

First published in Great Britain in 2022 by Wren & Rook

Text copyright ©Tim Peake, 2022
Illustration copyright © Max Rambaldi, 2022

All rights reserved.

The right of Tim Peake and Max Rambaldi to be identified as the author and illustrator respectively of this Work has been asserted by them in accordance with the Copyright, Designs & Patents Act 1988.

ISBN: 978 1 5263 6361 9
E-book ISBN: 978 1 5263 6362 6
1 3 5 7 9 10 8 6 4 2



Wren & Rook
An imprint of
Hachette Children's Group

Part of Hodder & Stoughton
Carmelite House
50 Victoria Embankment
London EC4Y 0DZ

An Hachette UK Company
www.hachette.co.uk
www.hachettechildrens.co.uk

Printed in China

Designed by Nigel Baines
Additional images supplied by Nigel Baines
With thanks to Christine Tursky

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of the publisher, nor be otherwise circulated in any form of binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

The website addresses (URLs) included in this book were valid at the time of going to press. However, it is possible that contents or addresses may have changed since the publication of this book.

THE
COSMIC
Diary OF OUR
INCREDIBLE
UNIVERSE

TIM PEAKE

With **STEVE COLE**

Illustrated by Max Rambaldi

wren
& rook



**If found
please
return this
book to:**

Small planet
travelling around
a middle-aged
star called the
Sun

Seven other
planets also spin
around the Sun,
along with asteroids,
comets and dwarf
planets

The Solar System
is surrounded
by this distant
bubble of icy
objects

The Sun is one
of about 800
million stars in this
section of space

The Earth
Solar System

Oort Cloud

Orion Arm

Milky Way

Local Group

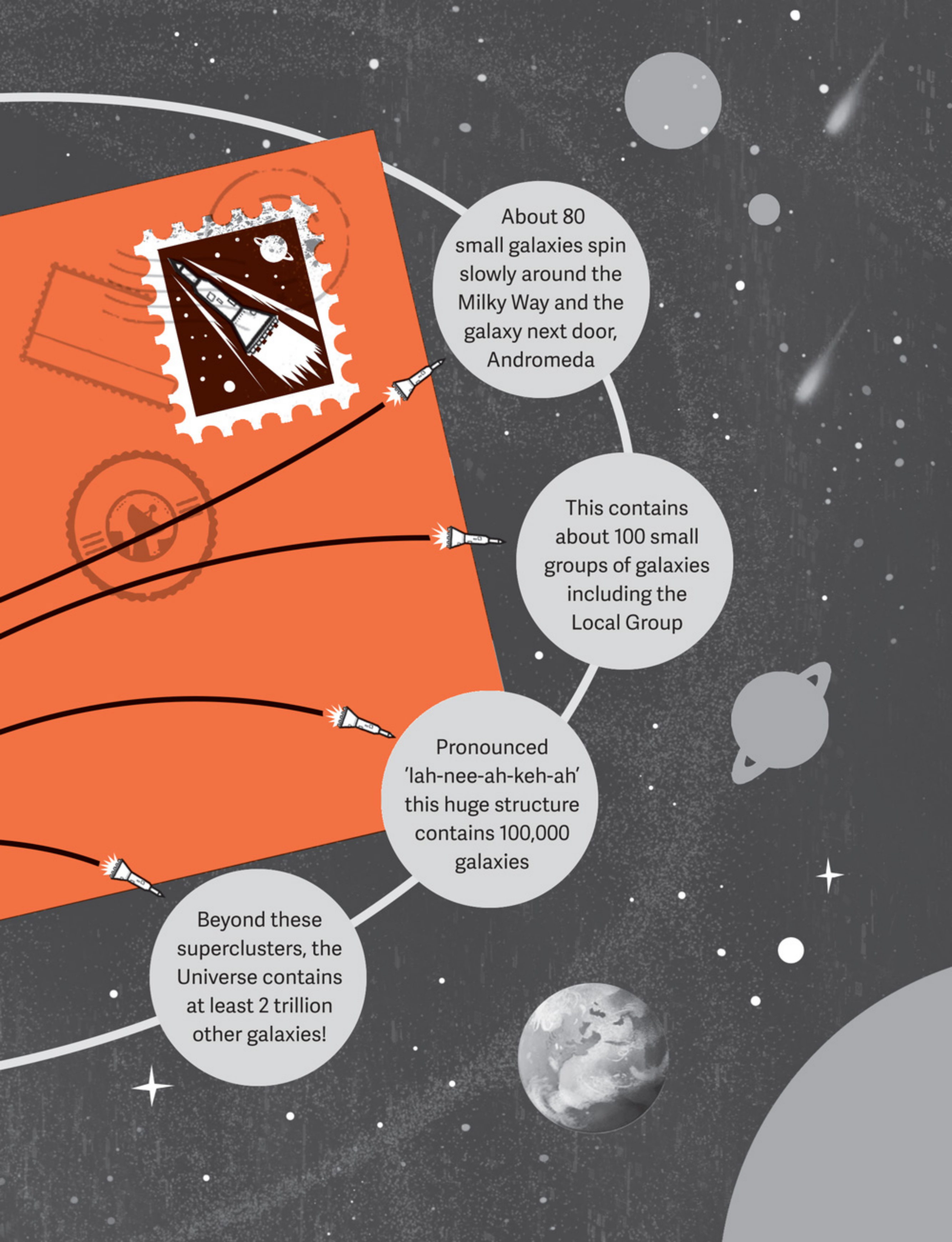
Virgo Supercluster

Laniakea Supercluster

The Universe

This is our galaxy –
a group of at least
100 billion stars
and 100 billion
other planets





The infographic is set against a dark, starry background. On the left, a large orange trapezoidal shape contains three postage stamps: a rocket, a satellite, and a person. Four black lines with rocket icons at their ends extend from the orange shape to four circular callouts. The callouts are arranged in a descending spiral from top-left to bottom-left. The background also features a large grey planet, a ringed planet, and a detailed Earth.

About 80 small galaxies spin slowly around the Milky Way and the galaxy next door, Andromeda

This contains about 100 small groups of galaxies including the Local Group

Pronounced 'lah-nee-ah-keh-ah' this huge structure contains 100,000 galaxies

Beyond these superclusters, the Universe contains at least 2 trillion other galaxies!

Contents

**Introduction
from
Tim Peake**



**Chapter 1:
Bang!
I'm Here!**



**Chapter 4:
A Star Is Born**



8

16

18

32

52

70

92

108

**Meet the
Experts**



**Chapter 3:
Let There
Be Light
(and Dark)**



**Chapter 2:
Battle of
the Particles**



**Chapter 5:
Black Holes
and Other
Heavy Stuff**



**Chapter 6:
Growing
a Galaxy**





**Chapter 9:
A Universe
of Wonders**



Afterword



**Chapter 8:
Coming
to Life**



**Shoot for
the Moon!
(Resources)**

136

158

176

194

206

208

216

217



**Chapter 7:
Planet
Power!**



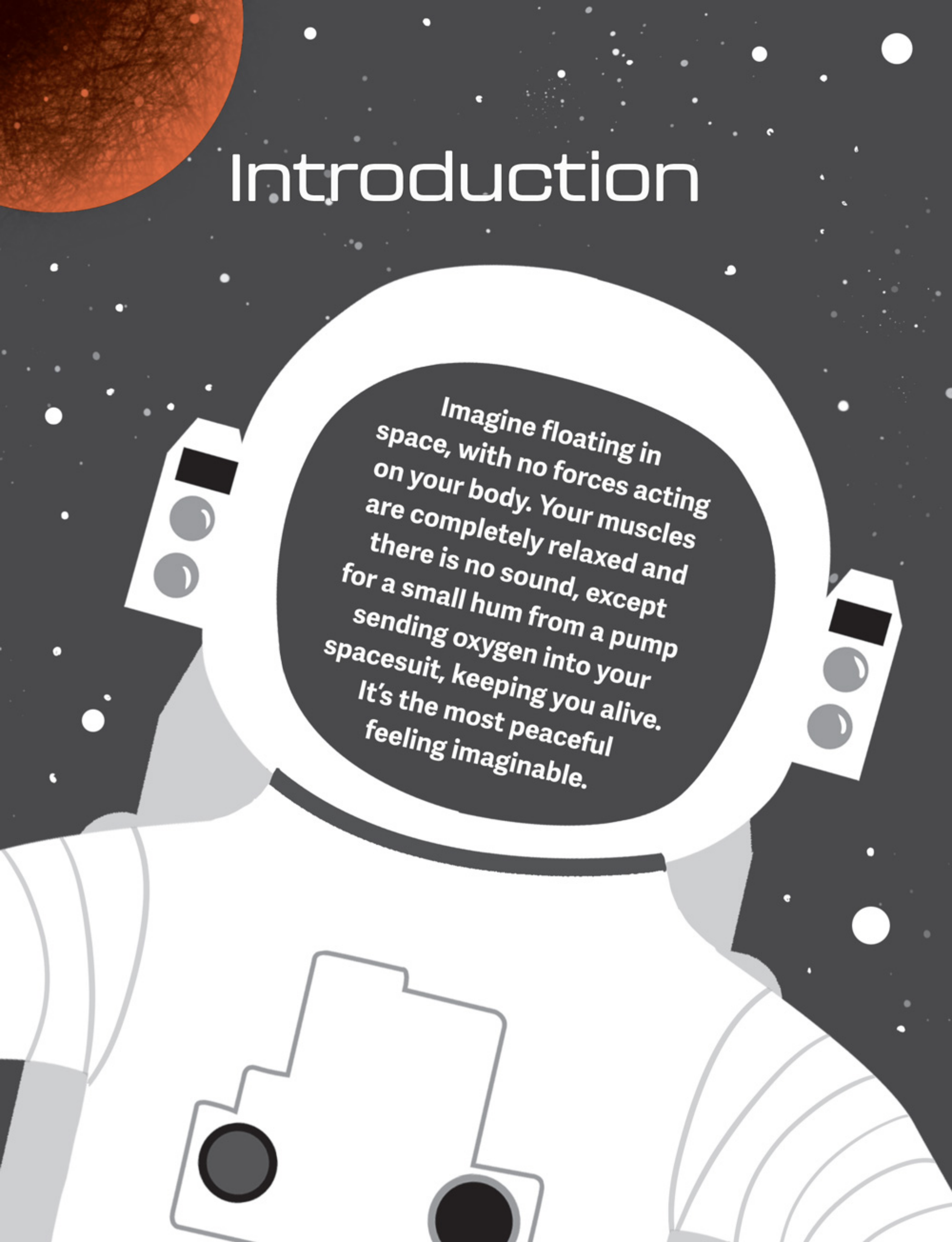
**Chapter 10:
The Far-Flung
Future of
the Universe**

i

**Glossary
and Index**

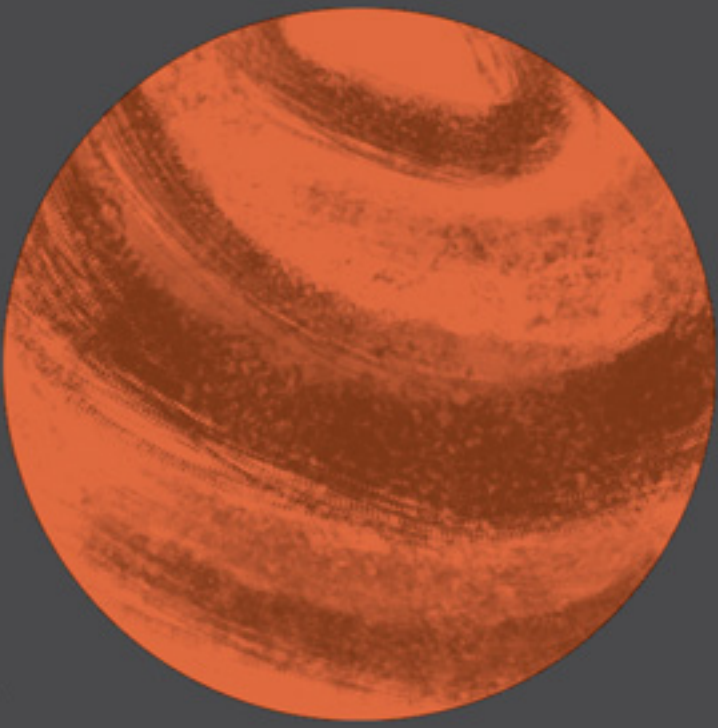


**Trailblazing
Scientists
from Around
the World**

An illustration of an astronaut in a white spacesuit floating in space. The astronaut's helmet is white with a dark circular visor. Inside the visor, there is a dark grey oval containing white text. The astronaut's arms are visible, with white gloves and suit details. The background is a dark grey space filled with white stars of various sizes. In the top left corner, a large, textured orange planet is partially visible.

Introduction

Imagine floating in space, with no forces acting on your body. Your muscles are completely relaxed and there is no sound, except for a small hum from a pump sending oxygen into your spacesuit, keeping you alive. It's the most peaceful feeling imaginable.



Over one shoulder you see a **beautiful planet**, full of colour: blue oceans, white clouds, orange deserts and green forests. That's Earth. That's where you were born. The planet itself looks alive – electrical storms light up the night sky, volcanoes leave trails of smoke, **swirling hurricanes** form over **warm oceans** and the eerie lights of the aurora dance over the poles. It's comforting to look at. It's home.

You look over the other shoulder. It's black. In fact, it's the blackest black you have ever seen. It's so dark you feel like you are falling into it, being sucked towards an **infinite black universe**. It's not comforting to look at. In fact, it's quite scary.



As you **effortlessly** orbit the Earth you pass from daylight to night. The Sun quickly sets and suddenly the Universe comes alive. Stars appear over the horizon and you can see the familiar planets of Venus, Mars, Jupiter and Saturn. Hundreds of billions of stars now come into view, shining their pinpricks of light through the blackness.

Your mind is trying to make sense of what you are seeing. On the one hand, looking out into endless space, you feel so **incredibly small**, so insignificant.



After all, **your planet** is just a small lump of rock orbiting a very ordinary star.

We call that star 'the Sun' like it's something special. But in fact the Sun is simply one of at least **100 billion** stars that make up the Milky Way – a very average-sized galaxy, and one of an estimated **2 trillion galaxies** that exist.

The Earth and all its neighbours orbiting the Sun – our entire solar system – could be **snuffed out** and, frankly, the Universe would barely even notice the difference.

Or would it?

To answer that, the first thing we need to do is travel back in time. So jump in, hold on tight, wind the clock back **13.8 billion years**. All the way to the beginning, and **then** pop back just a little bit further. Things are going to get pretty weird, because where we are going it seems that absolutely **NOTHING** exists.



No light.

No sound.

No time.

No space.

No school.

Just, yes – you got it . . .

NOTHING.