

MATH OUTSIDE THE BUBBLE



Mathematicians Eponymous

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Q: What do the following have in common?

- (a) the Ohio town where the cordless phone was invented,
- (b) the German brand of butter biscuit created to rival the French *Petit écolier*, and
- (c) the neon-green orb-weaver spider recently discovered by Alireza Zamani.

A: Each is named for a mathematician.



Figure 1. Euclid, Ohio; Choco Leibniz; and *Araniella villanii*.

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Most often, of course, it's mathematics that's named after mathematicians: theorems and rules, methods and paradoxes. And many a mathematical result bears, famously, a misnomer of sorts, the name of someone other than its originator. Alfred Clebsch and Feodor Deahna established the necessary and sufficient conditions, respectively, for the so-called Frobenius theorem of differential topology; Ferdinand Frobenius applied the result. Simon Newcomb formulated what we know as Benford's law in 1881, fifty-seven years before Frank Benford rediscovered it. In 1972, H. C. Kennedy proposed what he termed Boyer's law:¹ "Mathematical formulas and theorems are usually not named after their original discoverers" [1].

Further afield from the meat of mathematics, a mathematician's name can achieve some measure of immortality attached to a prize, an institute, an endowed chair—or a Paris boulevard. MacTutor catalogs nearly one hundred streets in the French capital named after mathematicians.² There's Rue Gaston Darboux in the 18th Arrondissement, Passage Poncelet in the 17th. Many of the mathematicians similarly commemorated are French, but not all of them: Sophie Germain and Lagrange get streets (see Figure 2), but so too do Emmy Noether (just north of Paris, actually, in Saint-Ouen) and Huygens.³

One name notably absent from the Paris street signs is Euclid's. He who denied the existence of a royal road to geometry has perhaps more miles of pavement to his name than any other mathematician.⁴ Washington, DC, has a Euclid Street, as do Detroit, Philadelphia, and Santa

Monica (where it takes the place of 13th Street). There's a Euclid Avenue in Brooklyn and San Francisco, in Chicago and Cleveland. Twelve miles northeast of Cleveland lies the town referred to in (a) above: Euclid, Ohio, was named by the surveyors who, in the late eighteenth century, mapped the area for the Connecticut Land Company.

The European Space Agency has plans to launch a near-infrared space telescope named Euclid—its mission is to map the geometry of the dark universe⁵—but mathematicians are already well represented extraterrestrially. There are craters named for Chebyshev and Dirichlet (see Figure 3), Lambert and Markov, Poisson and Weierstrass. The asteroid belt includes minor planets known as 50033 Perelman and 9999 Wiles.



Figure 2. Rue Lagrange, in Paris's 5th Arrondissement.



Figure 3. The crater Dirichlet, located on the far side of the moon.

And it's not just space scientists showing mathematicians the love. A mathematical namesake made news in early 2020 when Iranian arachnologist Alireza Zamani named a newly documented species after the Fields-Medalist-turned-parliamentarian the media likes to call "the Lady Gaga of mathematics." (Gaga, incidentally, has a two-species genus of ferns named after her, as well as an extinct mammal and a parasitic wasp.⁶) Zamani derived earlier species names from *Spider-Man* actors and fictional spiders,⁷ but when naming his latest discovery he honored a man famous for his extensive collection of spider brooches, Cédric Villani.

¹The Boyer in question is C. B. Boyer, who, in his 1968 book *A History of Mathematics, observed*, "Clio, the muse of history, often is fickle in the matter of attaching names to theorems!"

²See <https://bit.ly/3bURviX>.

³While the three streets named for women mathematicians—the third is Rue Marie-Louise Dubreil-Jacotin (see <https://bit.ly/3bArAxk>)—include first names, the majority of those named for men do not.

⁴Use Google maps to find the Euclid Street/Avenue closest to you. It's probably not too far!

⁵See <https://bit.ly/2R9XQiI>.

⁶Gaga germanotta and Gaga monstraparva, Gagadon minimonstrum, Aleiodes gaga.

⁷Filistata maguirei and Pritha garfieldi after Tobey Maguire and Andrew Garfield, respectively, and Lycosa aragogi after Aragog from the Harry Potter series.



Figure 4. *Gaussia* palm.

“Orb web spiders are the closest that a spider can get to being a mathematician,” Zamani explains. When constructing their webs, he says, the arachnids use their front legs to measure the angle between radial threads, often spacing them with astonishing constancy. The final structure of the webs neatly approximates the golden spiral.

A new species like *Araniella villanii* doesn’t come to scientific light often, Zamani notes, since orb-weavers excel at dispersal and have wide distribution ranges. “We thought it would be a splendid tribute to name this rare mathematician spider after a one of a kind, spider aficionado mathematician,” he says.⁸

Villani and a spider may seem an unsurprising pairing, but Leibniz and a cookie? Though the German food company Bahlsen has been producing its Leibniz-Keks butter biscuits—Figure 1 shows the Choco Leibniz variety—since 1891, the only connection between the mathematician and

⁸Villani is not the only mathematician with a taxonomic presence. *Gaussia* gets two genuses, both *Gaussia*, one of palms (see Figure 4) and one of copepods.

the sweet treat is the city of Hanover: Bahlsen is based where Leibniz lived from 1676 until his death in 1716.⁹

The list of miscellaneous mathematical namesakes is a long and varied one. Abel has a mountain in Svalbard named after him, Descartes an island in each of Australia and Antarctica. There’s a typeface named Euler, an operating system named Turing. Archimedes is a cartoon owl in the Disney movie *The Sword in the Stone*; The Fibonacci were a Los Angeles art rock band active in the eighties. But let’s conclude this tour of mathematician eponyms¹⁰ with a non-example.

Newton boasts a mountain in Svalbard; an island in Antarctica; an asteroid; a telescope; a street in Paris; a township in Ohio, even—but *not* a cookie. Tempting though it is to pair a Fig Newton with a Choco Leibniz for a calculus cookie duo, the former is actually named *not* for he of *Principia* fame but for the Boston suburb of Newton (itself derived from “new town”).

Eat that, Isaac.

References

- [1] H. C. Kennedy, *Classroom Notes: Who Discovered Boyer’s Law?*, Amer. Math. Monthly 79 (1972), no. 1, 66–67. MR1536593



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⁹*Leibniz-Keks* is perhaps slightly more explicable in the context of a fad that swept German-speaking Europe in the late nineteenth century: it was all the rage to name food products after historical figures. Leibniz is to a German butter biscuit what Mozart is to an Austrian sphere of pistachio marzipan and nougat coated in dark chocolate—the Mozart-Bonbon.

¹⁰This survey is certainly not exhaustive. I invite readers to bring to my attention particularly interesting eponyms they’ve come across.