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Brave New World:

Can we solve tomorrow's problems by using life itself?

Hear what four eminent scientists have to say about how modern technology has advanced our botanical understanding and how life itself might be the key to solving the world's environmental and energy crises.

- The recent anniversaries of Charles Darwin's birth and his publication of 'On the Origin of Species' raised awareness of the role of adventurous naturalists and industrious scientists and their endeavours to explain the interconnectedness of all living things and map the evolution of life. It also brought into focus our modern appreciation of life and all its manifestations.
- The technological revolution of the last thirty years has been accompanied by an equally revolutionary advancement in our understanding of evolution from a molecular perspective. Thanks to modern techniques, we can clone and even synthesise DNA, sequence genes and study life as never before. Our pace of learning has been growing exponentially and we will learn more about genetics and the variety of life in the next 10 years than we have in all of human history.
- We have discovered that most of the Tree of Life is invisible to us and is made up of an amazing diversity of microorganisms – including bacteria, fungi, Archaea and unicellular plants and animals such as plankton. We have found microorganisms living in every environment of the biosphere, including the acid of our gut, hot springs, high in the atmosphere and deep in the Earth's crust.
- And sailing into these modern frontiers of the unknown are Darwin-like explorers, such as Craig Venter. This American biologist and entrepreneur, most famous for being one of the first to sequence the human genome, recently sailed around the world conducting an ocean exploration genome project with the goal of assessing the genetic diversity in marine microbial communities. From the first five ocean samples, this team grew the number of known genes on the planet by 10 times and the number of genes involved in solar energy conversion by 100 times.
- This botanical congress is testimony to the importance of plants to humans and life as we know it. Plants feed us, nurture our spirits (biophilia), underpin every ecosystem and fuel much of our energy needs. It will highlight the environmental crises we currently face and the challenges and benefits of conserving ecosystems, using plants as biofuels, trees for carbon sequestration etc.
- However, microorganisms represent most of the Tree of Life. Does biotechnology based on *microorganisms* hold the answers to solving the world's environmental and energy crises? The time might be right to prioritise research into microbes that convert CO₂ into biomass, biomass into biofuels, reduce carbon emissions by converting coal into natural gas, control undesirable organisms, produce industrial chemicals, and assist in sewage and other waste treatments.

SPEAKERS' DETAILS



Robyn Williams is Australia's best-known scientific journalist whose knowledge and passion makes science interesting to just about everyone. He has conducted countless interviews with scientists on ABC TV on programs such as *Quantum* and *Catalyst*, and presents Radio National's *Science Show*, *Ockham's Razor* and *In Conversation*. As moderator of this forum he is guaranteed to bring out the best in his interviewees and generate audience participation.



Kirsten Heimann established the North Queensland Algal Identification/Culturing Facility within the School of Marine and Tropical Biology at James Cook University in Townsville. She leads a research team focusing on the effects of toxic chemicals on life forms and the development of micro algae for the remediation of carbon and nutrient pollution. The biomass generated from industrial-scale remediation sites can be used for the commercial production of fertilizers, animal feeds, health products and biofuels. Kirsten most recent award was the Queensland Telstra Business Women – Nokia Innovation Award in 2010.



Kevin Thiele is a plant taxonomist and an unashamed enthusiast for naming (and at times renaming) multicellular, lignified, photosynthesizing life forms. He is also a committed environmentalist who once ran for the Greens in a Victorian State election on a platform that saving the planet is more important than GDP, border security and law and order combined, and that one day environmentalists will become such a threat to the Liberal and Labor parties that they'll forget their differences and form a coalition to keep us out. He also heads the Western Australian Herbarium, a botanical research institution embedded in a global biodiversity hotspot where new species of plants are still discovered on almost every field trip.



Jeff Powell became fascinated with the ecology of soils after learning of the complex relationships occurring beneath our feet. Described as the "poor man's tropical rainforest", the soil is home to a plethora of species waiting to be discovered. Even severely damaged soils are not free of life; in fact, these soils breed the microorganisms that could potentially lead to their rehabilitation. Thanks to rapid advances in molecular technologies (and the funding opportunities that go along with them); we are finding many of these organisms for the first time.



David Mabberley has a distinguished career which has led to his being recognised as an eminent botanist, historian of science and authority on botanical art. He was awarded the Engler Medal in 2009 for his internationally acclaimed 'Mabberley's Plant-Book', which gives an overview of the world's flora and is currently in its third edition. He is about to take up the role of Executive Director at the Royal Botanic Gardens and Domain Trust in Sydney and lead Australia's oldest botanic garden and scientific institution towards its 200th anniversary in 2016.