



## Members of the IUCN Technical Subgroup on Synthetic Biology and Biodiversity Conservation

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### Kent Redford



Kent is Principal at Archipelago Consulting ([archipelagoconsulting.com](http://archipelagoconsulting.com)) established in 2012 and based in Portland, Maine, USA. Archipelago Consulting was designed to help individuals and organizations improve their practice of conservation, and has worked with the Global Environment Facility, U.S. National Park Service, Moore Foundation, MacArthur Foundation, Packard Foundation and the American Zoo and Aquarium Association amongst others. Prior to Archipelago Consulting Kent spent 14 years at the Wildlife Conservation Society (WCS) in New York. Previously he spent five years as head of Science and Stewardship in The Nature Conservancy's Latin

American Division. He started his career with a decade on the faculty at University of Florida where he co-founded the Program for Studies in Tropical Conservation and the Tropical Conservation and Development Programs. He received his Ph.D. in Biology from Harvard University and has written numerous articles and books on synthetic biology and conservation, national parks, local peoples, conservation, and wildlife. He has organized and co-organized four meetings bringing together conservation biologists and synthetic biologists to discuss the future of nature in an increasingly synthetic world and currently serves as Chair of IUCN's Task Force on Synthetic Biology and Biodiversity Conservation.

### Luke Alphey



Luke Alphey leads the Arthropod Genetics Group at The Pirbright Institute. He works in the emerging field of genetic pest management, focusing particularly on synthetic biology approaches in mosquitoes. Prof Alphey holds a Wellcome Investigator Award to develop synthetic reduced-vector-competence for chikungunya virus, leads a Wellcome-MRC Newton Award programme to develop underdominance-based gene drive systems and is part of a consortium led by Kevin Esvelt (MIT) with funding from DARPA to develop "daisy drives", all in mosquitoes. Other major funding sources for the Group include BBSRC and EC-

H2020. Before moving to Pirbright in Feb 2014 he was the Research Director of Oxitec Ltd, a spin-out company from Oxford University that he co-founded in 2002. Oxitec aims to control insect pests by use of engineered sterile males of the pest insect species ('RIDL males'). Oxitec successfully conducted the world's first outdoor experiments with a GM insect in the USA in 2006, and in 2010 showed that a wild mosquito population could be suppressed by this genetics-based method. In August 2015 Intrexon Inc. announced an agreed offer to acquire Oxitec for \$160m. Prof Alphey was selected as a Technology Pioneer of the World Economic Forum in 2008 and BBSRC Innovator of the Year 2014.

### Elizabeth Bennett



Elizabeth Bennett is the Vice President for Species Conservation at the Wildlife Conservation Society (WCS). She received her Ph.D. from Cambridge University for research on the ecology of primates in Peninsular Malaysia. She moved to Sarawak in 1984, and worked there for the next 18 years. This started by conducting the first ever detailed field study of the proboscis monkey, followed by studies of the effects of hunting and logging on wildlife. Her time in Sarawak culminated in her leading a team, with WCS and Sarawak Government staff, to write a comprehensive wildlife policy for the State, and subsequently to head a unit within the Government to oversee its implementation.

After that, she became Director, Hunting and Wildlife Trade Program at WCS. This included working with WCS field staff to develop strategies to address the bushmeat trade in Central Africa and the illegal wildlife trade in China. Her current role involves overseeing WCS's species conservation programmes globally. Liz has trained wildlife practitioners at many levels, including post-graduate students and government wildlife staff in Sarawak, Sabah, Myanmar and China. She has published widely, with more than 130 scientific and popular publications. Her services to conservation have been recognized by her being awarded the "Golden Ark" award by Prince Bernhard of the Netherlands, "Member of the Most Excellent Order of the British Empire" (MBE) by Her Majesty Queen Elizabeth II, D.Sc. (*honoris causa*) by Nottingham University, UK, and Merdeka Award for Outstanding Contribution to the People of Malaysia.

## Thomas Brooks



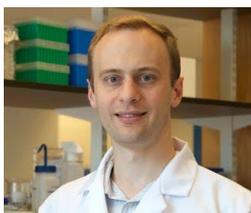
Thomas Brooks is Chief Scientist at the International Union for Conservation of Nature (IUCN), based in Gland, Switzerland. His responsibilities include scientific support to the delivery of knowledge products under IUCN standards (such as the IUCN Red List of Threatened Species), maintaining IUCN interaction with peer scientific institutions, and strengthening the Union's culture of science. Originally from Brighton, UK, he holds a B.A. (Hons) in Geography from the University of Cambridge (1993) and a Ph.D. in Ecology and Evolutionary Biology from the University of Tennessee (1998). He has previously worked for The Nature Conservancy (1998–1999), Conservation International (1999–2010), and NatureServe (2010–2012). His background is in threatened species conservation (especially of birds) and in biodiversity hotspots (he has extensive field experience in tropical forests of Asia, South America and Africa). He has authored 250 scientific and popular articles, including 121 indexed in the ISI 'Web of Science'.

## Hilde Eggermont



Hilde is a biologist by education, and completed 10 years of postdoctoral research in paleolimnology (Afrotropics). Since 2012, she is coordinator of the [Belgian Biodiversity Platform](#), a science-policy interface for biodiversity and ecosystem services in Belgium. I am acting as Belgian focal point for the Intergovernmental Platform for biodiversity and ecosystem services ([IPBES](#)), and Vice-Chair of the [BiodivERsA Partnership](#) (a network of 35 national and regional funding organisations promoting pan-european research on biodiversity and nature-based solutions). Hilde is also Belgian focal point for IUCN, member of the IUCN European Policy Advisory Group (EUPAG), and IUCN Regional Councillor for Western Europe. Her main interests/expertise include science-policy interfacing, research programming and promotion, and horizon scanning activities (some 40+ peer-reviewed papers).

## Kevin Esvelt



Kevin M. Esvelt is an assistant professor of the MIT Media Lab, where he leads the Sculpting Evolution Group in exploring evolutionary and ecological engineering. He received his Ph.D. from Harvard University for inventing a synthetic microbial ecosystem to rapidly evolve useful biomolecules, and subsequently helped pioneer the development of CRISPR, a powerful new method of genome engineering.

In 2013, Esvelt was the first to identify the potential for CRISPR “gene drive” systems to alter wild populations of organisms. Recognizing the implications of an advance that could enable individual scientists to alter the shared environment, he and his colleagues chose to break with scientific tradition by revealing their findings and calling for open discussion and safeguards before they demonstrated the technology in the laboratory. At MIT, the Sculpting Evolution Group develops safer “[daisy drives](#)” that only spread locally, as well as ways of restoring populations to their original genetics. Together with the communities of Nantucket and Martha's Vineyard, they are advancing the “Mice Against Ticks” project aiming to prevent tick-borne disease. Other research interests include unraveling the workings of molecular evolution, controlling the fitness of microbes in the gut, and reducing animal suffering. An outspoken advocate of freely sharing research plans to accelerate discovery and improve safety, Kevin seeks to use gene drive as a catalyst to reform the scientific ecosystem.

## Todd Kuiken



Dr. Todd Kuiken is a Senior Research Scholar with the Genetic Engineering and Society Center at NC State University where he explores the scientific and technological frontier, stimulating discovery and bringing new tools to bear on public policy challenges that emerge as science advances. He previously was the principal investigator on the Woodrow Wilson Center's Synthetic Biology Project. He has numerous projects evaluating and designing new research and governance strategies to proactively address the biosafety, biosecurity and environmental opportunities/risks associated with emerging genetic technologies; including a project to ensure safety and security within the rapidly expanding community of amateur biologists and the growing network of community laboratories and maker spaces. Dr. Kuiken is a member of the United Nations Convention on Biological Diversity Ad-Hoc Technical Expert Group on Synthetic Biology. He has also worked with the United Nations Treaty for Plant Genetic Resources for Food and Agriculture to assess whether de-materialization and digitization of data will affect the structure, function and viability of the Treaty. He is also a member of the executive committee on human practices for the International Genetically Engineered Machines competition and a founding member of its

biosafety/biosecurity committee. He received a B.S. in Environmental Management and Technology at Rochester Institute of Technology, an M.A. in Environmental and Resource Policy from The George Washington University and earned his Ph.D. from Tennessee Tech University where his research focused on the air/surface exchange of mercury associated with forest ecosystems.

### **Nicholas Macfarlane**



Dr Nicholas Macfarlane is part of IUCN's Science & Knowledge Unit, in the Policy & Programme Group. Based in Washington DC, Nicholas comes to IUCN from the Ocean Studies Board at the US National Academy of Sciences. He has a PhD in Biology from MIT and in Oceanography from the Woods Hole Oceanographic Institution, an MSc in Technology and Policy from MIT, and a BA in Psychology and Neuroscience from Princeton. Originally from Canada, Nicholas has field experience from Florida, Spain, Honduras, Indonesia, and Ecuador, and is fluent in all three of IUCN's official languages.

### **Daniel Masiga**



Dr Masiga is a Principal Scientist and Head of Animal Health Theme. He leads a diverse group that conducts research to understand the biology of vectors of livestock diseases, primarily tsetse flies and ticks. He is also interested in vector-pathogen interactions, and the molecular basis of behaviours, such as the chemosensing that enables disease vectors to navigate their environments. He uses genomics and associated bioinformatics analyses to drive his research, with a focus on neglected tropical diseases.

Dr Masiga considers building capacity of young African scholars as a major investment of the resources at his disposal as team leader.

### **Maria Julia Oliva**



Maria Julia Oliva is Senior Coordinator for Policy and Technical Support at the Union for Ethical BioTrade (UEBT) since 2009. In this capacity, she provides training, advice and technical support for UEBT members and partners on issues such as equitable trade practices and access and benefit sharing. Julia has held several positions in international organizations and published widely on the interface between sustainability, trade and intellectual property. She is a member of the IUCN Commission on Environmental Law and the Board of Directors of IP-Watch, an independent reporting service on intellectual property issues. She has a law degree from the University of Mendoza and a Masters of Laws (LL.M) in environmental law, cum laude, from Northwestern School of Law at Lewis and Clark College.

### **Ryan Phelan**



Ryan Phelan is Co-founder and Executive Director of Revive & Restore, a nonprofit organization with a mission to enhance biodiversity through the genetic rescue of endangered and extinct species. Ryan works with some of the world's leading molecular biologists, conservation biologists, and conservation organizations to develop pioneering genetic rescue projects. The goal is to use cutting-edge genomic technologies to solve previously intractable wildlife conservation challenges such as those posed by inbreeding, exotic diseases, climate change, and destructive invasive species.

Since the inception of Revive & Restore in 2012, Ryan has brought together diverse groups of scientists and conservation practitioners in a series of meetings and workshops to advance the field of genetic rescue. The first of these was the 2013 TedXDeExtinction meeting, which explored the idea of reviving extinct species and re-introducing them to the wild. For the 2016 IUCN World Conservation Congress, she organized the first significant workshop on genetic rescue, with both a public and a private event. In 2017, in partnership with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), Ryan organized the "Engineering Resilience" workshop, which was modelled on Revive & Restore's highly successful "New Genomic Solutions for Conservation" workshop in 2015.

Ryan is a serial entrepreneur, active in both the for-profit and nonprofit worlds. She was the founder and CEO of two innovative healthcare companies: DNA Direct, the first medical genetics company to focus on bringing personalized medicine to the consumer, and Direct Medical Knowledge, a consumer health web site unique for its content depth and innovative search interface.

## Gernot Segelbacher



Gernot Segelbacher is working as professor at the University of Freiburg in Germany, where his research focus is on the application on genetic and genomic technologies for conservation. He is especially interested in bridging the gap between scientists and conservation managers and has been involved in several initiatives focusing on (such as ConGRESS) <http://www.congressgenetics.eu/Default.aspx>. He is also co-Chair of the Conservation Genetics Specialist Group (CGSG) which goal is to make the importance and relevance of genetic diversity more visible and increase its impact and application within IUCN and worldwide.

## Lydia Slobodian



Lydia Slobodian is a Legal Officer with the IUCN Environmental Law Centre, based in Bonn. She manages a portfolio on legal frameworks and tools related to biodiversity. She supports development of legal and policy frameworks governing access and benefit sharing in relation to genetic resources, and advises countries on implementation of the Nagoya Protocol, including implications of synthetic biology and related technologies for traceability of genetic resources and sharing of benefits. Lydia leads the IUCN delegation to the inter-governmental conference on marine biodiversity of areas beyond national jurisdiction.

## Delphine Thizy



Delphine Thizy is the Stakeholder Engagement Manager of Target Malaria, a non-for-profit consortium of researchers developing an innovating vector control approach to save millions of lives from malaria. She has over 10 years of experience in the field of stakeholder engagement in lower-income countries, with a particular attention on conflict drivers. After receiving her Master's Degree in development studies and project management from the University Pierre Mendes France (Grenoble, France), she worked in advocacy for Palestinian farmers' rights before holding several positions within PlanNet Finance in the Middle East and South Asia. There she was responsible for technical

assistance to microfinance institutions in post-conflict countries as well as leading a team for capacity strengthening of various civil society groups.

Afterwards she joined a consultancy company, Channel Research, specialising on social impact of projects. In that role she conducted a number of projects evaluations in the field of humanitarian aid and development for a variety of donors and organisations – including the European Commission, members of the Red Cross and Red Crescent Movement and private foundations. After creating her own consultancy company she specialised in social performance and stakeholder engagement for infrastructure and extractive industries. She led several teams for large social impact assessments across Africa.

Since 2014 she became the Stakeholder Engagement Manager of Target Malaria and works with teams in Mali, Uganda and Burkina Faso, as well as at the global level to engage stakeholders to co-develop and share an innovative long-term, sustainable and cost-effective vector control technology.

## Dan Tompkins



Dan Tompkins leads the science strategy for Predator Free 2050, New Zealand's initiative to eradicate invasive predators for the benefit of native biodiversity, as the Project Manager for Predator Free 2050 Ltd. Dan is a Member of the New Zealand National IUCN Council and the IUCN Invasive Species Specialist Group, and is an Honorary Professor at the University of Otago.

An ecologist and epidemiologist by training, with degrees from Cambridge University and the University of Oxford, Dan's past research includes: exploring novel high-tech approaches to pest control (including the 'Trojan Female Technique' approach to fertility control); understanding the interactions among species in the New Zealand mammal pest community; demonstrating the efficacy of oral BCG vaccination for TB control in brushtail possums; and demonstrating the role of shared diseases in native species declines (including the UK red squirrel)

## Madeleine van Oppen



Madeleine was originally trained in marine ecology, developed as an ecological geneticist post-MSc and begun to study corals in 1997 and coral-associated microorganism in 2000. Madeleine's current research focuses on the field of coral reef restoration, in particular the development of coral stock better able to cope with disturbed environments and predicted future ocean conditions. This includes the manipulation of microbial communities associated with corals, laboratory evolution of algal endosymbionts, selective breeding of corals, and the conditioning (i.e., transgenerational acclimation) of corals to predicted future ocean conditions (i.e., assisted evolution). Recently, she has begun to explore synthetic biology as an approach to increase climate resilience of corals.

Madeleine completed her PhD on the molecular biogeography of seaweeds at the University of Groningen (Netherlands) in 1995, and subsequently conducted postdoctoral positions at the University of East Anglia, UK (Speciation in Cichlid fishes), and James Cook University, Australia (Molecular relationships in the coral genus *Acropora*, and Genetic diversity and specificity of acroporid coral-dinoflagellate symbioses). In 2001, she took up a position at the Australian Institute of Marine Science (AIMS), Townsville. She commenced as a professor in the School of BioSciences, University of Melbourne, in 2015, while still maintaining a part-time position as Senior Principal Research Scientist at AIMS.

## Gerd Winter



Gerd Winter was born in Diepholz/Germany 1943. He studied law and sociology at Freiburg, Lausanne, Göttingen, Konstanz and New Haven. Academic degrees: First and Second Juridical State Examination, Lic. rer. soc. (Konstanz), Dr. iur. (Göttingen) and Dres. iur. h. c. (Luzern and Tbilisi). Since 1973 he is professor of law and the sociology of law at the University of Bremen. From 1987-1994, Gerd was Co-director of the Center for European Law and Policy (ZERP). In 1994 he founded the Research Centre for European Environmental Law (FEU) ([www.feu.uni-bremen.de](http://www.feu.uni-bremen.de)) which he directed until 2016. He has extensive experience with interdisciplinary projects involving law, sociology and natural sciences, including in relation to biotechnology and dangerous chemicals. Gerd has been an expert at hearings and member of expert committees on law reform, including on biotechnology. Teaching and publications on administrative and environmental law in comparative, EU and international perspectives. He is Member of the German Association of Constitutional Law Teachers (VVdStRL) and the IUCN World Commission of Environmental Law (WCEL). Further, he is Secretary of the Avosetta Group of European environmental lawyers ([www.avosetta.org](http://www.avosetta.org)), Member of the editorial boards of *Gaia - Ecological Perspectives for Science and Society*, and *Journal of Environmental Law (JEL)*, and Counsel in various administrative inquiries and court proceedings concerning industrial and infrastructure projects in Northern Germany. He is a legal consultant in different developing and transition countries concerning administrative and environmental law reform, with a focus on Georgia.