DR. LUCIA **PEREZ-DIAZ**

Illustration Portfolio, 2025

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@DrLPerezDiaz

Hola!

Dr. Lucia Perez-Diaz is an Earth Scientist and author-illustrator who has spent the last decade exploring the power of storytelling for opening up the world of scientific discovery to non-scientists of all ages. She currently works as an Geodynamicist in Oxford, and spends most of her time investigating what the Earth looked like back through geological time.

She has authored and illustrated science pieces for online magazines, been interviewed as an expert for topical news reports, participated as an invited guest on science podcasts, and conducted numerous scientific outreach events and public lectures at museums and educational institutions - both for children and adults.

Lucia's first book "How the Earth works" was published by DK Books in March 2025 (and will be joined in June 2026 by its follow-up, "How the Oceans work"). She has also recently illustrated QUARTETnary, an educational card game about geological time, and written the "Earth" chapter for Neon Squid's "The Big Book of Useless Knowledge".

You can find out more at *www.luciaperezdiaz.com/about*

“How the Earth works”

(DK Books, March 2025, Children’s non-fiction)

A voyage of discovery into Earth's remarkable journey and the secret ingredient for a habitable planet

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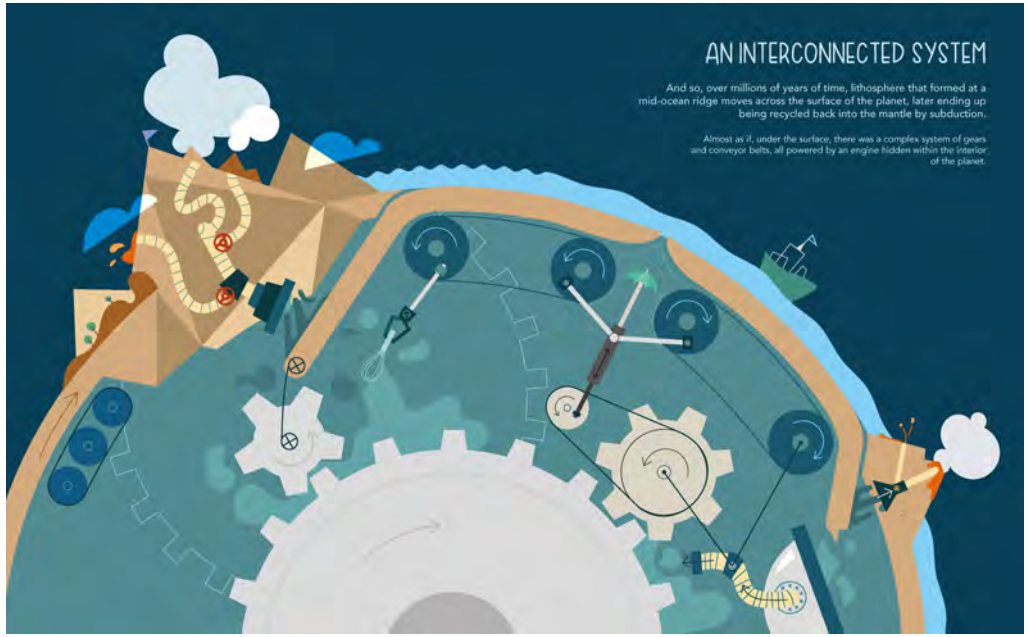
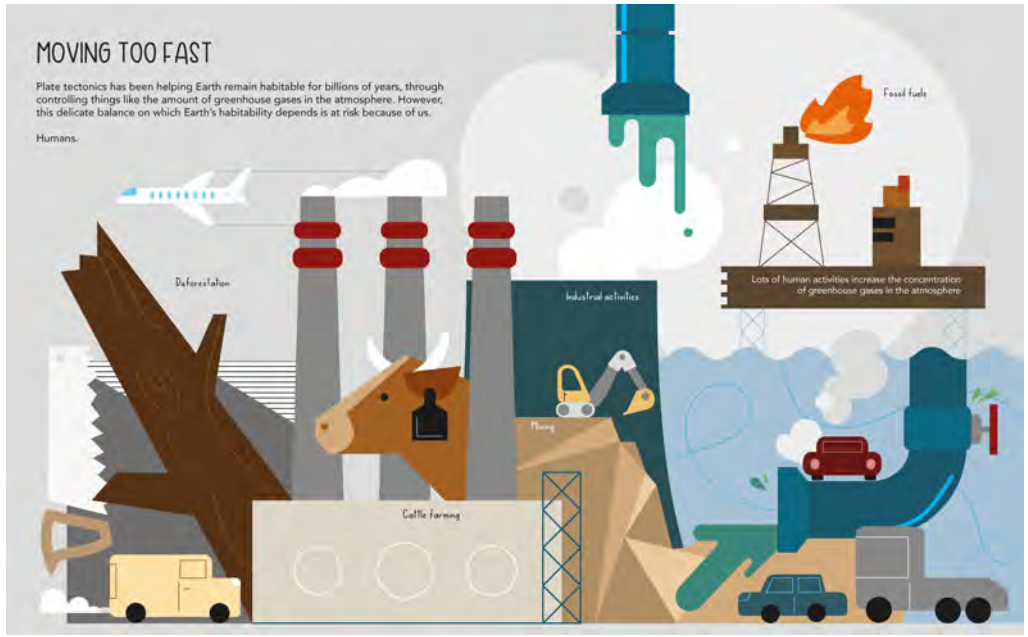




Nature Geoscience: Commentary

Estimating pi using geoscience

Fabian B. Wadsworth, Jérémie Vasseur, Iphigenia Anagnostopoulos & Lucia Perez-Diaz

In celebration of -day 2022, we ask: How accurately can the value of be constrained using the geometry of the Earth and other planets?

Pi-day (March 14th) is a pedagogic opportunity to look for non-standard and fun ways to constrain the value of . At the heart of -day celebrations is the pursuit of innovative empirical, experimental, and fun methods to find , such as the 1777 Buffon needle problem or the determination of the period of a pendulum of length , where is the gravitational acceleration. These experimental approaches are usually underpinned by a simple geometric relationship, which is the approach we can use here to find a geoscientist's method for estimating.

If we assume that the Earth is a smooth sphere of radius , then we can also assume that it has a circular intersecting plane that passes through it's centre. Such an intersecting plane traces a great circle on the Earth's surface with circumference . Using this spherical assumption, we can find by . NASA provide high precision determinations of both and for a plane through the equator and for a plane through a meridian. These yield an equatorial and a meridional , within 0.002 and 0.180% of the true value of Pi, respectively.

Of course, the Earth is a geoid with surface roughness, and is therefore not a smooth sphere. By contrast, Jupiter is smoother as well as being far larger than the Earth, such that using Jupiter for this exercise may reduce the uncertainties associated with the assumption of spherical smoothness. Indeed, referring again to NASA data, Jupiter's equatorial radius and equatorial circumference are and , which combine to yield , within 0.0003% of the true value. These results – using both the Earth and Jupiter – provide a reasonable and accessible method for estimating the value of at least as good or better than most classroom exercises.

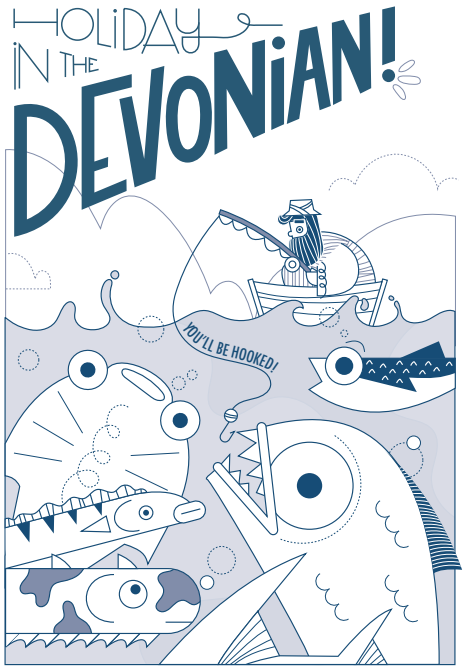
Perhaps more satisfying – and closer to the spirit of -day – is to compute a value of using data that we can collect ourselves, rather than relying on precision NASA measurements. To explore this, we can look back to the earliest determinations of and in antiquity. First, in Caelestia (1.7 49-52) Cleomedes describes a method for finding the meridional , that was originally proposed by Eratosthenes in the 3rd Century BC. This involved measuring the distance between two cities on the same meridian, and measuring the difference in angles of shadows cast by the sun on a vertical rod at noon on the summer solstice. Cleomedes tells us that this method yielded a result stadia. There is some uncertainty on how exactly to translate stadia to kilometers, such that km4,5. Also using geometry and a relatively simple measurement, around 1000 AD, al-Biruni measured the radius of the Earth by casting a line between a mountain-top of known height and the horizon, and measuring the angle of that line with respect to a horizontal This yielded cubits. As with stadia, there is some uncertainty associated with the cubit unit system, and so al-Biruni's radius is km9. These estimates for and yield , bounding the true value to within . Importantly, the techniques used by both Eratosthenes and al-Biruni can be readily understood and repeated using available equipment7, providing a fun method for determining the Earth's geometry and thereby deriving via Earth-scale measurements.

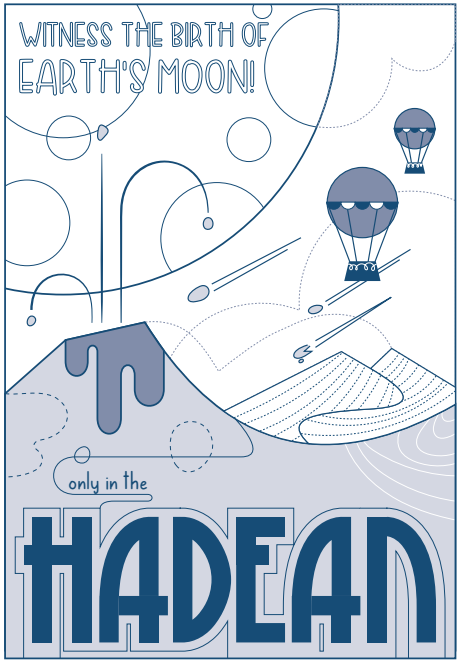
Editorial scientific illustration

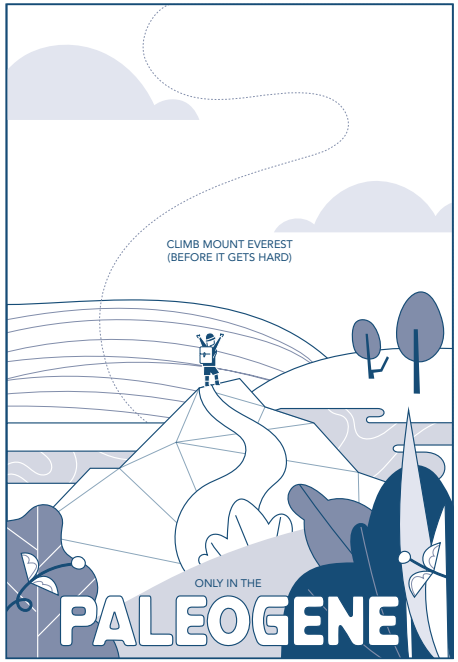
commissioned by Nature Geoscience magazine

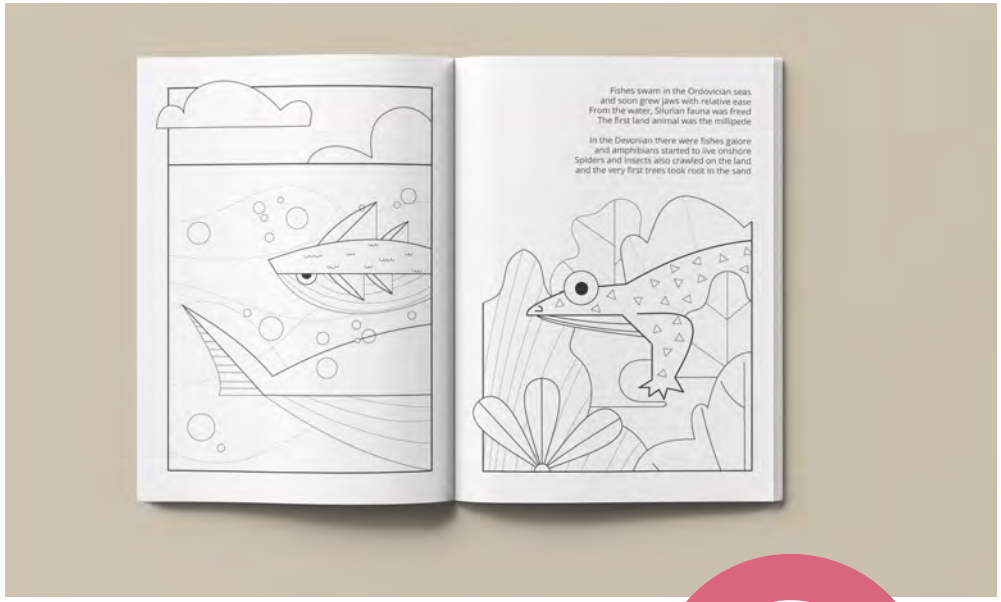
Adventures through time

Collection of original illustrations inspired by imaginary holiday destinations through Earth's geological past.









QUARTETnary

Educational card game (and colouring book) about Earth's geological past.
Received the European Geosciences Union Public Engagement Grant in 2023.

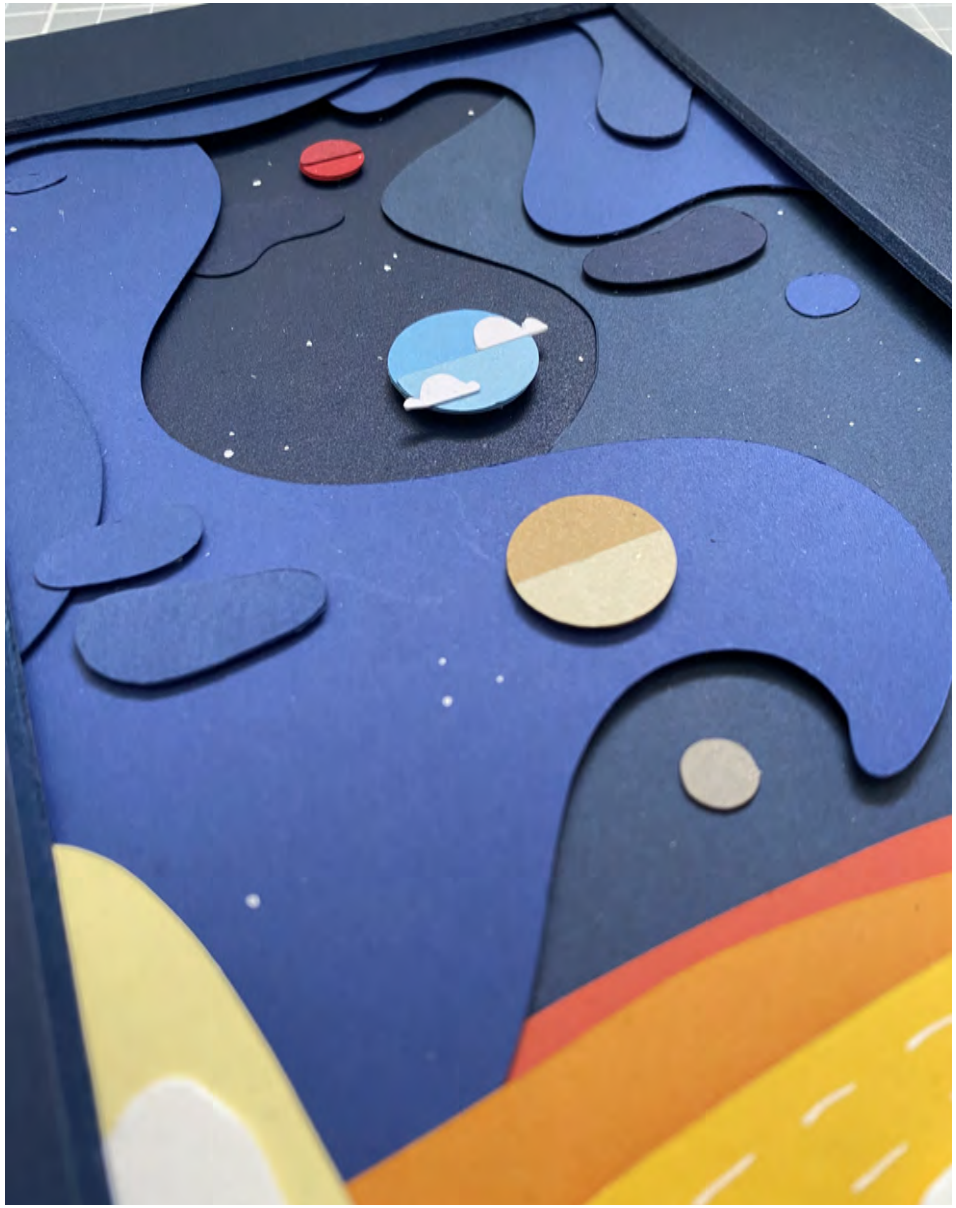
www.quartetnary.com

From pixels to paper

Blackbirds, created by cutting and attaching layers of coloured archival cardstock.

From pixels to paper

"Looking out, looking in"
Mini collection of papercut art pieces, created by hand using archival cardstock.



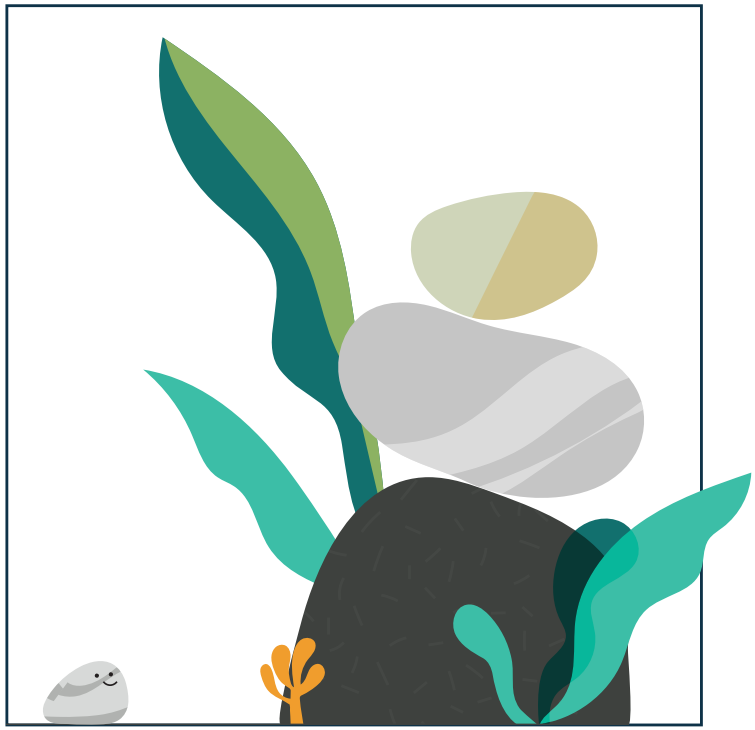
You can see more of my paper-based work by clicking here.

Keep asking questions

Mural commissioned by Bicester Public Library for their children's section.

Pebblo the pocket stone

Just a little rock, with a big personality.



Margot

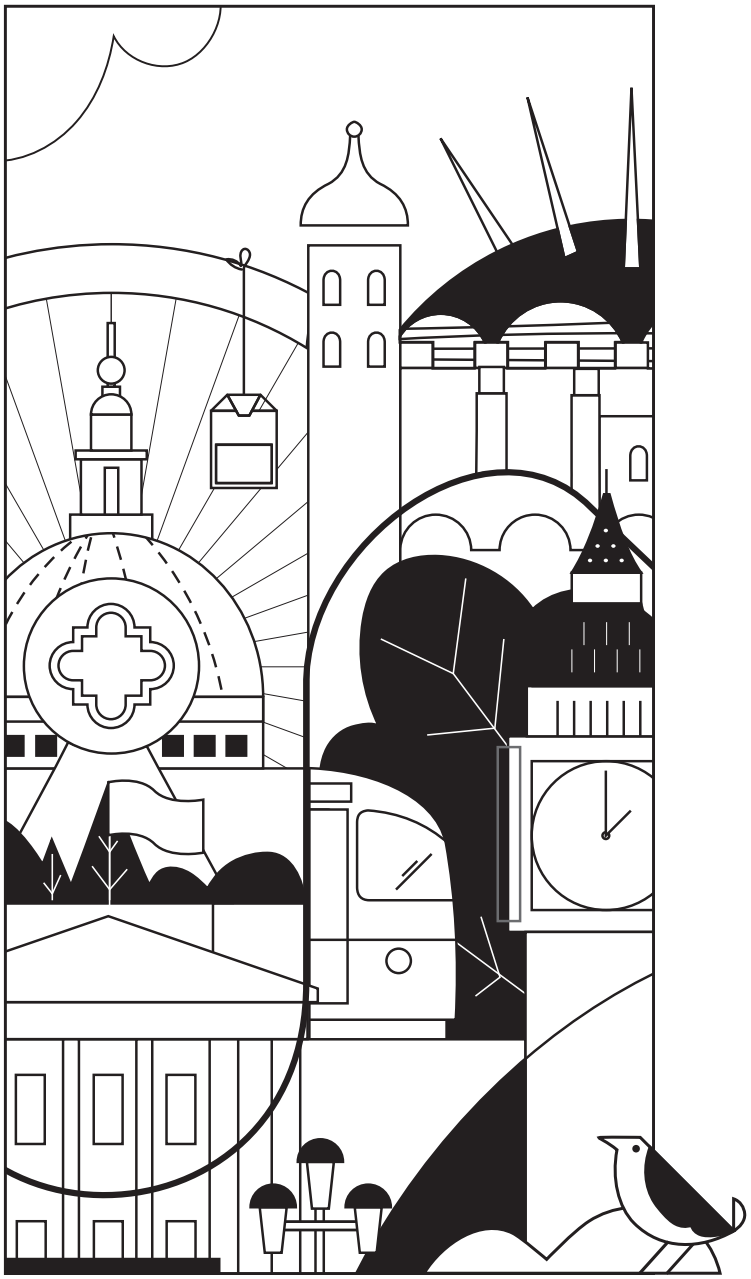
Character study

The Nutcracker Ballet

Character study

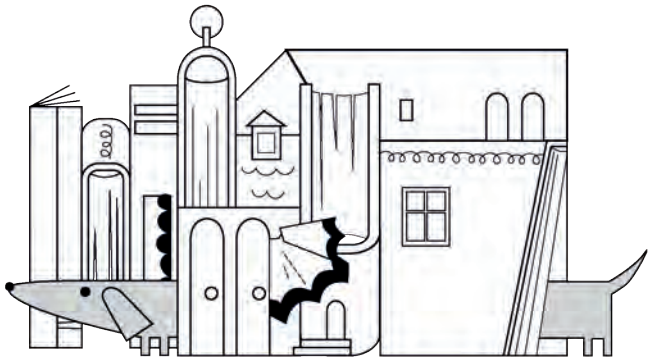
Cityscape sketches

Vienna / London



“City of Books”

Created for Bologna’s Childrens Book Fair 2024



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