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# Welcome Universe Neil Degrasse Tyson

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Degrasse Tyson*

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## NATALIE WHITEHEAD

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How to Make a Spaceship Princeton University Press

"This is a condensed edition of Welcome to the Universe - essentially a pocket-sized version of the original "astrophysical tour" of the cosmos. In 8 chapters (compared to the original 24 chapters), the reader learns the essential astrophysics everyone should know -- about the size and scale of the universe; the solar system; the lives/deaths of stars; the search for life in the galaxy; our Milky Way; galaxies, the Big Bang and the expanding universe; inflation and the multiverse; and our future in the cosmos. For those who may have felt that Welcome to the Universe was a bit beyond them, this book covers all the essentials in an even more accessible and concise fashion, while imparting real physical insight into how the universe works by the book's end"--

*Astrophysics for Young People in a Hurry*  
Prometheus Books

The story of unmanned space exploration, from Viking to today Dreams of Other Worlds describes the unmanned

space missions that have opened new windows on distant worlds. Spanning four decades of dramatic advances in astronomy and planetary science, this book tells the story of eleven iconic exploratory missions and how they have fundamentally transformed our scientific and cultural perspectives on the universe and our place in it. The journey begins with the Viking and Mars Exploration Rover missions to Mars, which paint a startling picture of a planet at the cusp of habitability. It then moves into the realm of the gas giants with the Voyager probes and Cassini's ongoing exploration of the moons of Saturn. The Stardust probe's dramatic round-trip encounter with a comet is brought vividly to life, as are the SOHO and Hipparcos missions to study the Sun and Milky Way. This stunningly illustrated book also explores how our view of the universe has been brought into sharp focus by NASA's great observatories—Spitzer, Chandra, and Hubble—and how the WMAP mission has provided rare glimpses of the dawn of creation. Dreams of Other Worlds reveals how these unmanned exploratory missions have redefined what it means to be the temporary tenants of a small planet in a vast

cosmos.

### A Brief Welcome to the Universe

Dragonfly Books

A New York Times bestseller! The historic race that reawakened the promise of manned spaceflight A Finalist for the PEN/E. O. Wilson Literary Science Writing Award Alone in a Spartan black cockpit, test pilot Mike Melvill rocketed toward space. He had eighty seconds to exceed the speed of sound and begin the climb to a target no civilian pilot had ever reached. He might not make it back alive. If he did, he would make history as the world's first commercial astronaut. The spectacle defied reason, the result of a competition dreamed up by entrepreneur Peter Diamandis, whose vision for a new race to space required small teams to do what only the world's largest governments had done before. Peter Diamandis was the son of hardworking immigrants who wanted their science prodigy to make the family proud and become a doctor. But from the age of eight, when he watched Apollo 11 land on the Moon, his singular goal was to get to space. When he realized NASA was winding down manned space flight, Diamandis set out on one of the great entrepreneurial adventure stories of our time. If the government wouldn't send him to space, he would create a private space flight industry himself. In the 1990s, this idea was the stuff of science fiction. Undaunted, Diamandis found inspiration in an unlikely place: the golden age of aviation. He discovered that Charles Lindbergh made his transatlantic flight to win a \$25,000 prize. The flight made Lindbergh the most famous man on earth and galvanized the airline industry. Why, Diamandis thought, couldn't the same be done for space flight? The story of the bullet-shaped SpaceShipOne, and

the other teams in the hunt, is an extraordinary tale of making the impossible possible. It is driven by outsized characters—Burt Rutan, Richard Branson, John Carmack, Paul Allen—and obsessive pursuits. In the end, as Diamandis dreamed, the result wasn't just a victory for one team; it was the foundation for a new industry and a new age.

### The Pluto Files: The Rise and Fall of America's Favorite Planet Ballantine Books

A Princeton astrophysicist explores whether journeying to the past or future is scientifically possible in this "intriguing" volume (Neil deGrasse Tyson). It was H. G. Wells who coined the term "time machine"—but the concept of time travel, both forward and backward, has always provoked fascination and yearning. It has mostly been dismissed as an impossibility in the world of physics; yet theories posited by Einstein, and advanced by scientists including Stephen Hawking and Kip Thorne, suggest that the phenomenon could actually occur. Building on these ideas, J. Richard Gott, a professor who has written on the subject for Scientific American, Time, and other publications, describes how travel to the future is not only possible but has already happened—and contemplates whether travel to the past is also conceivable. This look at the surprising facts behind the science fiction of time travel "deserves the attention of anyone wanting wider intellectual horizons" (Booklist). "Impressively clear language. Practical tips for chrononauts on their options for travel and the contingencies to prepare for make everything sound bizarrely plausible. Gott clearly enjoys his subject and his excitement and humor are contagious; this book is a

delight to read.” —Publishers Weekly

**Universe Down to Earth** National Geographic Books

“A compelling appeal, at just the right time, for continuing to look up.”—Air & Space America’s space program is at a turning point. After decades of global primacy, NASA has ended the space-shuttle program, cutting off its access to space. No astronauts will be launched in an American craft, from American soil, until the 2020s, and NASA may soon find itself eclipsed by other countries’ space programs. With his signature wit and thought-provoking insights, Neil deGrasse Tyson—one of our foremost thinkers on all things space—illuminates the past, present, and future of space exploration and brilliantly reminds us why NASA matters now as much as ever. As Tyson reveals, exploring the space frontier can profoundly enrich many aspects of our daily lives, from education systems and the economy to national security and morale. For America to maintain its status as a global leader and a technological innovator, he explains, we must regain our enthusiasm and curiosity about what lies beyond our world. Provocative, humorous, and wonderfully readable, *Space Chronicles* represents the best of Tyson’s recent commentary, including a must-read prologue on NASA and partisan politics. Reflecting on topics that range from scientific literacy to space-travel missteps, Tyson gives us an urgent, clear-eyed, and ultimately inspiring vision for the future.

**Cosmic Queries** Princeton University Press

Answers popular astronomy questions such as “How big are the craters on the Moon?,” “Why are solar eclipses considered so dangerous to look at?,” and “How does a black hole affect time

and mass?”

*Merlin's Tour of the Universe* W. W. Norton & Company

An epic, full-color visual journey through all scales of the universe In *The Zoomable Universe*, the award-winning astrobiologist Caleb Scharf and the acclaimed artist Ron Miller take us on an epic tour through all known scales of reality, from the largest possible magnitude to the smallest. Drawing on cutting-edge science, they begin at the limits of the observable universe, a scale spanning  $10^{27}$  meters—about 93 billion light-years. And they end in the subatomic realm, at  $10^{-35}$  meters, where the fabric of space-time itself confounds all known rules of physics. In between are galaxies, stars and planets, oceans and continents, plants and animals, microorganisms, atoms, and much, much more. Stops along the way—all enlivened by Scharf’s sparkling prose and his original insights into the nature of our universe—include the brilliant core of the Milky Way, the surface of a rogue planet, the back of an elephant, and a sea of jostling quarks. *The Zoomable Universe* is packed with more than 100 original illustrations and infographics that will captivate readers of every age. It is a whimsical celebration of discovery, a testament to our astounding ability to see beyond our own vantage point and chart a course from the farthest reaches of the cosmos to its subatomic depths—in short, a must-have for the shelves of all explorers.

**Alien Oceans** Princeton University Press Presenting a rich array of stereoscopic color images, which can be viewed in 3D using a special stereo viewer that folds easily out of the cover of the book, this book reveals your cosmic environment as you have never seen it before.

Journey into the vast depths of the observable universe by visualising the most spectacular images in astronomy in stereoscopic 3D. Welcome to the Universe in 3D takes you on a grand tour of the observable universe, guiding you through the most spectacular sights in the cosmos a in breathtaking 3D.

Astronomy is the story of how humankind's perception of the two-dimensional dome of the sky evolved into a far deeper comprehension of an expanding three-dimensional cosmos. This book invites you to take part in this story by exploring the universe in depth, as revealed by cutting-edge astronomical research and observations. You will journey from the Moon through the solar system, out to exoplanets, distant nebulas, and galaxy clusters, until you finally reach the cosmic microwave background radiation (or CMB), the most distant light we can observe. The distances to these celestial wonders range from 1.3 light-seconds to 13.8 billion light-years. Along the way, the authors explain the fascinating features of what you are seeing, including how the 3D images were made using the same technique that early astronomers devised to measure distances to objects in space. The dramatic 3D images in this one-of-a-kind book will astonish you, extending your vision out to the farthest reaches of the universe. You will never look up into the night sky the same way again.

*A Brief Welcome to the Universe* W. W. Norton & Company

Bringing his cosmic perspective to civilization on Earth, Neil deGrasse Tyson shines new light on the crucial fault lines of our time—war, politics, religion, truth, beauty, gender, and race—in a way that stimulates a deeper sense of unity for us all. In a time when our political and

cultural views feel more polarized than ever, Tyson provides a much-needed antidote to so much of what divides us, while making a passionate case for the twin chariots of enlightenment—a cosmic perspective and the rationality of science. After thinking deeply about how science sees the world and about Earth as a planet, the human brain has the capacity to reset and recalibrates life's priorities, shaping the actions we might take in response. No outlook on culture, society, or civilization remains untouched. With crystalline prose, *Starry Messenger* walks us through the scientific palette that sees and paints the world differently. From insights on resolving global conflict to reminders of how precious it is to be alive, Tyson reveals, with warmth and eloquence, an array of brilliant and beautiful truths that apply to us all, informed and enlightened by knowledge of our place in the universe.

*Mathematics and Art* Simon and Schuster

This is a cultural history of mathematics and art, from antiquity to the present. Mathematicians and artists have long been on a quest to understand the physical world they see before them and the abstract objects they know by thought alone. Taking readers on a tour of the practice of mathematics and the philosophical ideas that drive the discipline, Lynn Gamwell points out the important ways mathematical concepts have been expressed by artists. Sumptuous illustrations of artworks and cogent math diagrams are featured in Gamwell's comprehensive exploration. Gamwell begins by describing mathematics from antiquity to the Enlightenment, including Greek, Islamic, and Asian mathematics. Then focusing on modern culture, Gamwell traces

mathematicians' search for the foundations of their science, such as David Hilbert's conception of mathematics as an arrangement of meaning-free signs, as well as artists' search for the essence of their craft, such as Aleksandr Rodchenko's monochrome paintings. She shows that self-reflection is inherent to the practice of both modern mathematics and art, and that this introspection points to a deep resonance between the two fields: Kurt Gödel posed questions about the nature of mathematics in the language of mathematics and Jasper Johns asked "What is art?" in the vocabulary of art. Throughout, Gamwell describes the personalities and cultural environments of a multitude of mathematicians and artists, from Gottlob Frege and Benoît Mandelbrot to Max Bill and Xu Bing. *Mathematics and Art* demonstrates how mathematical ideas are embodied in the visual arts and will enlighten all who are interested in the complex intellectual pursuits, personalities, and cultural settings that connect these vast disciplines.

### **How Did the First Stars and Galaxies**

**Form?** W. W. Norton & Company  
Presents an entertaining and engaging look at some of nature's most remarkable creatures ... Shows not only how studying these animals can provide deep insights into how life evolved, but also how scientific discovery can be filled with adventure and fun--Adapted from cover.

*Accessory to War: The Unspoken Alliance Between Astrophysics and the Military*  
Princeton University Press

From the author of *Astrophysics for People in a Hurry* and the host of *Cosmos: A Spacetime Odyssey*, a memoir about growing up and a young man's budding scientific curiosity. This is

the absorbing story of Neil deGrasse Tyson's lifelong fascination with the night sky, a restless wonder that began some thirty years ago on the roof of his Bronx apartment building and eventually led him to become the director of the Hayden Planetarium. A unique chronicle of a young man who at one time was both nerd and jock, Tyson's memoir could well inspire other similarly curious youngsters to pursue their dreams. Like many athletic kids he played baseball, won medals in track and swimming, and was captain of his high school wrestling team. But at the same time he was setting up a telescope on winter nights, taking an advanced astronomy course at the Hayden Planetarium, and spending a summer vacation at an astronomy camp in the Mojave Desert. Eventually, his scientific curiosity prevailed, and he went on to graduate in physics from Harvard and to earn a Ph.D. in astrophysics from Columbia. There followed postdoctoral research at Princeton. In 1996, he became the director of the Hayden Planetarium, where some twenty-five years earlier he had been awed by the spectacular vista in the sky theater. Tyson pays tribute to the key teachers and mentors who recognized his precocious interests and abilities, and helped him succeed. He intersperses personal reminiscences with thoughts on scientific literacy, careful science vs. media hype, the possibility that a meteor could someday hit the Earth, dealing with society's racial stereotypes, what science can and cannot say about the existence of God, and many other interesting insights about science, society, and the nature of the universe. Now available in paperback with a new preface and other additions, this engaging memoir will enlighten and inspire an appreciation of astronomy and

the wonders of our universe.

**Welcome to the Universe** Joseph Henry Press

A 2020 Outstanding Science Trade Book for Students K-12! With an introduction from Neil DeGrasse Tyson about the importance of kid-like curiosity, this lyrical picture book biography on the beloved astrophysicist and host of *Cosmos* is the perfect gift for young astronomers and fans of all ages. Neil deGrasse Tyson was born curious. And the secrets of a billion galaxies lay there—waiting for him to explore its cosmic mysteries. He just had to look up. Up beyond the city lights, up at the shining stars, up through the Milky Way, and past the veil of the night sky. Follow young Neil's journey as he discovers the wonders of space, the thrill of science, and the joy in sharing the beauty of our amazing universe. Read his favorite mind-blowing facts and learn what mysteries are left to solve. From *On a Beam of Light* author Jennifer Berne and debut paper illustrator Lorraine Nam comes the inspiring true tale of Neil's life and how he became a world-famous astrophysicist. The future of discovery lays with you. Look up with Neil and begin your own journey into the cosmos.

**The Sky Is Not the Limit** HMH

Bringing demonstrations of the principles of nature into the living room, Tyson writes in a lucid, easygoing style that finally makes scientific literacy possible for enthusiasts and those with math and science phobias alike.

Starstruck Katherine Tegen Books

The New York Times bestseller: "You gotta read this. It is the most exciting book about Pluto you will ever read in your life." —Jon Stewart When the Rose Center for Earth and Space at the American Museum of Natural History reclassified Pluto as an icy comet, the

New York Times proclaimed on page one, "Pluto Not a Planet? Only in New York." Immediately, the public, professionals, and press were choosing sides over Pluto's planethood. Pluto is entrenched in our cultural and emotional view of the cosmos, and Neil deGrasse Tyson, award-winning author and director of the Rose Center, is on a quest to discover why. He stood at the heart of the controversy over Pluto's demotion, and consequently Plutophiles have freely shared their opinions with him, including endless hate mail from third-graders. With his inimitable wit, Tyson delivers a minihistory of planets, describes the oversized characters of the people who study them, and recounts how America's favorite planet was ousted from the cosmic hub.

**The Cosmic Web** Disney Electronic Content

How science changed the way artists understand reality Exploring the Invisible shows how modern art expresses the first secular, scientific worldview in human history. Now fully revised and expanded, this richly illustrated book describes two hundred years of scientific discoveries that inspired French Impressionist painters and Art Nouveau architects, as well as Surrealists in Europe, Latin America, and Japan. Lynn Gamwell describes how the microscope and telescope expanded the artist's vision into realms unseen by the naked eye. In the nineteenth century, a strange and exciting world came into focus, one of microorganisms in a drop of water and spiral nebulas in the night sky. The world is also filled with forces that are truly unobservable, known only indirectly by their effects—radio waves, X-rays, and sound-waves. Gamwell shows how artists developed the pivotal style of modernism—abstract, non-objective

art—to symbolize these unseen worlds. Starting in Germany with Romanticism and ending with international contemporary art, she traces the development of the visual arts as an expression of the scientific worldview in which humankind is part of a natural web of dynamic forces without predetermined purpose or meaning. Gamwell reveals how artists give nature meaning by portraying it as mysterious, dangerous, or beautiful. With a foreword by Neil deGrasse Tyson and a wealth of stunning images, this expanded edition of *Exploring the Invisible* draws on the latest scholarship to provide a global perspective on the scientists and artists who explore life on Earth, human consciousness, and the space-time universe.

*Cosmos* Princeton University Press  
Semi-autobiographical discussion of astronomy and astronomers, and history of astronomy and cosmology.--

*Starry Messenger* Princeton University Press

The authoritative story of the headline-making discovery of gravitational waves—by an eminent theoretical astrophysicist and award-winning writer. From the author of *How the Universe Got Its Spots* and *A Madman Dreams of Turing Machines*, the epic story of the scientific campaign to record the soundtrack of our universe. Black holes are dark. That is their essence. When black holes collide, they will do so unilluminated. Yet the black hole collision is an event more powerful than any since the origin of the universe. The profusion of energy will emanate as waves in the shape of spacetime: gravitational waves. No telescope will ever record the event; instead, the only evidence would be the sound of spacetime ringing. In 1916, Einstein

predicted the existence of gravitational waves, his top priority after he proposed his theory of curved spacetime. One century later, we are recording the first sounds from space, the soundtrack to accompany astronomy's silent movie. In *Black Hole Blues and Other Songs from Outer Space*, Janna Levin recounts the fascinating story of the obsessions, the aspirations, and the trials of the scientists who embarked on an arduous, fifty-year endeavor to capture these elusive waves. An experimental ambition that began as an amusing thought experiment, a mad idea, became the object of fixation for the original architects—Rai Weiss, Kip Thorne, and Ron Drever. Striving to make the ambition a reality, the original three gradually accumulated an international team of hundreds. As this book was written, two massive instruments of remarkably delicate sensitivity were brought to advanced capability. As the book draws to a close, five decades after the experimental ambition began, the team races to intercept a wisp of a sound with two colossal machines, hoping to succeed in time for the centenary of Einstein's most radical idea. Janna Levin's absorbing account of the surprises, disappointments, achievements, and risks in this unfolding story offers a portrait of modern science that is unlike anything we've seen before.

**Explore the Cosmos like Neil deGrasse Tyson** Princeton University Press

At the edge of time -- A world of time and space -- A world without a beginning? -- Glimpses of the big bang -- The universe and the accelerator -- The origins of everything -- Hearts of darkness -- A beacon in the dark? -- Radically rethinking dark matter -- A

flash in time -- Endless worlds most beautiful -- Touching the edge of time.

**Letters from an Astrophysicist**

Princeton University Press

For the millions of Americans who want spirituality without religion, Sam Harris's latest New York Times bestseller is a guide to meditation as a rational practice informed by neuroscience and psychology. From Sam Harris, neuroscientist and author of numerous New York Times bestselling books, *Waking Up* is for the twenty percent of Americans who follow no religion but who suspect that important truths can be found in the experiences of such

figures as Jesus, the Buddha, Lao Tzu, Rumi, and the other saints and sages of history. Throughout this book, Harris argues that there is more to understanding reality than science and secular culture generally allow, and that how we pay attention to the present moment largely determines the quality of our lives. *Waking Up* is part memoir and part exploration of the scientific underpinnings of spirituality. No other book marries contemplative wisdom and modern science in this way, and no author other than Sam Harris—a scientist, philosopher, and famous skeptic—could write it.