Mathematicians
A–Z

Šnajder
Taimiņa
Ugbebor
Vaughan

UNIVERSITY OF OXFORD
Mathematical Institute

Vera Šnajder
(Bosnia and Herzegovina, 1904–1976)

Vera Šnajder was born in Sarajevo (then Austria-Hungary, now Bosnia and Herzegovina) at the turn of the twentieth century. In 1928, following her doctoral studies in the recently formed Kingdom of Yugoslavia, she moved to Paris where she completed postdoctoral research at the Institut Henri Poincaré and the Laboratory for Hydrodynamics at the Sorbonne. There, she researched *Stokes flow*, which produces mathematical descriptions of viscous fluids (e.g. lava, paint, honey). She became the first mathematician from Bosnia and Herzegovina to have an international publication when the French Académie des Sciences distributed her paper *The extension of Hele-Shaw's method to cyclic movements*. Šnajder joined the revolutionary People's Front of Sarajevo during World War II, then later played a pivotal role in developing mathematical education in Yugoslavia. In 1949 she helped found, and became a professor at, the University of Sarajevo. Šnajder demonstrated a profound commitment to and leadership of STEM education in Yugoslavia, serving as Dean of Students twice at the University of Sarajevo and as President for the Society of Mathematicians, Physicists, and Astronomers of Yugoslavia.

Šnajder conducting experimental research at the Institut Henri Poincaré.

Daina Taimiņa
(Latvia, b. 1954)

Daina Taimiņa is a Latvian mathematician and artist best known for her innovations in representing hyperbolic space. She completed her training as a mathematician at the University of Latvia, where she received her master's degree, PhD, and higher doctoral degree (1992) in mathematics and computer science. At Cornell University in 1997, Taimiņa was to teach a geometry class involving *hyperbolic geometry* (see inset). At the time, weak and flimsy paper models of these geometric spaces were used in class to demonstrate their properties to students. Taimiņa realised she could apply her skills in crocheting to make more durable and solid representations of the same structures. Her models became a popular, pedagogically effective, and artistically meritorious way of explaining hyperbolic geometry to her students and the public. Taimiņa has published several books on mathematical art, education and history, most recently the 4th edition of *Experiencing Geometry: Euclidean and non-Euclidean with History* with David W. Henderson (American mathematician, 1939–2018).

Euclidean geometry assumes the sum of the angles in every triangle is 180°; in *hyperbolic* geometry, the sum of the angles in a triangle is strictly less than 180°. Above: a representation of the hyperbolic plane in $\mathbb{R}^3$ (*Global Warm(n)ing, 2008–2010 by Daina Taimiņa*).

Olabisi Ugbebor
(Nigeria, b. 1951)

Olabisi Oreofe Ugbebor was born in Lagos, Nigeria, and excelled during her primary and secondary schooling. She was awarded a Federal Government Scholarship to study mathematics at the University of Ibadan, and was the only woman in her class of seven. She continued her studies at University College London, receiving a PhD in 1976 while raising two children. Her thesis, titled *Sample Path Properties of Brownian Motion* (see below), and subsequent research led to several papers on financial mathematics. Her most cited papers study the *Black-Scholes Pricing Model*, a mathematical model used to estimate the future value of financial assets such as stock options. Following her graduate education, Ugbebor returned to Nigeria and began her decades-long career teaching at the University of Ibadan. Ugbebor became the first female professor of mathematics in Nigeria in 1998 and has held several senior roles at the University of Ibadan, including chair of the departmental student-staff committee and Acting Head of the Department of Mathematics. In 2017 she was awarded Fellowship of the Mathematics Association of Nigeria.

Brownian motion (named after Scottish botanist Robert Brown, 1773–1858) is the random motion of particles suspended in a liquid or gas, such as pollen in water or motes of dust in the air.

Dorothy Vaughan
(USA, 1910–2008)

Born in Kansas City, Missouri, Dorothy Vaughan obtained her B.A. in Mathematics from Wilberforce University, a historically Black university, in 1929. Although encouraged to pursue graduate studies, the financial calamity of the Great Depression forced her to instead accept a position as a high school mathematics teacher in Virginia to support her family. In 1943, as a result of US government recruitment of female mathematicians to support its war effort, Vaughan joined the National Advisory Committee for Aeronautics (*NACA*, the predecessor to NASA). She was assigned to the *West Area Computing Centre* in Langley, where federal segregation of government facilities at the time required Vaughan and her other black co-workers to use separate dining rooms and bathrooms from their white colleagues. In 1949, Vaughan became the head of the West Area Computing Centre, becoming the first African-American to be a supervisor of a NACA group. Vaughan worked at the frontier of electronic computing during the Space Race, becoming an expert FORTRAN programmer before retiring in 1971. Her successful career at NACA/NASA is partly included in the 2016 film *Hidden Figures*, and in 2019 Vaughan was posthumously awarded the Congressional Gold Medal.

Left: the first launch of *Scout B* in 1965. Before retiring, Vaughan contributed to the *Scout Launch Vehicle Program*, a family of rockets designed to place small payloads in orbit.

Poster sources Šnajder: Wikipedia; BH Futures Foundation; Gropp, H. *Mathematics in Bosnia–Herzegovina*, Proceedings of a Symposium held in Budapest on August 1, 2009 during the XXIII ICHST. (English). Praha: Matfyzpress, 2010. pp. 75–80; Vukovic, M. *Vera Šnajder, the first woman mathematician in Bosnia and Herzegovina*, (translated to English by Dragan Huterer), 2018. Taimina: Wikipedia, pi.math.cornell.edu/~dtaimina, dainataimina.blogspot.com, Youtube (TEDx talks). Ugbebor: britannica.com, mathshistory.st-andrews.ac.uk, Wikipedia, The Nation Newspaper: *Meet Nigeria's Queen of Mathematics* by Kofoworola Belo-Osagie, 2013. Vaughan: Wikipedia, NASA, *Hidden Figures: The American Dream and the Untold Story of the Black Women Who Helped Win the Space Race* by Margot Lee Shetterly, 2016.

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