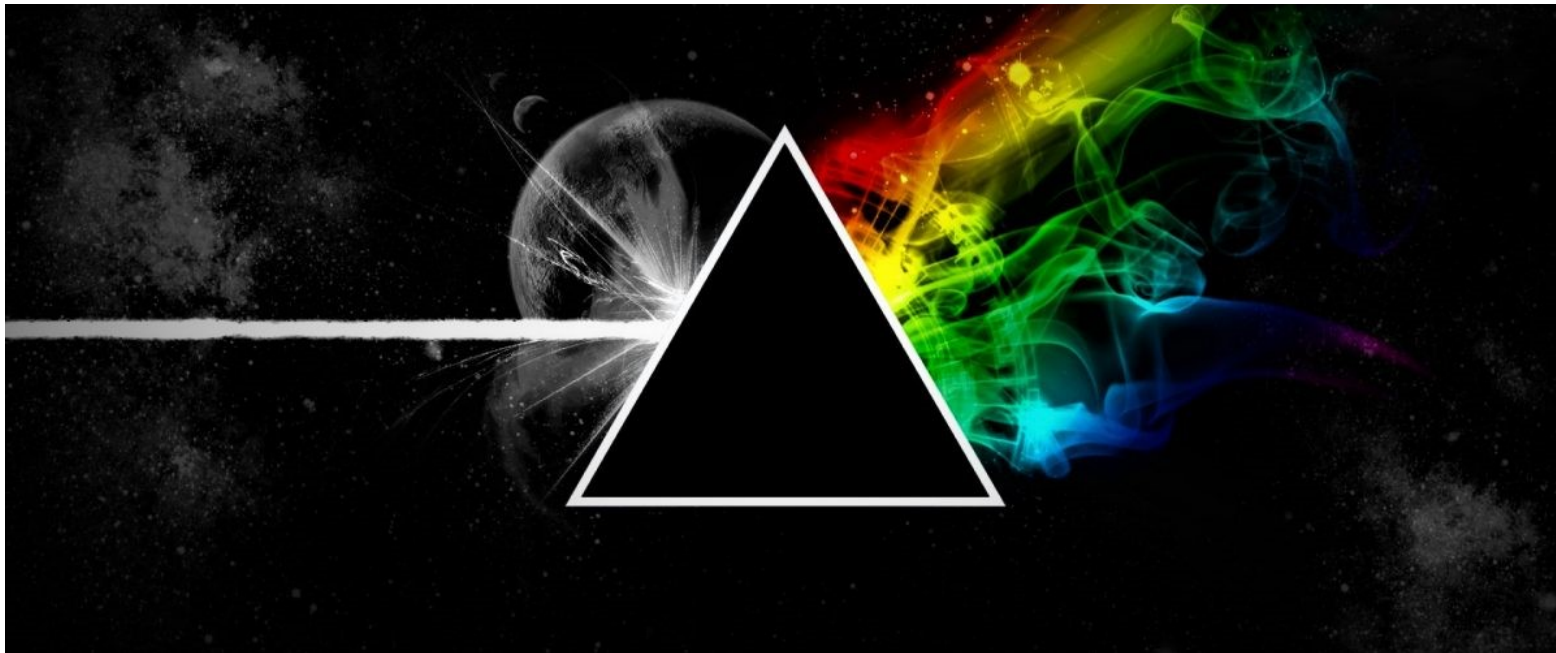


La rappresentazione delle piante è un continuo intrecciarsi di **Arte** (interiorità, soggettività) e **Scienza** (oggettività)





Jules Coignet. Panorama di Bolzano con un pittore, 1837. National Gallery of Arts, Washington DC, USA



Nella rappresentazione delle piante, l'artista è come un prisma che scompone l'immagine e la interpreta seguendo la sua sensibilità. Il flusso è unidirezionale: dalla natura all'artista



EXPLORE A CAPTIVATING WORLD WITH NUMBERS IN NATURE AT MSI

NEW PERMANENT EXHIBIT EXPLORES MATHEMATICAL PATTERNS IN NATURE WITH A MIRROR MAZE EXPERIENCE *Numbers In Nature: A Mirror Maze* is an interactive and immersive new permanent exhibit at the Museum of Science and Industry, Chicago

Ma la relazione tra Natura e Arte non è solo rappresentazione. A volte, in un gioco di specchi, Natura e Arte si incontrano e si confondono.

Un albero di cemento o un palazzo fatto di alberi?

Milano, Bosco verticale
Boeri studio, 2014.



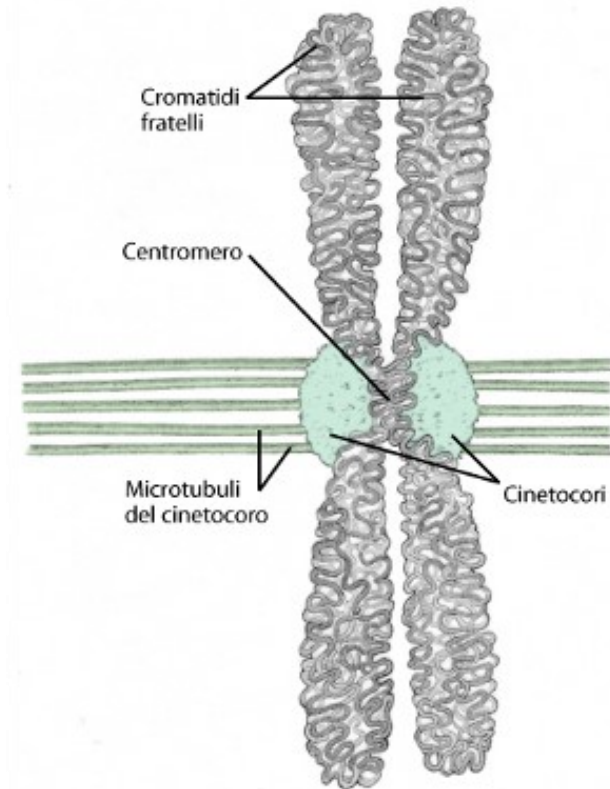
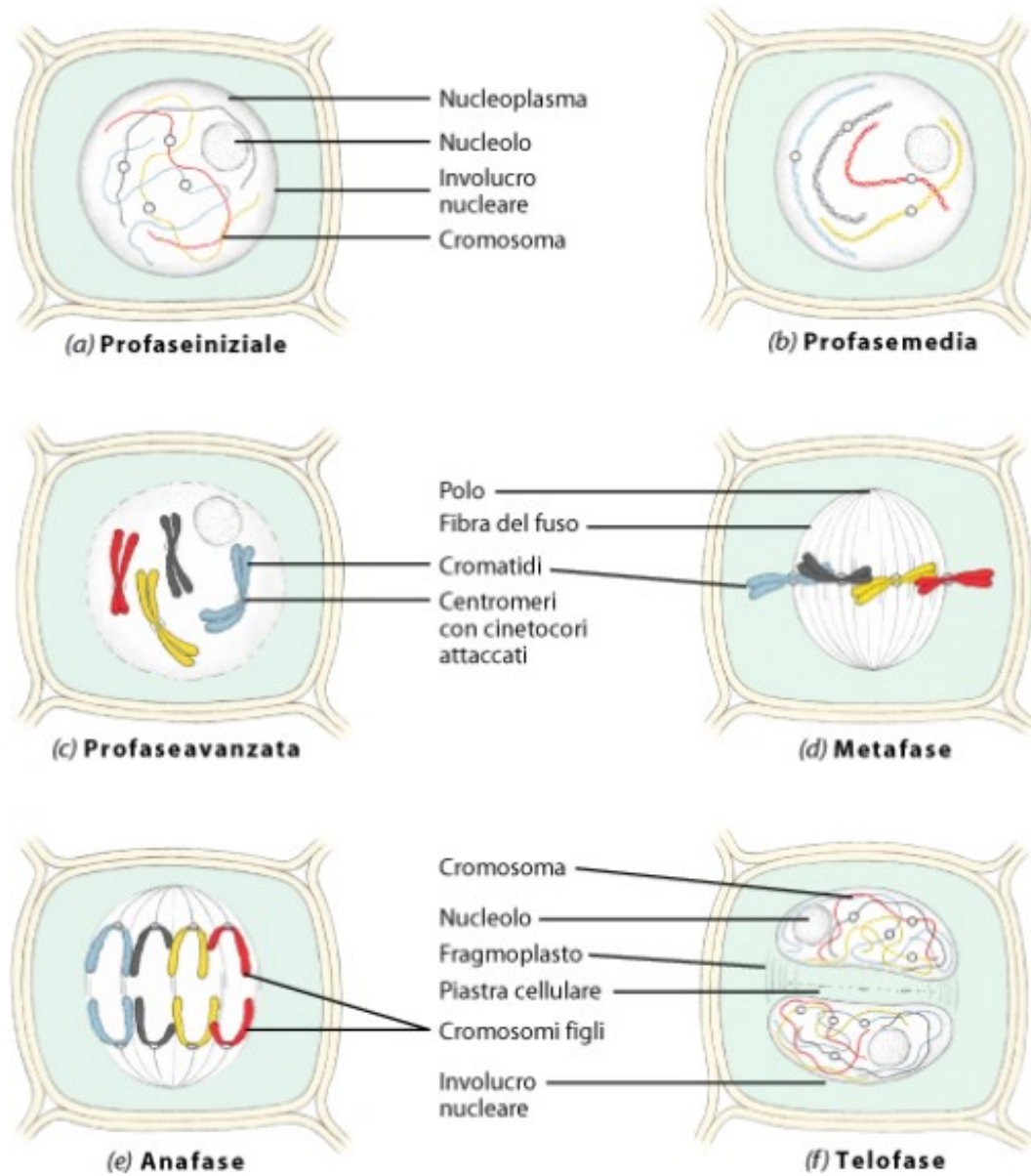
Due torri alte 80 e 112 m, che ospitano nel complesso 800 alberi (480 alberi di prima e seconda grandezza, 300 dalle dimensioni più ridotte, 15.000 piante perenni e/o tappezzanti e 5.000 arbusti. Una vegetazione equivalente a quella di 30.000 mq di bosco e sottobosco, concentrata su 3.000 mq di superficie urbana.

Una chiesa o una foresta?

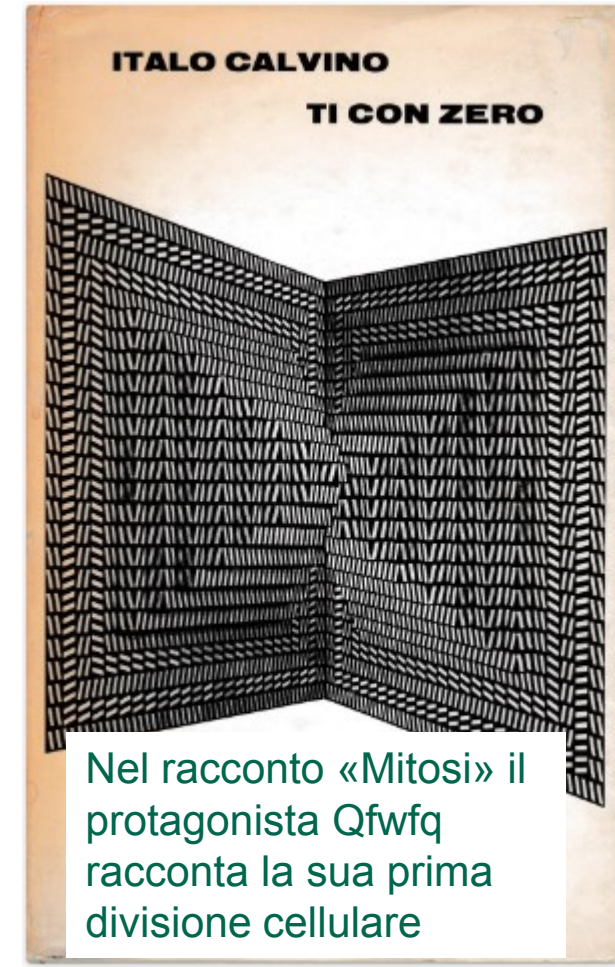
Barcelona, Temple Expiatori de la Sagrada Família
(1882- in corso)
Antoni Gaudì (1852-1926)



Arte e Natura si specchiano e si confondono anche a livello cellulare!



Le fasi della Mitosi (divisione cellulare)

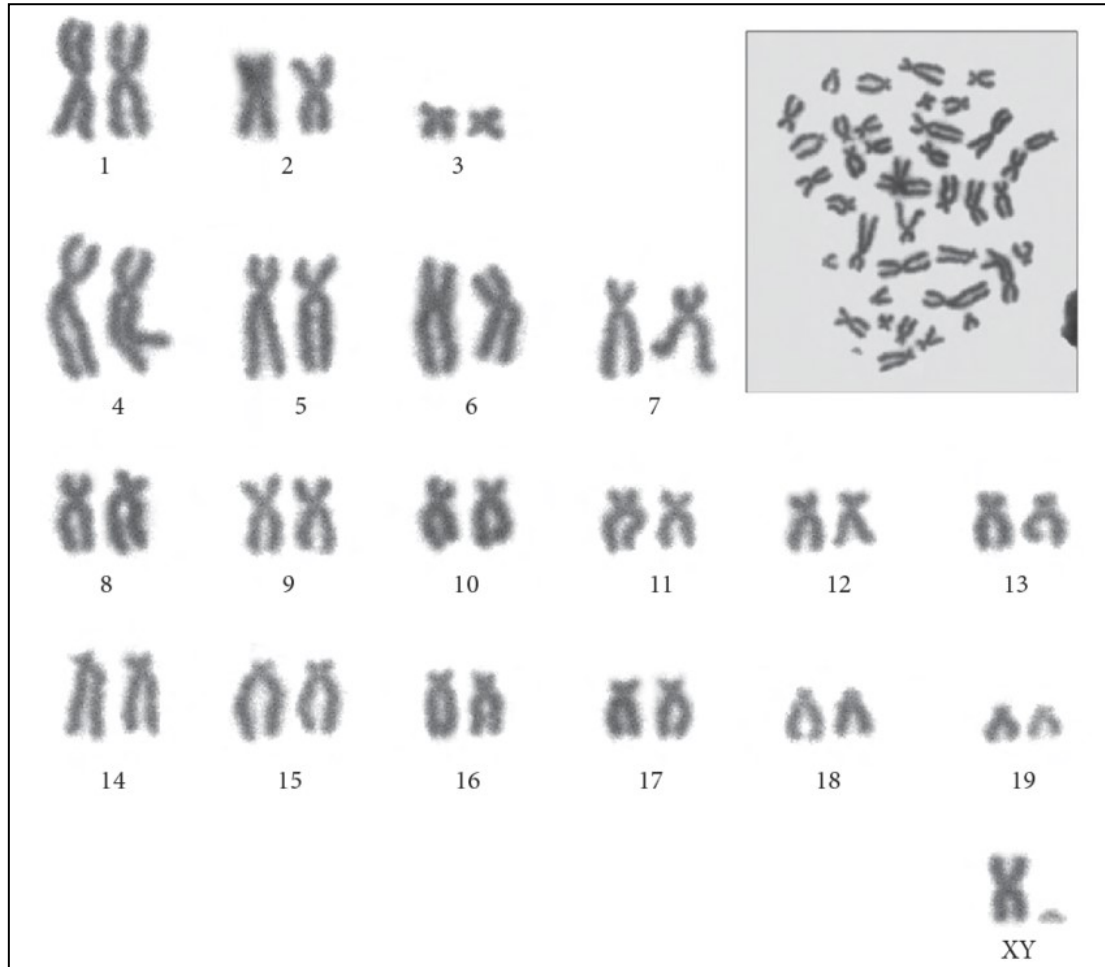




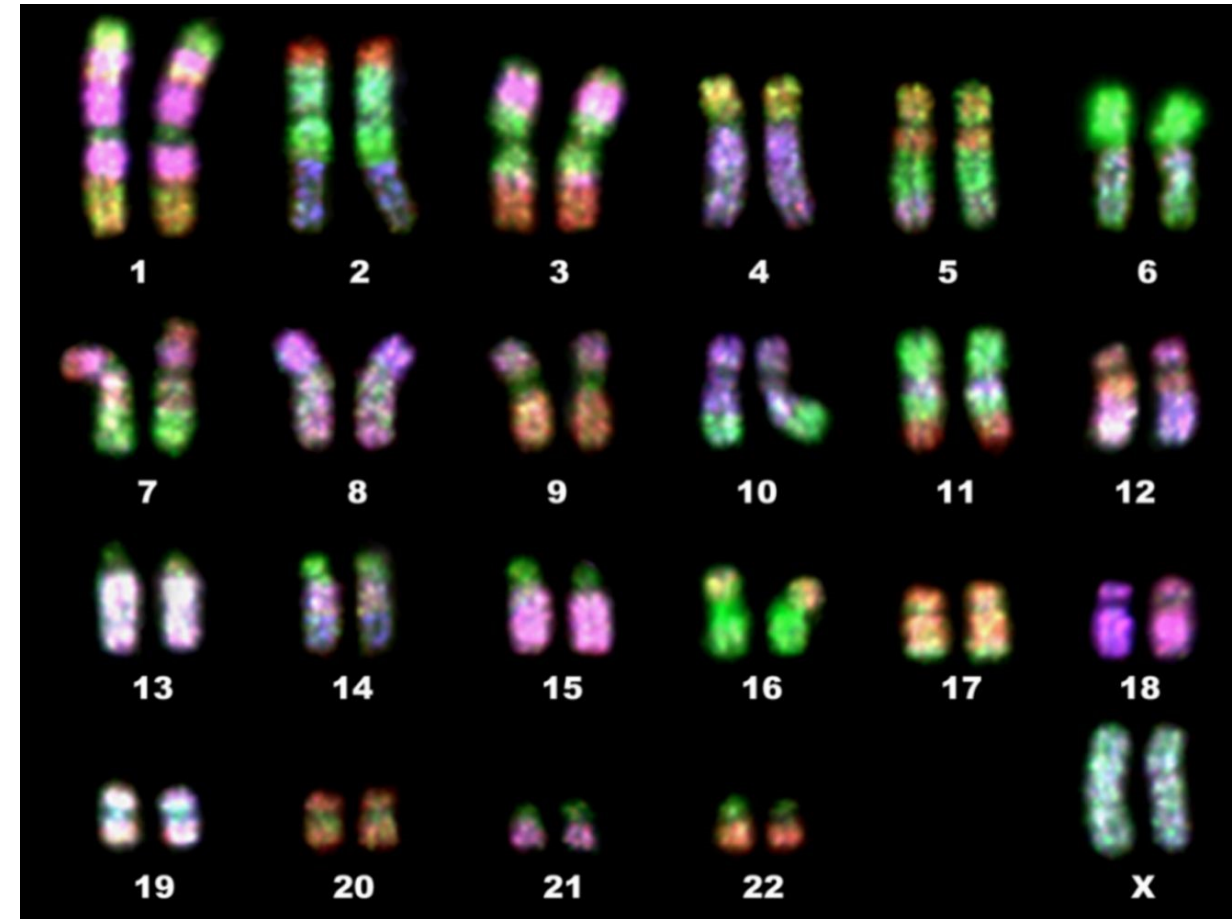
**Torey
Thornton
(1990)**



Un esempio di cariotipo (non umano)



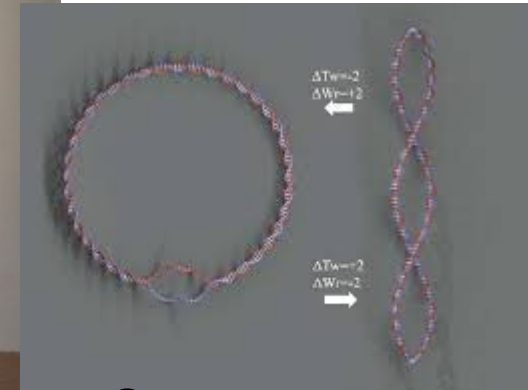
Cariotipo umano (individuo di genere femminile)



Tecniche di citogenetica consentono di evidenziare diverse porzioni dei cromosomi utilizzando colorazioni in fluorescenza

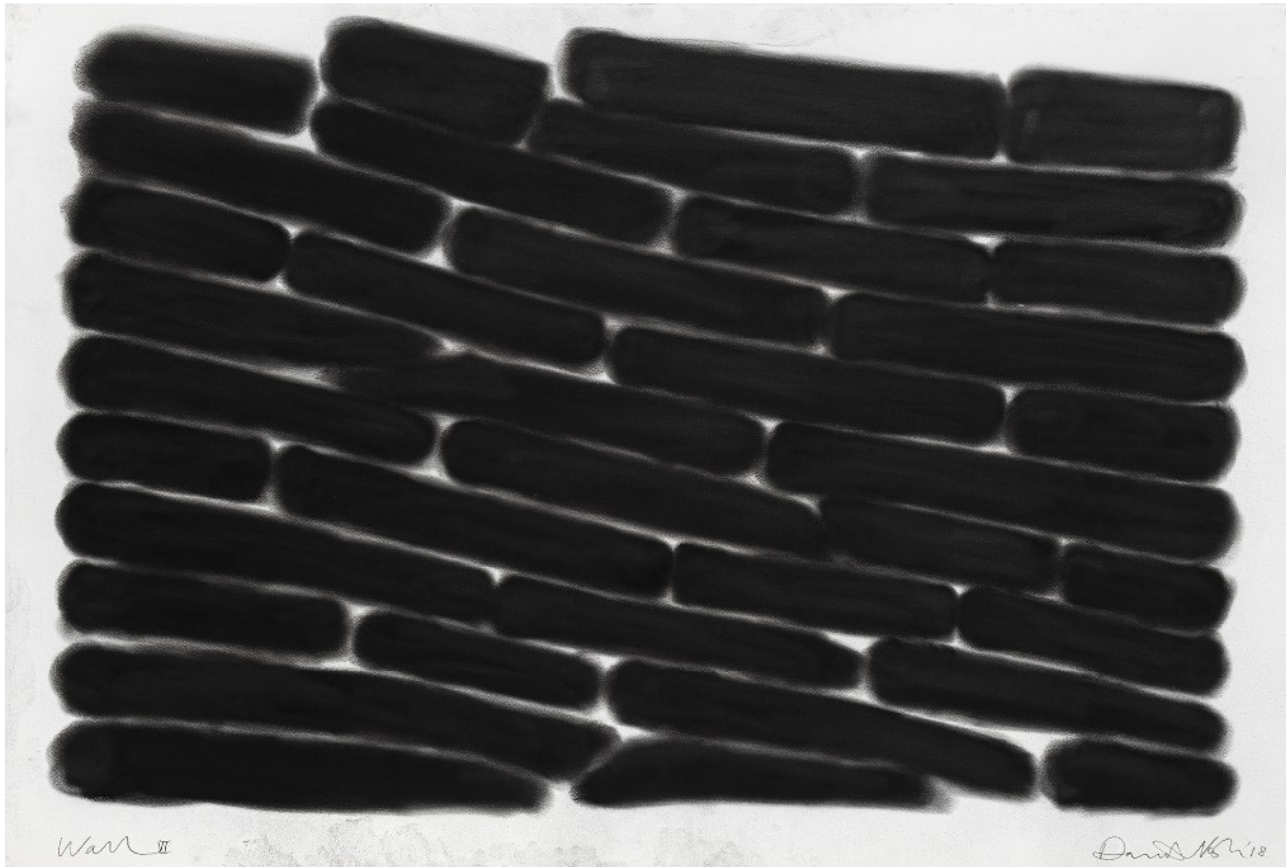
Michelangelo Pistoletto (1933)

Il progetto del Terzo Paradiso consiste nel condurre l'artificio, cioè la scienza, la tecnologia, l'arte, la cultura e la politica a restituire vita alla Terra. Terzo Paradiso significa il passaggio ad un nuovo livello di civiltà planetaria, indispensabile per assicurare al genere umano la propria sopravvivenza. Il Terzo Paradiso è il nuovo mito che porta ognuno ad assumere una personale responsabilità in questo frangente epocale. Con il Nuovo Segno d'Infinito si disegnano tre cerchi: quello centrale rappresenta il grembo generativo del Terzo Paradiso.” (Michelangelo Pistoletto)

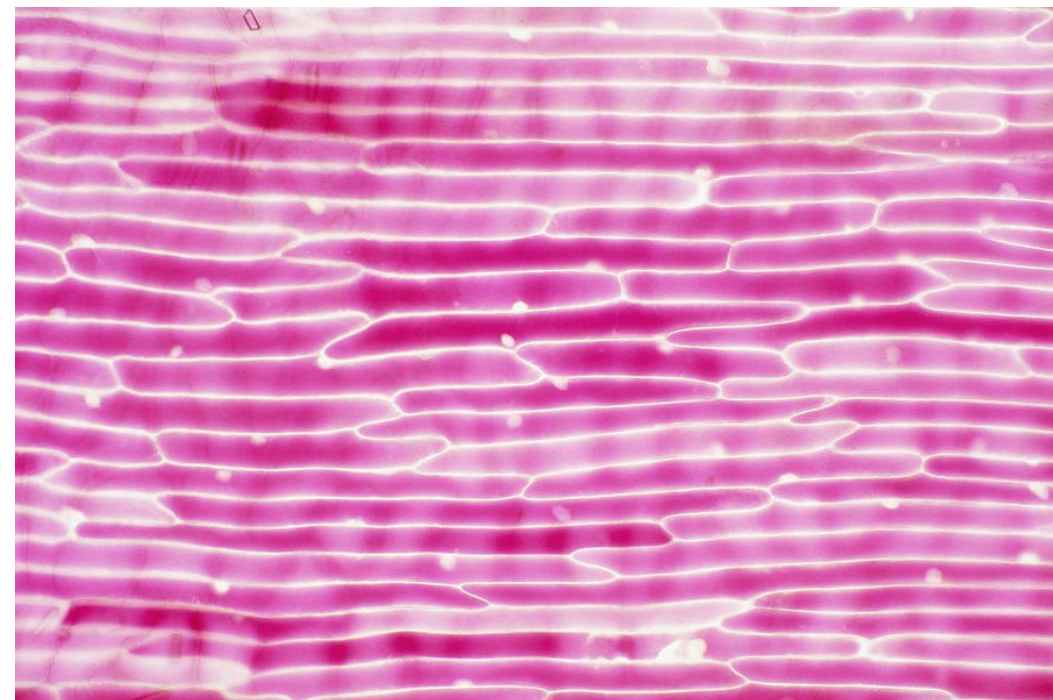


Schema che mostra il ripiegamento di parte del DNA batterico





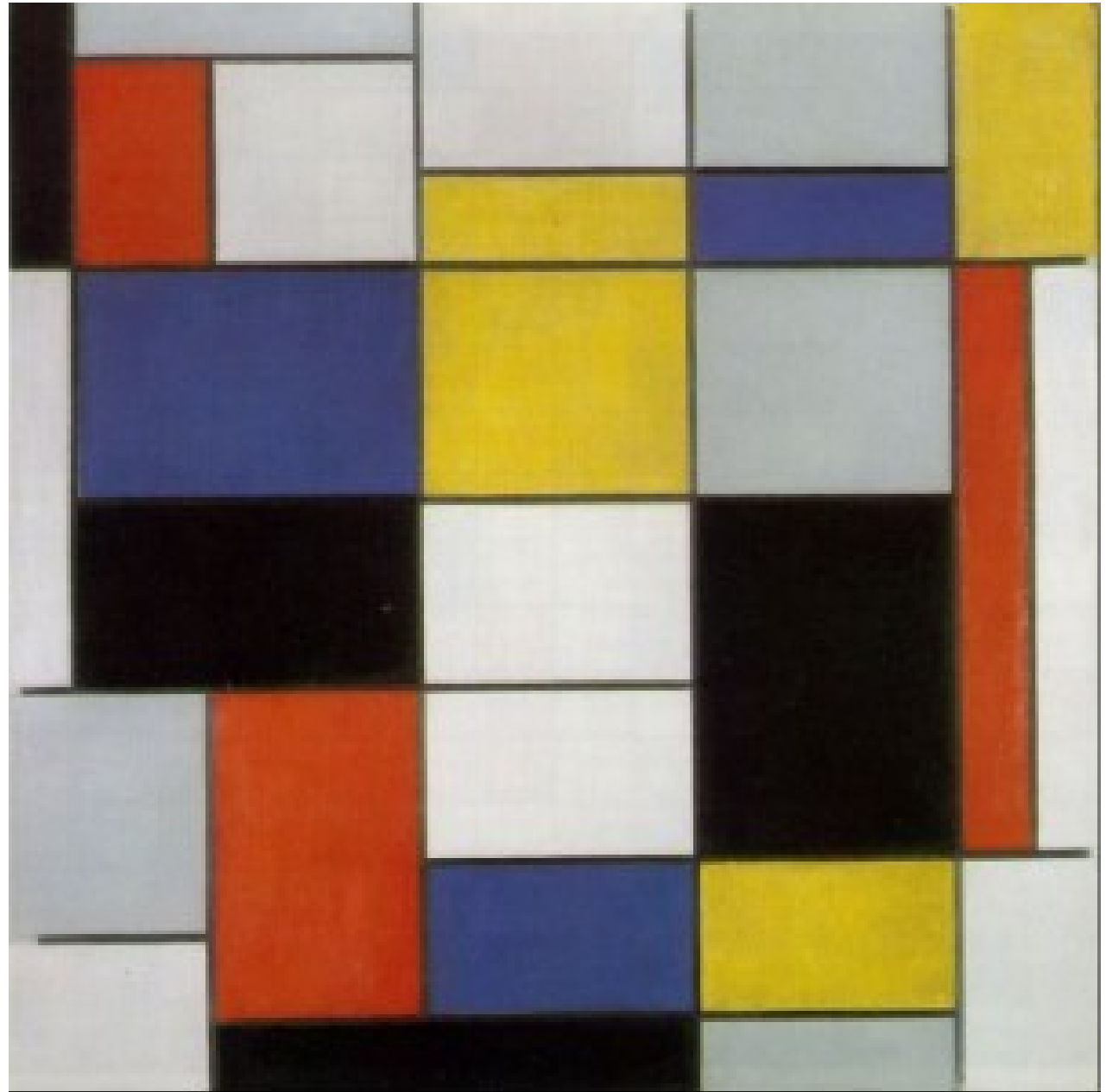
David Nash
(1945)
Wall VI



Cellule epidermiche da bulbo di *Allium cepa*
(cipolla)

Piet Mondrian 1872-1944

Co-fondatore della corrente
artistica «*De Stijl*»





1898



1908



1911



Melo in fiore 1912

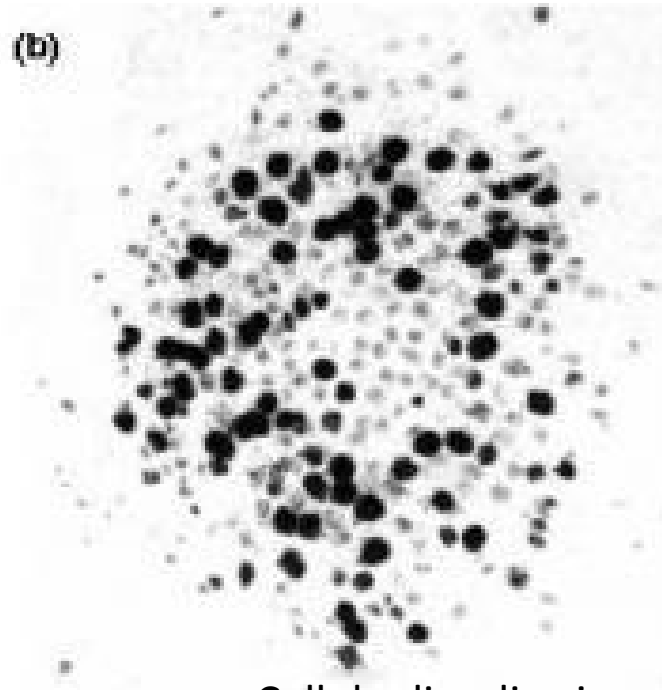


Composizione alberi2 1913

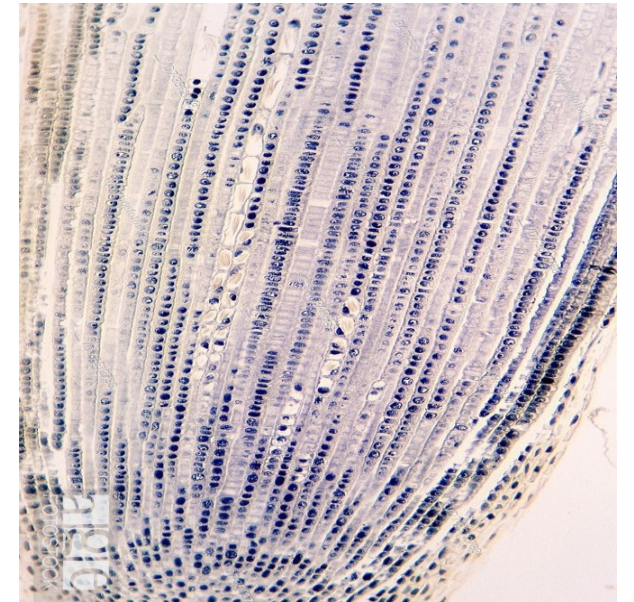


Composizione in linea 1917

(b)



Cellule di radice in cui i nuclei sono stati marcati con un tag radioattivo o con un colorante

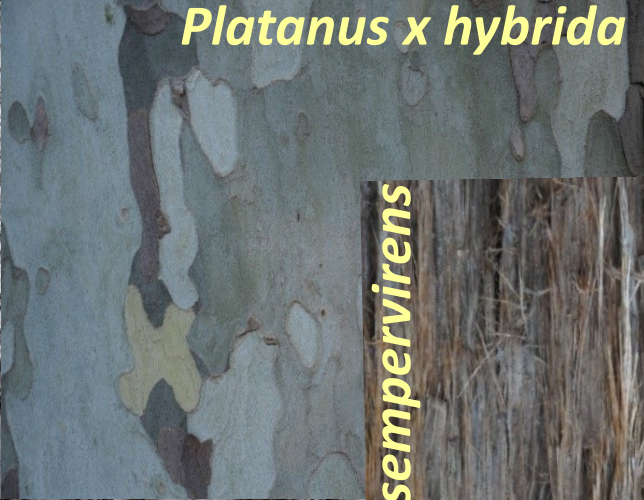


**Piet
Mondrian
1872-1944**

Ogni bosco è
una galleria
d'arte a cielo
aperto: la
meravigliosa
scorza degli
alberi



Abies alba (abete)



Platanus x hybrida



Ceratonia siliqua
(carrubo)



Aesculus hippocastanum



Sequoia sempervirens



Ulmus minor (olmo)



Quercus ilex (leccio)



Quercus suber (sughera)

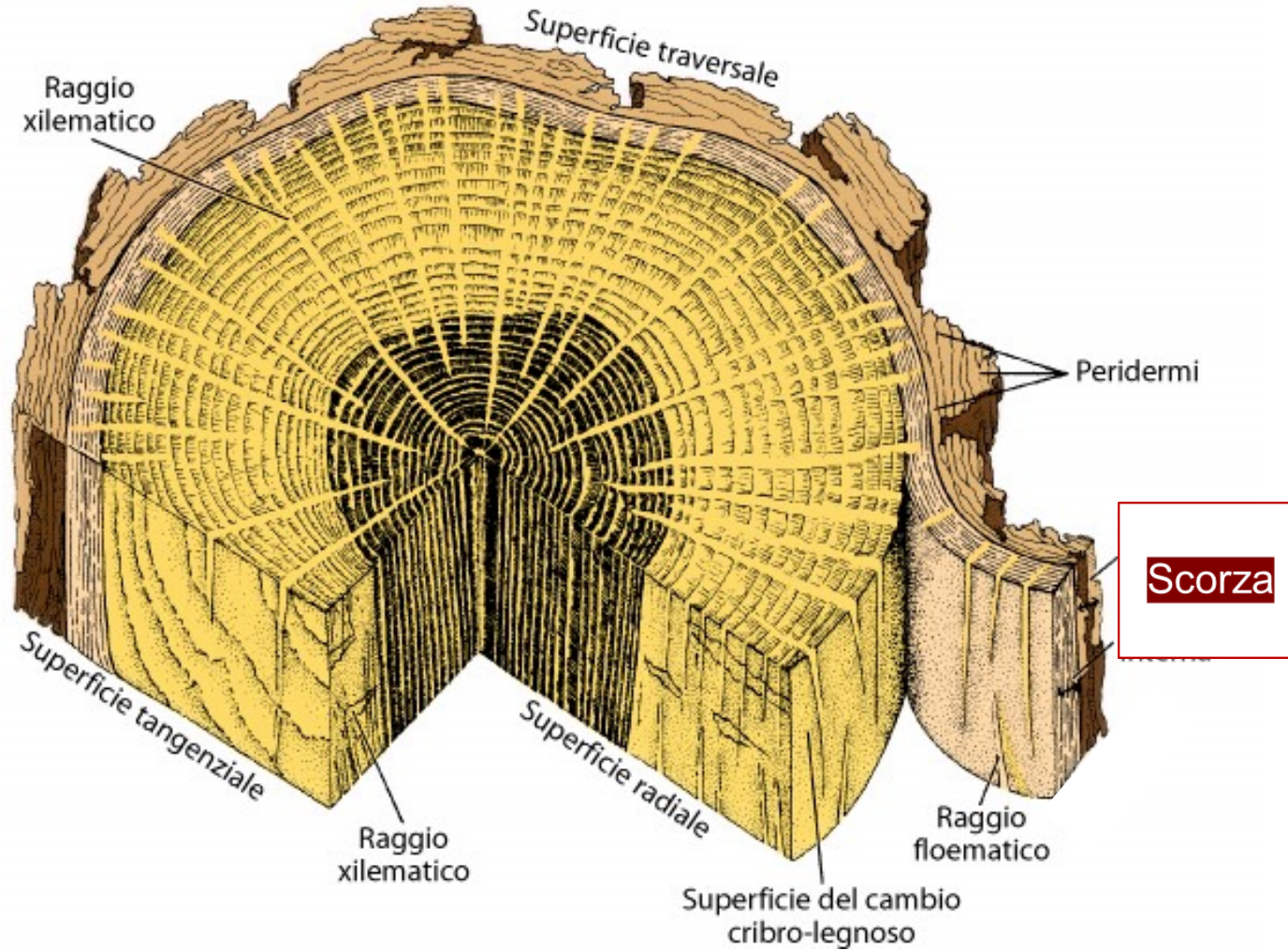


Juglans regia (noce)



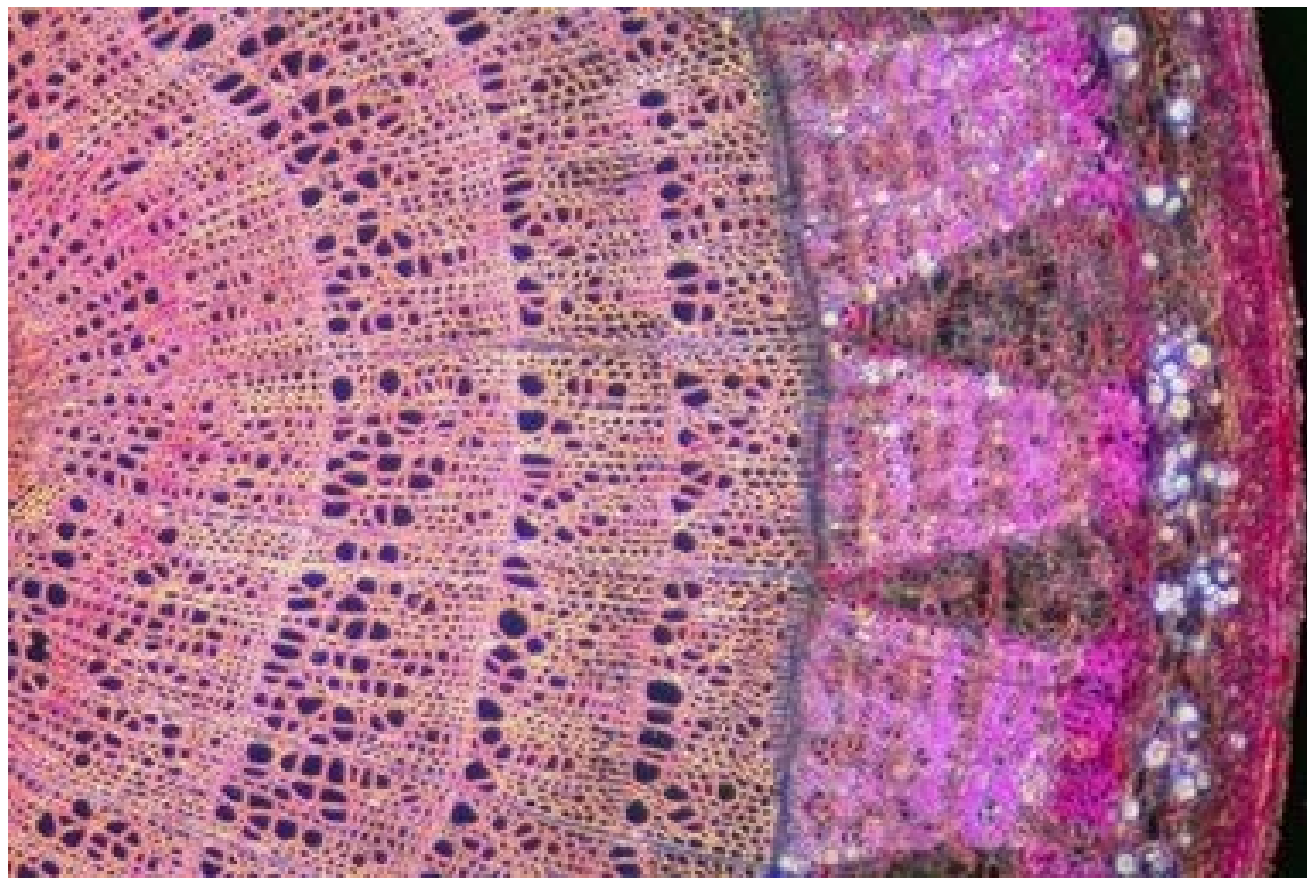
Eucalyptus globulus

Struttura secondaria del fusto



La parola **scorza** (o ritidoma) è preferibile al comune termine «corteccia», che in botanica indica un diverso tipo di tessuto

Sezione trasversale del fusto di un albero





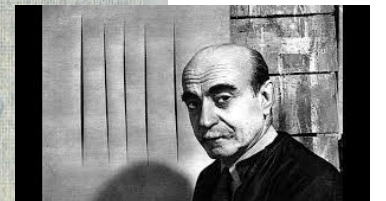
Frank Bowling (1934)



Quercus suber



Lucio Fontana (1899-1968)



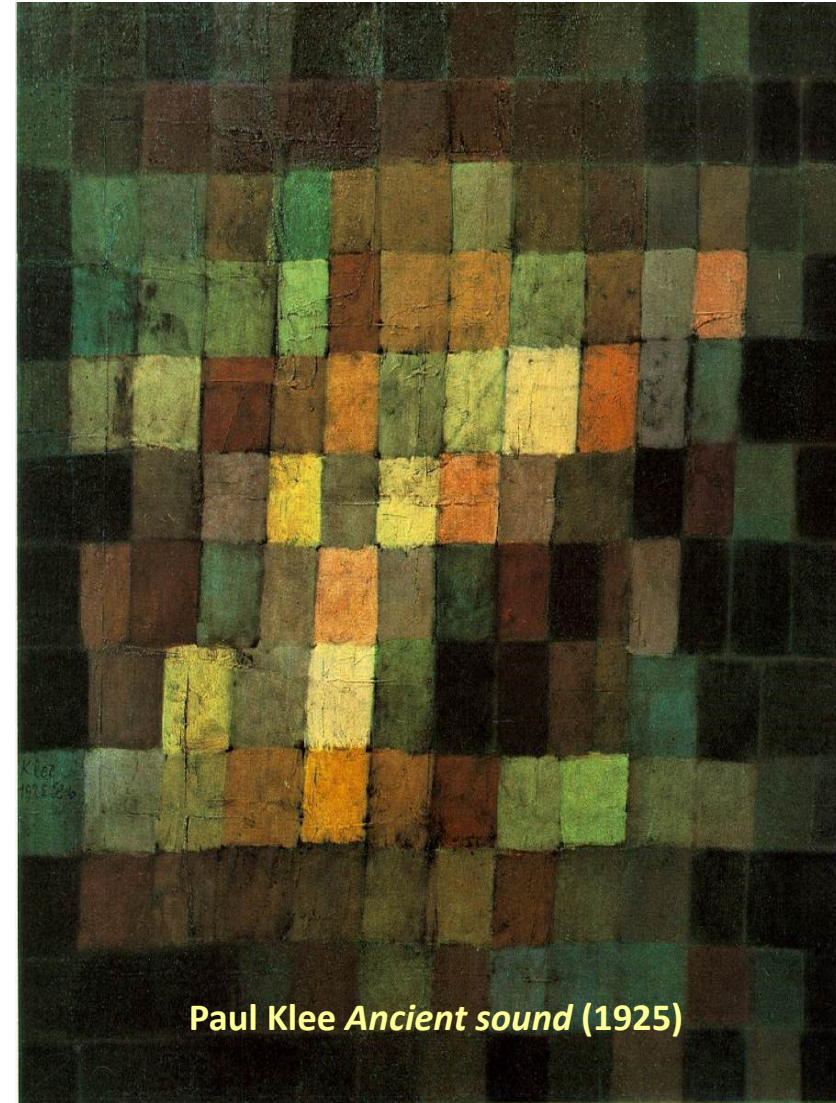
Betula pendula (betulla)

Eucalyptus globulus



Gerhard Richter (1932)

Platanus x hybrida



Paul Klee *Ancient sound* (1925)

Jackson Pollock



157.5 x 94.6 cm



Paul Jackson **Pollock** (Cody, 28 gennaio 1912 – Long Island, 11 agosto 1956)



Number 3, 1949, Hirshhorn Museum and Sculpture Garden, Washington, DC, USA



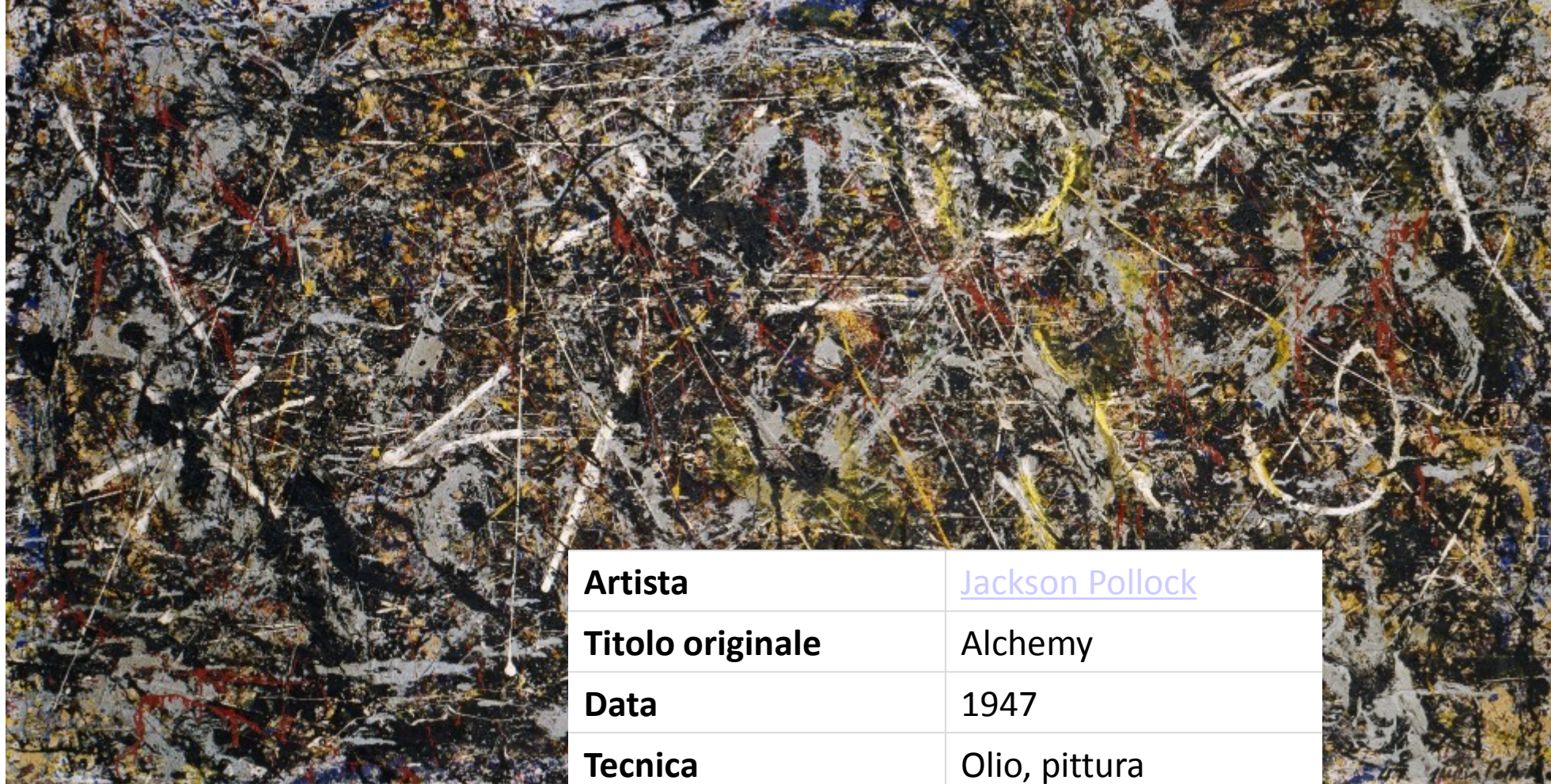
*Halesia
carolina*



One: Number 31, 1950, MoMA, NYC
2,7 m x 5,31 m

Washingtonia filifera





Artista	Jackson Pollock
Titolo originale	Alchemy
Data	1947
Tecnica	Olio, pittura d'alluminio, smalto alchidico con sabbia, sassolini, filati e bastoncini spezzati di legno su tela
Dimensioni	114,6 x 221,3 cm
Credit line	Collezione Peggy

L'analisi di alcune opere ha evidenziato che le forme tracciate da Pollock sono frattali. In proposito, un breve articolo del fisico Richard Taylor è stato pubblicato nel 1999 dalla nota rivista scientifica *Nature*

Fractal analysis of Pollock's drip paintings

Scientific objectivity proves to be an essential tool for determining the fundamental content of the abstract paintings produced by Jackson Pollock in the late 1940s. Pollock dripped paint from a can onto vast canvases rolled out across the floor of his barn. Although this unorthodox technique has



Figure 1 *Alchemy*, painted by Jackson Pollock in 1947. Drip paintings of this period are characterized by fractal dimensions close to 1.5. Reproduced by permission of ARS, NY and DACS, London, 1999.

been recognized as a crucial advancement in the evolution of modern art, the precise quality and significance of the patterns created are controversial. Here we describe an analysis of Pollock's patterns which shows, first, that they are fractal¹, reflecting the fingerprint of nature, and, second, that the fractal dimensions increased during Pollock's career.

To quantify the fractal content of Pollock's drip paintings, such as *Alchemy* (Fig. 1), we used the well-established 'box-counting' method² to calculate the fractal dimension D . We cover the scanned photograph of a Pollock painting with a computer-generated mesh of identical squares. The number of squares $N(L)$ that contain part of the painted pattern is then counted; this is repeated as the size, L , of the squares in the mesh is reduced. The largest size of square is chosen to match the canvas size ($L \approx 2.5$ m) and the smallest is chosen to match the finest paintwork ($L \approx 1$ mm). For fractal behaviour, $N(L)$ scales according to $N(L) \propto L^{-D}$, where $1 < D < 2$. The D values are extracted from the gradient of a graph of $\log N(L)$ plotted against $\log L$. This fractal analysis reveals two distinct D values occurring over the ranges $1 \text{ mm} < L < 5 \text{ cm}$ and $5 \text{ cm} < L < 2.5 \text{ m}$. Our analysis of a film of Pollock while painting shows that the fractal patterns occurring over the lower range are determined by the dripping process, whereas the fractal patterns across the higher range are shaped by his motions around the canvas.

Our analysis shows that Pollock refined his dripping technique: the fractal dimensions increased steadily through the years, from close to 1 in 1943 to 1.72 in 1952.

of paint trajectories that occupied only 20% of the 0.35-m^2 canvas area; by 1952 he was painting multiple layers of trajectories that covered over 90% of his 9.96-m^2 canvas. It is important that Pollock introduced his fractals systematically: the initial fractal layer essentially determined D by acting as an anchor layer for the subsequent fractal layers, which then fine-tuned the value of D .

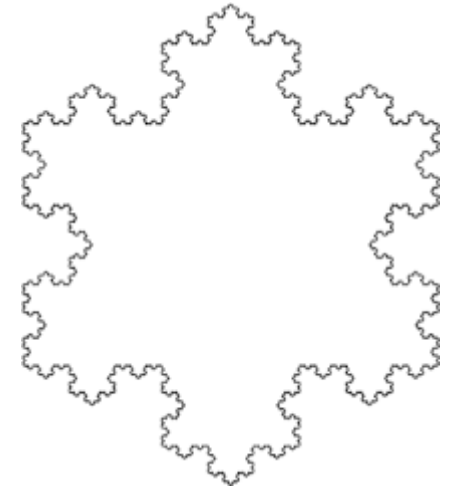
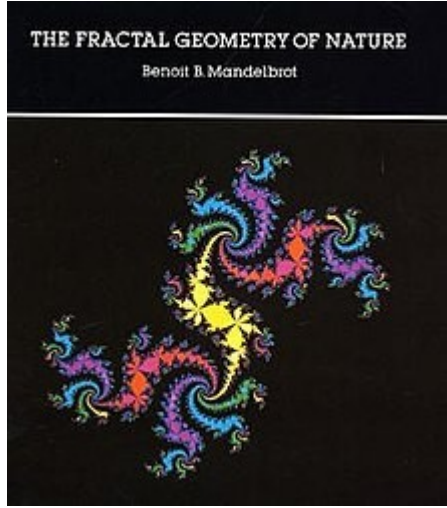
Richard P. Taylor, Adam P. Micolich, David Jonas

School of Physics, University of New South Wales, Sydney 2052, Australia

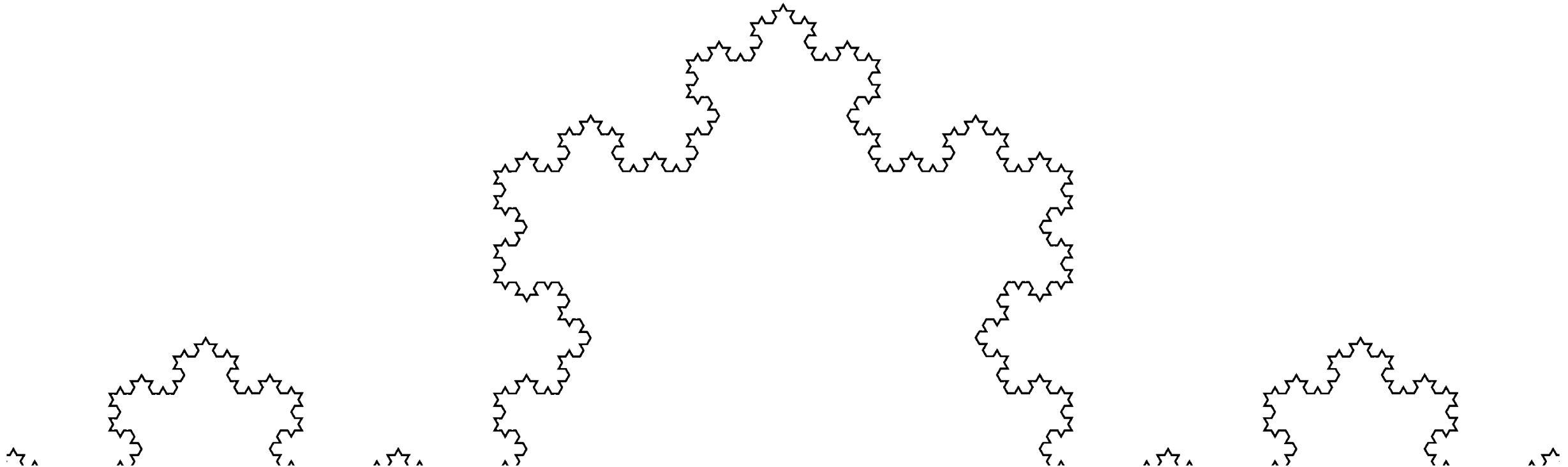
e-mail: rpt@newt.phys.unsw.edu.au

1. Mandelbrot, B. B. *The Fractal Geometry of Nature* (Freeman, New York, 1977).
2. Ott, E. *Chaos in Dynamical Systems* (Cambridge Univ. Press, 1993).

Cosa sono I frattali?



Koch snowflake

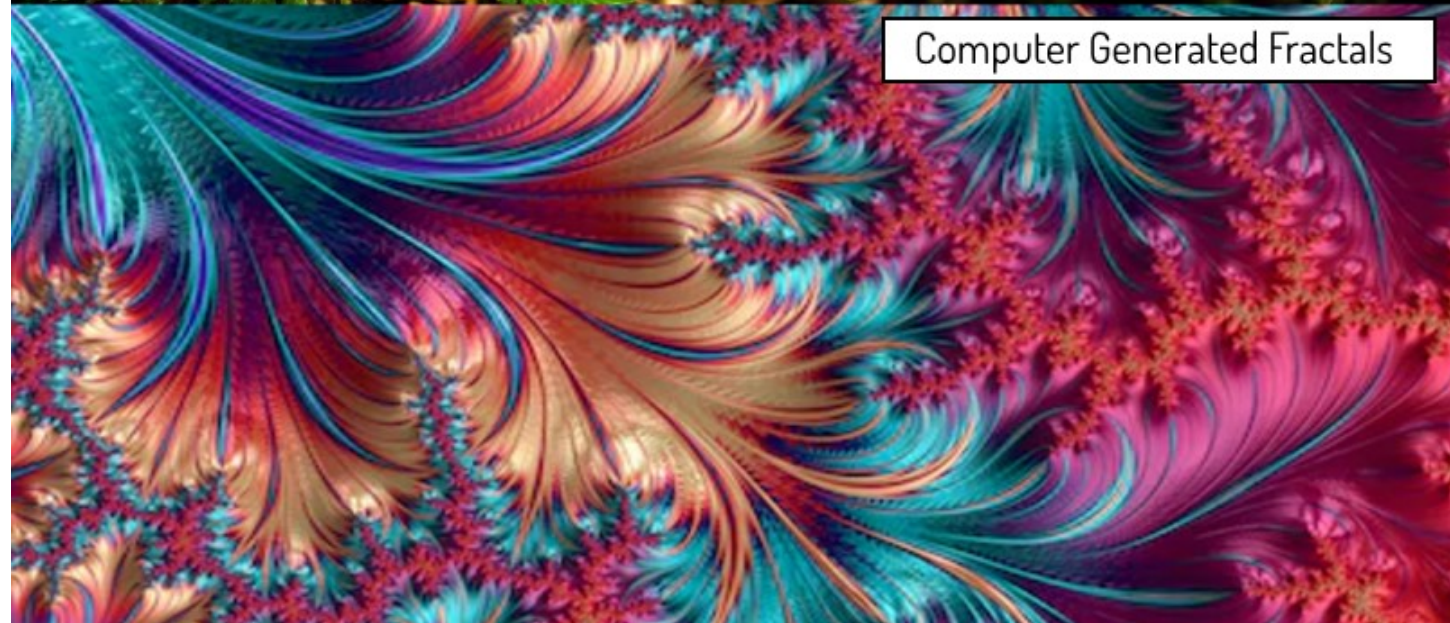


Le piante sono una miniera di frattali!

Foglia di felce (*Pteridophyta*)



Fractal Art in Nature



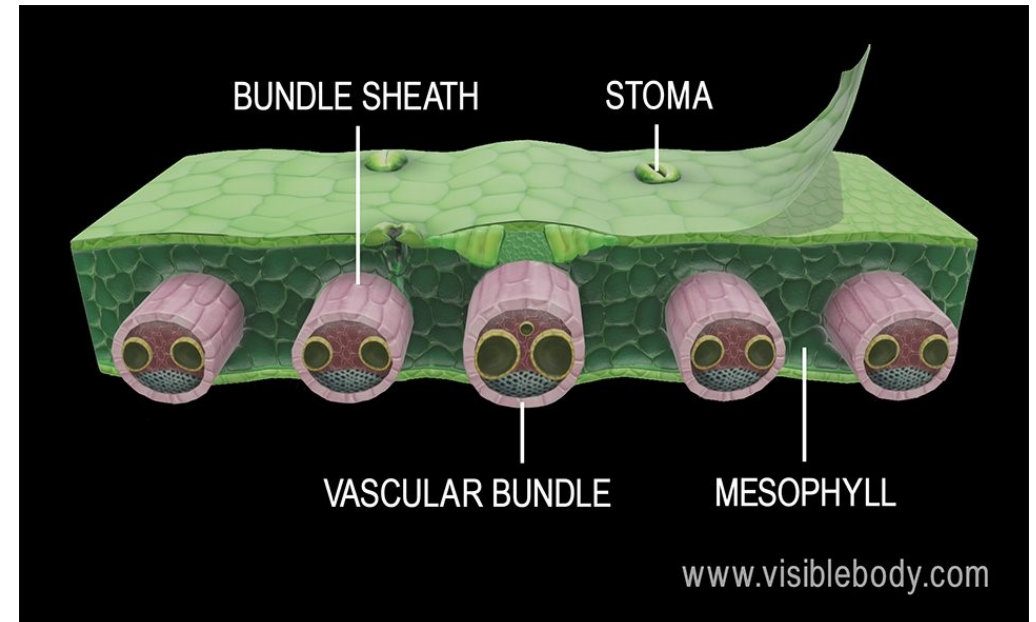
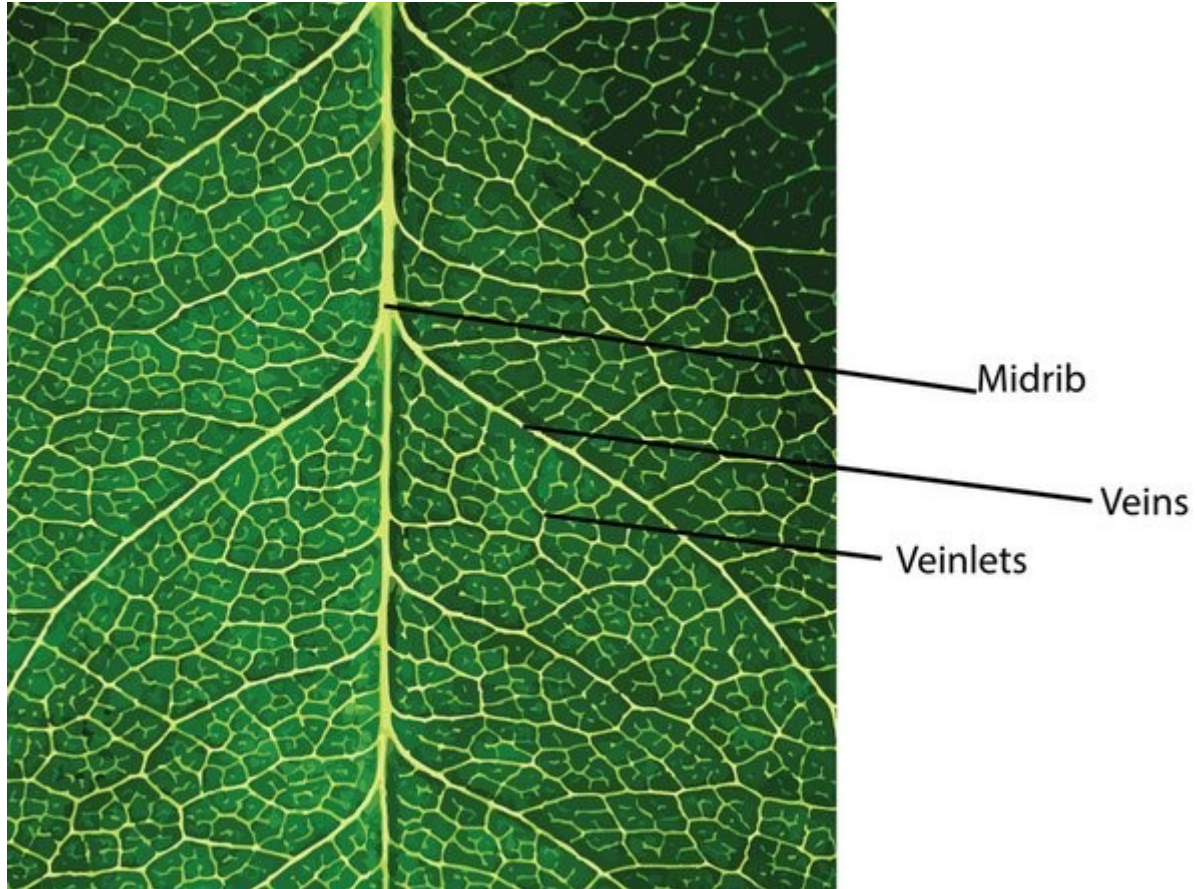
Computer Generated Fractals



Fillotassi spirale



Le nervature delle foglie



Ma torniamo all'arte...





Janaina Mello Landini (1974-)
Ciclotrama azul





Fare Arte con la Natura: Land Art ed altri singolari esperimenti

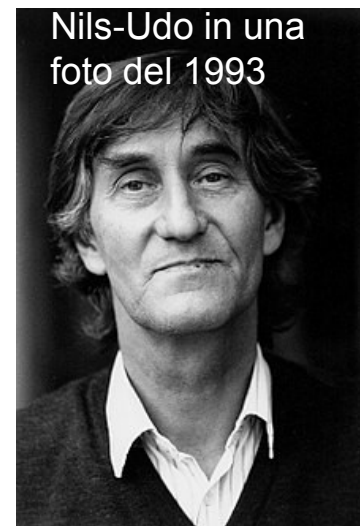




Nils-Udo (1937)
Sans titre, 1999



Sans titre, 1998. La Réunion.
Infiorescenze di *Kniphofia uvaria* in
una fenditura della lava solidificata



Nils-Udo in una
foto del 1993



Andy Goldsworthy (1956-). Land artist

Sycamore leaves edging the roots of a sycamore tree,
Hampshire, 1 November 2013

Platanus occidentalis



Axel Erlandson (1884-1964)
The tree circus, Gilroy, CA, USA



<https://vimeo.com/490099399>



Daan Roosegaarde's latest artwork GROW is an homage to the beauty of agriculture. In the world film premiere GROW appears as a 20,000m² luminous dreamscape of red and blue waves of light over an enormous field. GROW is inspired by scientific light recipes which improve plants' growth and resilience.