

## Michael W. Bruford (1963–2023)

By Sean Hoban, Gernot Segelbacher, Cristiano Vernesi & Isa-Rita M. Russo

 Check for updates

**Conservation and livestock geneticist who made a significant and lasting contribution to biodiversity policy and the management of endangered species.**

**M**ichael W. Bruford, beloved and accomplished conservation geneticist, passed away on 13 April 2023 at the age of 59. His passing leaves a gulf in the hearts of hundreds of dear colleagues around the world. Mike spent a career at the forefront of evolutionary biology, conservation, molecular ecology and agricultural biodiversity. He focused on identifying the genetic basis of adaptation, exploring drivers of biodiversity and pioneering techniques for conservation genetics. He helped to establish the field of conservation genetics and increase its importance in conservation biology, and simultaneously worked to understand the history of domestication and the genetic diversity and distinctiveness of rare breeds. He also championed the inclusion of genetic diversity in policy and management. Throughout his career he was highly collaborative, and known for his warmth, humour and compassion.

Mike was born in Wales, UK, and grew up with a love of nature. He earned his PhD (1992) from University of Leicester where he studied hypervariable markers in the chicken genome. Mike joined the Zoological Society of London in 1990 where he made his first major contribution – applying cutting-edge tools from agricultural science to endangered species. He was one of the first to use microsatellite markers for understanding the ecology of threatened species, including tracking paternity. In 1987 he and Terry Burke forecasted that “DNA fingerprinting will be of great significance to studies of the sociobiology, demography and ecology of wild birds”. Mike joined Cardiff University in 1999, and for his 30+ year career there he continued to apply genetics and genomics to domesticated (goats, sheep and cows) and wild (mole rats, Komodo dragons, monkeys and rhinoceros, among many others) species.

We note just a few of his accomplishments in agricultural and conservation genomics. He worked on the genome sequencing of



the threatened and ecologically and culturally important saker falcon, identified genes under selection, and used molecular ecology to understand falcon migration pathways and conserve distinct populations. Meanwhile, he was involved in genomic studies of giant pandas, and used genetic tools to better estimate the number of living wild pandas. He was also one of the first to apply genetic markers to museum samples, documenting loss of genetic diversity in the Mauritius kestrel. Coinciding with his research interest in birds, he loved birdwatching; many colleagues remember conversations outdoors in which Mike would notice a bird, grab binoculars and quickly identify it with loud enthusiasm! On the agricultural side, he worked to understand the genetic subdivision, distinctiveness and history of sheep breeds. He was also an advocate for biobanks (the secure storage of tissues and DNA for future research and conservation). He directed [Frozen Ark](#) from 2016 and led the [CryoArks Initiative](#) to link UK zoological biobanks.

One of Mike’s lasting legacies is the application of research to policy and management. His early research included Cameroon rainforest birds, Sumatran orangutans and guanacos in Peru. Following his long-term international engagement, he led the EU programme ConGRESS (‘Conservation of Genetic

Resources for Effective Species Survival’), composed of 13 countries – one of the first major cross-border collaborations in conservation genetics. ConGRESS produced useful material for managers and policy-makers to understand and apply genetic concepts, including educational material, hands-on workshops, planning tools and decision trees. His inclusive nature inspired other initiatives such as [G-BiKE](#) (‘Genetic Biodiversity Knowledge for Ecosystem Resilience’), the NIMBioS (National Institute for Mathematical and Biological Synthesis) 2016 workshop on [next-generation genetic monitoring](#), and the [Coalition for Conservation Genetics](#). The usefulness of his work is further shown by a long list of nongovernmental organizations and governments he worked with, including the Durrell Wildlife Conservation Trust, Cap-eNature (South Africa), the Ryeland and Lley Sheep Societies, the UN Food and Agriculture Organization and the Welsh government.

Mike also co-initiated an IUCN [Specialist Group on Conservation Genetics](#) (CGSG) and was involved in many IUCN activities, such as providing other specialist groups with advice on population management. Mike also helped us to propose an IUCN [Resolution](#) at the 2020 World Conservation Congress, calling on the IUCN to integrate genetic diversity into all future IUCN activities, including planning protected areas, ex situ conservation, ecological restoration, species threat assessment, natural capital and the monitoring of biodiversity. He also worked to ensure that key biodiversity areas would safeguard genetic diversity and worked with [GEO BON](#) (Group on Earth Observations Biodiversity Observation Network) to define essential biodiversity variables. Interestingly, although well-travelled, Mike was also a passionate advocate of the Welsh language and culture.

Mike inspired us to continue efforts to achieve a dream that he had pursued for over a decade – to improve the protection of genetic diversity via the Convention on Biological Diversity (CBD). His commitment, insight and advice helped us to plan, propose and advocate for genetic diversity indicators at COP15 in December 2022.

Despite so many projects and commitments, he was extremely generous – available to help colleagues to meet deadlines,

plan events or write proposals. Importantly, Mike valued teaching and mentoring and inspired hundreds if not thousands of young scientists to work in biology and conservation. He was known for fascinating and inspiring lectures, and emanated enthusiasm, passion and energy. He supervised 67 PhD students and numerous postdoctoral researchers and gave them opportunities for leadership roles and new endeavours. Mike consistently elevated the voices of researchers who were younger and less experienced than himself.

He was committed to sustainability, serving as Dean for Environmental Sustainability at Cardiff University and helping to produce the university's climate emergency white paper and 'Ecosystem Resilience and Biodiversity Action Plan'. We would be remiss in omitting Mike's contributions to numerous journals, including *Heredity* (editor-in-chief, 2012–2016), *Animal Conservation*, *Endangered Species Research*, *Conservation Genetics Resources* and *Molecular Ecology*, the last of which he helped to establish as a leading publication in the field. He was on numerous boards and panels and founded an ecological restoration nongovernmental organization, Regrow Borneo. In 2003, he was awarded the

Scientific Medal of the Zoological Society of London and in 2020 received the ZSL Marsh Award for Conservation Biology. He was also a President's International Fellow of the Chinese Academy of Sciences (2018).


We will remember Mike for his remarkable, authentic and tireless spirit, which he kept until the end of the illness that took him too soon. We will also remember his humour, his love for nature, music, the Cardiff City and Welsh national football teams and food, as well as his deep commitment to his family. We will really miss his advice, mentorship, support and honesty.

### Additional information

S.H. (tree conservation biologist at The Morton Arboretum, USA) came to know Mike through the ConGRESS consortium, worked closely with him from 2010 on policy endeavours including in the IUCN and CBD, and travelled with him to numerous countries. G.S. (professor at University Freiburg, Germany) met Mike through the Population Genetics for Animal Conservation meeting in 2003 and worked with him on establishing and leading the IUCN CGSG. C.V. (group leader at the Fondazione Edmund Mach, Italy) first met Mike in 2003,

was inspired by him to work in conservation genetics, and collaborated on projects such as ConGRESS and G-BiKE. I.-R.M.R. (conservation biology lecturer at Cardiff University, UK) met Mike in 1999 at a microsatellite workshop in South Africa, joined his group as a postdoctoral researcher in 2010 at Cardiff and now co-coordinates the African region CGSG.

**Sean Hoban**  ,

**Gernot Segelbacher**  ,

**Cristiano Vernesi**<sup>3</sup>  & **Isa-Rita M. Russo**<sup>4</sup> 

<sup>1</sup>Center for Tree Science, The Morton Arboretum, Lisle, IL, USA. <sup>2</sup>Wildlife Ecology and Management, University Freiburg, Freiburg im Breisgau, Germany. <sup>3</sup>Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy. <sup>4</sup>School of Biosciences, Cardiff University, Cardiff, UK.

 e-mail: [shoban@mortonarb.org](mailto:shoban@mortonarb.org); [gernot.segelbacher@wildlife.uni-freiburg.de](mailto:gernot.segelbacher@wildlife.uni-freiburg.de); [cristiano.vernesi@fmach.it](mailto:cristiano.vernesi@fmach.it); [russoim@cardiff.ac.uk](mailto:russoim@cardiff.ac.uk)

Published online: 19 June 2023

### Competing interests

The authors declare no competing interests.