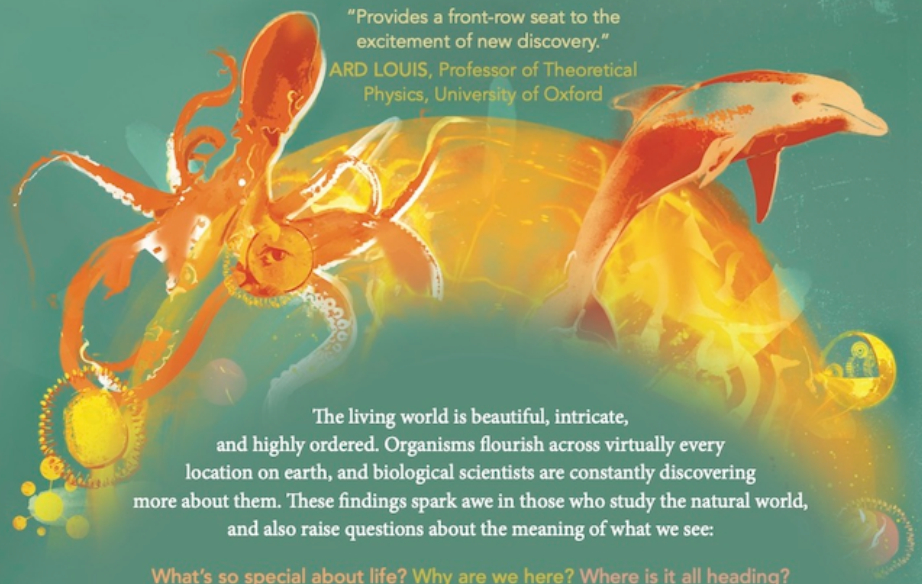

"Provides a front-row seat to the excitement of new discovery."
ARD LOUIS, Professor of Theoretical Physics, University of Oxford

The living world is beautiful, intricate, and highly ordered. Organisms flourish across virtually every location on earth, and biological scientists are constantly discovering more about them. These findings spark awe in those who study the natural world, and also raise questions about the meaning of what we see:

What's so special about life? Why are we here? Where is it all heading?

Drawing on the thoughts of six scientists of faith, the work of the theologian Alister McGrath, and the biblical scholar Hilary Marlow, Dr Ruth M. Bancewicz examines their research to assess the claim that the discoveries of science are consistent with the existence of a God.

Beautifully and creatively illustrated, *Wonders of the Living World* will inspire curiosity and amazement, and prove a fascinating guide to your thinking about the meaning of life.

FEATURING THE WORK OF: Prof. Stephen Freeland, *Astrobiologist*; Dr Rhoda Hawkins, *Theoretical Physicist*; Prof. Jeff Hardin, *Cell and Developmental Biologist*; Prof. Simon Conway Morris, *Palaeobiologist*; Prof. Jeff Schloss, *Evolutionary Biologist*; Dr Margaret Miller, *Marine Biologist*.

Supporting resources for this book can be found at wondersofthelivingworld.org.

DR RUTH M. BANCEWICZ previously worked in genetics and cell biology, and is now the Church Engagement Director at The Faraday Institute for Science and Religion, a Research Associate of St Edmund's College, University of Cambridge, and a member of the UK-based organization Christians in Science.

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WONDERS OF THE LIVING WORLD RUTH M. BANCEWICZ

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# WONDERS OF THE LIVING WORLD

ILLUSTRATED BY DANNY ALLISON

CURIOSITY, AWE, AND THE MEANING OF LIFE

# WONDERS OF THE LIVING WORLD

"In this beautifully illustrated book the wonders of the living world are seen through the eyes of six high-profile scientists. Full of fascinating insights, the book describes the world in a way that is accessible to those with or without any science background. A highly recommended journey."

**Dr Denis R. Alexander**, Emeritus Director, The Faraday Institute, Cambridge

"This beautiful book entices the reader with full-color artwork on every page, engaging personal stories, and exciting scientific findings. Along the way we meet several scientists, hearing their stories of the challenges of science and of the joys of discovery, and learn how science fits with their Christian faith. Readers are invited to revel in the wonders of the natural world and to ponder the larger 'why' questions that science alone can't answer, such as meaning, beauty, and God. A great book for science fans, pastors, and students."

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"This is a wonderful book about wonder. In the presence of the world's top scientists this will lead you into a new excitement with and appreciation of the natural world. And for some, it may lead to worship."

**Revd Professor David Wilkinson**, Principal of St John's College, Durham

"This beautifully produced book by Ruth M. Bancewicz really draws us into the excitement of scientific discovery. It's a lively combination of cutting edge research and the personal stories of scientists, both of which show us how science and faith can be friends not foes, each in their own way leading us into the wonder of the world we live in. A great read for a young adult and a great gift too for anyone wondering how faith and science fit together."

**Rt Revd Dr David Thompson**, former Bishop of Huntingdon

"*Wonders of the Living World* explores scientific discovery and its interaction with beliefs in a fresh and much-needed way: not simply through reasoned argument, but also by awakening the imagination and instilling a sense of awe. Bancewicz deftly considers how the beauty and intricacy in nature, uncovered by scientific pursuit, is helpful in addressing questions of ultimate meaning and purpose. I highly recommend it!"

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"When I picked up this book, I couldn't put it down. On every page another wonder of the natural world was beautifully described, with text wrapped around charming illustrations. The explanations are mixed in with the personal stories of scientists, providing a front-row seat to the excitement of new discovery."

**Ard Louis**, Professor of Theoretical Physics, University of Oxford

RUTH M. BANCEWICZ

# WONDERS OF THE LIVING WORLD

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# Contents

# Chapter 1

## Exploring the Wonders of the Living World:
*An introduction*

The internet was not the first major network on earth. Underneath the ground in any healthy forest are literally tonnes of fungi growing around the roots of the trees. These partner-organisms share nutrients with the trees, occasionally popping up a fruiting body or mushroom to release their spores into the wider world. The fungi spread so far that they connect the trees together, so nutrients are not just shared between a single sapling and the fungus growing on its roots, but also between one tree and another. The interconnectedness of the network can be measured in a simple experiment in which a traceable substance fed to one tree shows up in the roots of another tree elsewhere in the network.

This link between trees and their fungi is a great example of science revealing aspects of the world that would otherwise be completely hidden to us. As we start to understand how things work, our initial curiosity may lead to surprise, fascination, and a more lasting sense of wonder.

This book explores seven different aspects of the living world, starting with the microscopic and gradually zooming out to whole ecosystems. Each chapter is a story in itself, demonstrating the great beauty and wonder of our planet and the organisms that make their home on it. Together, these stories paint a picture of a place that is fruitful, ordered, and bursting with potential for many different kinds of life.

Our journey begins with a tour of the inner world of the cell, and the secret recipes for growth and development that are hidden inside its biological libraries. The chemical language of life has amazing properties: as a system for storing and passing on biological information, it may be one in a million. We see the constant movement of tiny molecules coming together like the dots in an impressionist's painting to make up a complete cell. Then, on a slightly larger scale, we look at how groups of cells can work together, multiplying and moving in a highly coordinated dance as they grow from an embryo into a newborn baby.

From here we explore how, over a long period of time, organisms hit upon new solutions to the challenges of life on earth. Different species often find similar ways to thrive, as if they were following well-worn paths in a map of life. One of the most important survival techniques is working together. From single cells to whole organisms, living things "snuggle" for existence. At the very largest scale, whole

ecosystems are like living cities, providing homes and services to millions of different organisms.

As we step back and take in the big picture, our sense of wonder in discovery can turn to awe as we observe the scale and complexity of the living world. When we understand more about our surroundings, we also start to ask new questions. Each topic in this book has been chosen because it touches at the heart of who we are as human beings, raising questions about meaning and purpose. What's so special about life? Why are we here? Where is it all heading?

Many of these questions can be tackled at a scientific level, but they also point to areas of knowledge that lie beyond science. The scientists who have contributed their thoughts to this book are all people of faith who take these sorts of discussions very seriously. They believe that their work is consistent with the existence of the God of the Bible, so toward the end we will also explore how their views fit in with Christian theology.

Each reader will approach questions of science, meaning, and purpose in a different way. Some may be fairly sure that God exists, and others might not. Many Christians will be confident that the book of Genesis speaks in theological and not scientific terms, so there is no problem with a Christian accepting evolutionary biology. Others may take a different view. The aim of this book is not to cover the issue of creation and evolution in depth, because others have already done that in helpful ways. This book is just an introduction – which will be enough for some, but frustratingly brief for others. The further reading section provides a list of books for readers who want to follow up these topics in more depth (pages 187–88).

Our aim here is simply to showcase the work of six scientists so you can share their sense of wonder and awe, and begin to think about the questions of meaning and purpose that they are asking – including the ultimate question of what this planet is for. We hope that you find this journey through the living world fascinating, exciting, and inspiring.