



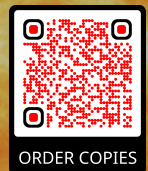
CODEX OF THE  
**FUTURE**  
SERIES

THE EMERGING TECHNOLOGY

# STARBURST COLLECTION

UNLIMITED THINKING . EXPONENTIAL POTENTIAL

BY MATTHEW GRIFFIN



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# ABOUT THE AUTHOR

Matthew Griffin, an award winning futurist and author of the Codex of the Future series, is described as "The Adviser behind the Advisers" and a "Young Kurzweil." Matthew is the Founder of the 311 Institute, a global Futures and Deep Futures advisory, as well as the World Futures Forum and XPotential University, two philanthropic organisations whose mission it is to solve global inequality and the world's greatest challenges.

Regularly featured in the global media, including the Associated Press, BBC, CNBC, Discovery, Entrepreneur Magazine, Forbes, Netflix, RT, Sky, ViacomCBS, and WIRED, Matthew's ability to identify, track, and explain the impacts of hundreds of exponential emerging technologies and trends on global business, culture, and society, is unparalleled.

Recognised as one of the world's foremost futurists, innovation, and strategy experts Matthew is an international advisor and keynote speaker who helps many of the world's most respected brands, governments, investors, NGO's, and royal households, explore, envision, build, and shape the future of global business, culture, and society.

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**PEPSICO**





**OUR**

# A LETTER FROM **FOUNDER**

**MATTHEW GRIFFIN**

**WE LIVE** in extraordinary times, in a world where individuals, organisations, and technology can impact the lives of billions of people and change the world at a speed and scale that would have been unimaginable just twenty years ago.

We also live in a world full of challenges, and a world where all too often negative news gets amplified at the expense of good news, and where tales of hope, inspiration, and positivity get drowned out and lost in the noise. It's no wonder therefore that today more people are more anxious about the future than ever before. And, arguably, a society which believes it's marching towards the darkness, rather than the light, has a poorer future than one that doesn't. Hope, however, is all around us and it's our purpose to light the way so all of us, people and planet, can prosper.

# TESTIMONIALS

THANK YOU EVERYONE!

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Peter K., EMEA Managing Director  
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Isaac H., Country Manager  
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**“THE FUTURE IS AN OPEN BOOK ...”**

- Matthew Griffin, Founder

311 Institute  
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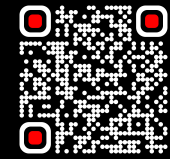
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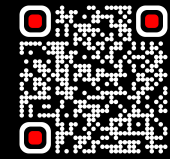
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## EXPONENTIAL TECHNOLOGY CODEX

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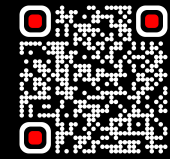
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## THE FUTURE OF SYNTHETIC CONTENT

Explore the technologies and trends revolutionising how content is made and consumed.



CODEX

# CONTENTS

Fifth Edition published January 2023. To request this Codex in an alternative language please contact the author.

## **22 ... THE MUSEUM OF THE FUTURE**

Our annual Starbursts give you a quick birdseye view of the latest Megatrends and Exponential Technologies re-shaping our world, and in this section you can review them all at your leisure.

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# THE MUSEUM OF THE FUTURE



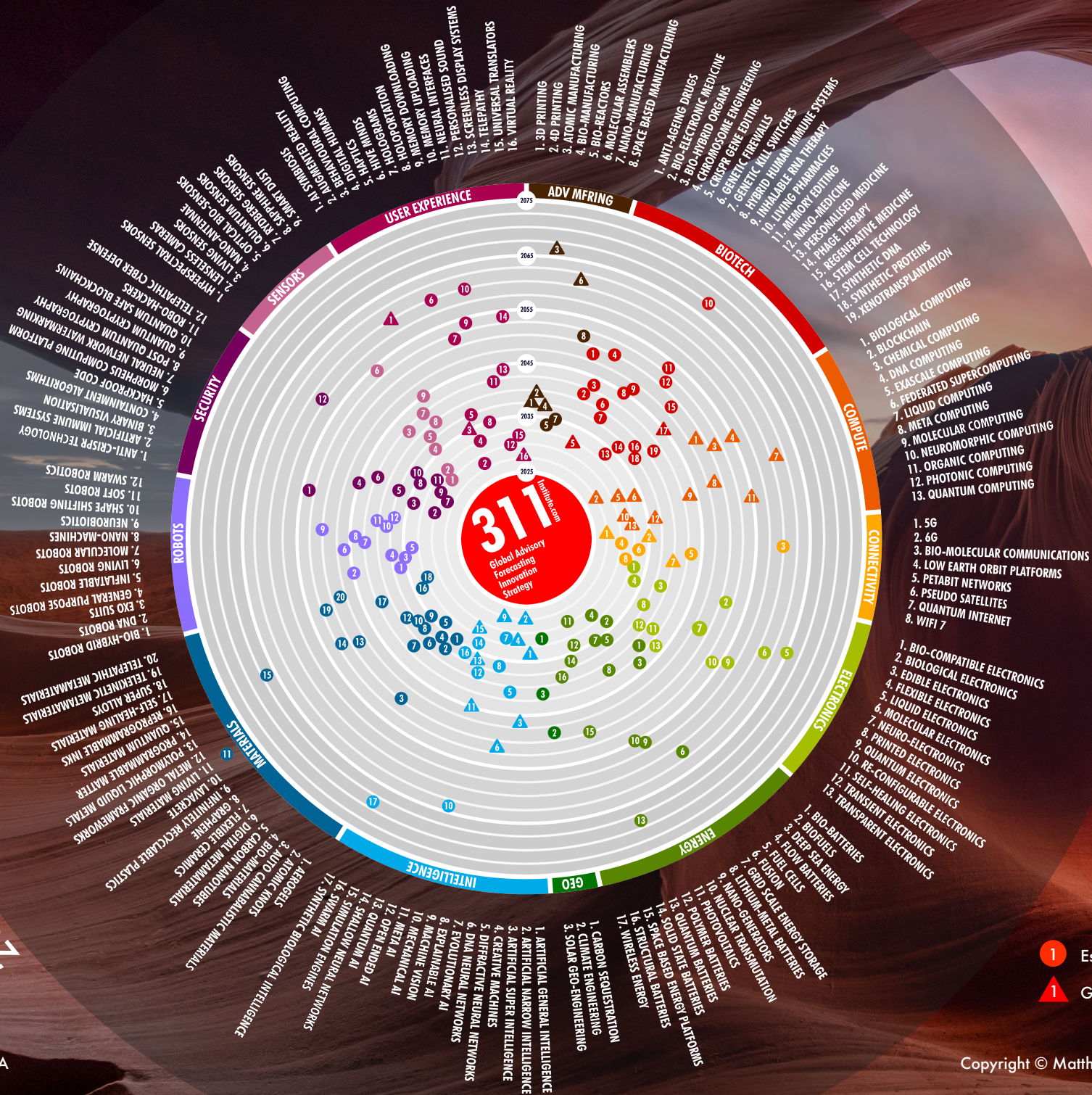


**E**VERY YEAR I publish a new Griffin Emerging Technology Starburst, and this year is no different. However, as the years change it would be all too easy just to consign all that hard work to the filing cabinet of history, never for them to be seen again. But that, in my opinion at least, would be a horrible waste so instead welcome to my Museum of the Future.

While the rest of this Codex looks to the future in this section we look to the present and the past, a kind of history of the future if you will, and put all those Starbursts proudly on display where you can scan and review them all at your leisure to see just how many powerful emerging technologies there are, and see first hand how difficult it is to keep up with them all and figure out the multitude of ways they can be combined together to create the products and paradigms that will shape our collective future.

Dive in to the wormhole ...

# 2023 GRIFFIN Emerging Technology Starburst



1 Estimated Wide Spread Use  
 ▲ General Purpose Technology





# 2023 STARBURST REVIEW

**I**N THE 2023 Griffin Emerging Technology Starburst I extended the timeline to 2075, an increase from the 2022 Starburst which only extended to 2070, and tracked the development of 167 of the world's most promising emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, I promoted 31 new emerging technologies and demoted 31.

## USING THE STARBURSTS

The Starbursts have been specifically designed to let you quickly see the estimated maturity of different technologies across different technology categories, and to get the most benefit from them I recommend you combine the information from this codex with that found in some of the other codexes in my Codex of the Future series, such as my [311 Trends Codex](#) and [How to Build Exponential Enterprises Codex](#).

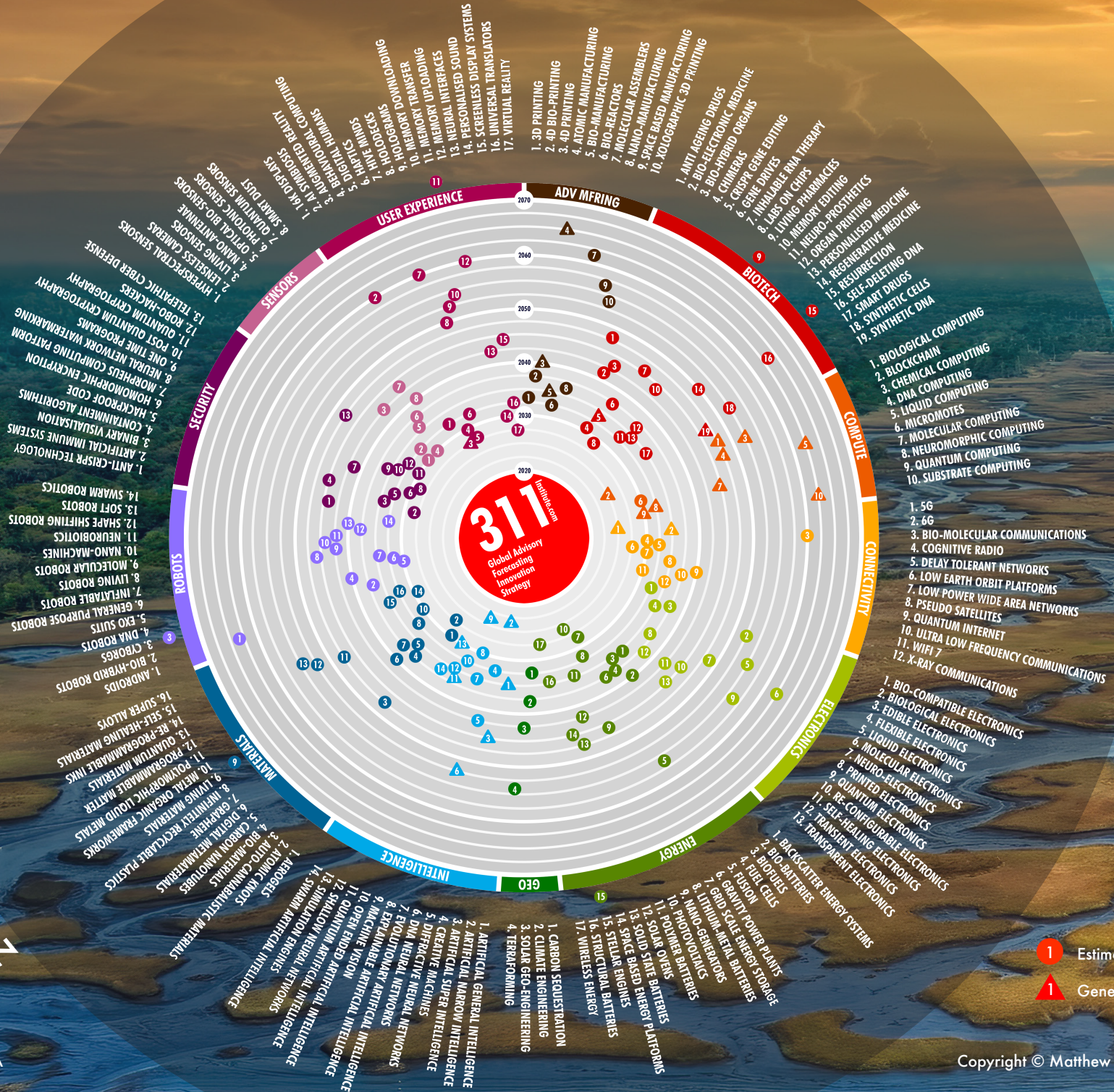
By doing this you will have all the frameworks and information you need to quickly model future scenarios, assess their impact on your organisation, as well as global business, culture, and society, and everything you need to develop new products, roadmaps, and strategies.

## TIMELINE:

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# 2025 to 2075

# 2022 GRIFFIN Emerging Technology Starburst



**1** Estimated Wide Spread Use  
**▲** General Purpose Technology



# 2022 STARBURST REVIEW

**I**N THE 2022 Griffin Emerging Technology Starburst, which displays 167 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, up to a timeline of 2070, I promoted 28 new emerging technologies and demoted 28.

In 2022 there was an up tick in notable world firsts compared to 2021 which as the global pandemic faded wasn't unexpected as investment and R&D flows started returning to pre pandemic norms. Therefore, as expected, I saw an increase in the number of new emerging technologies which were double the number spotted in 2021. Biotech, Compute, Energy, Intelligence, and Materials saw the largest gains.

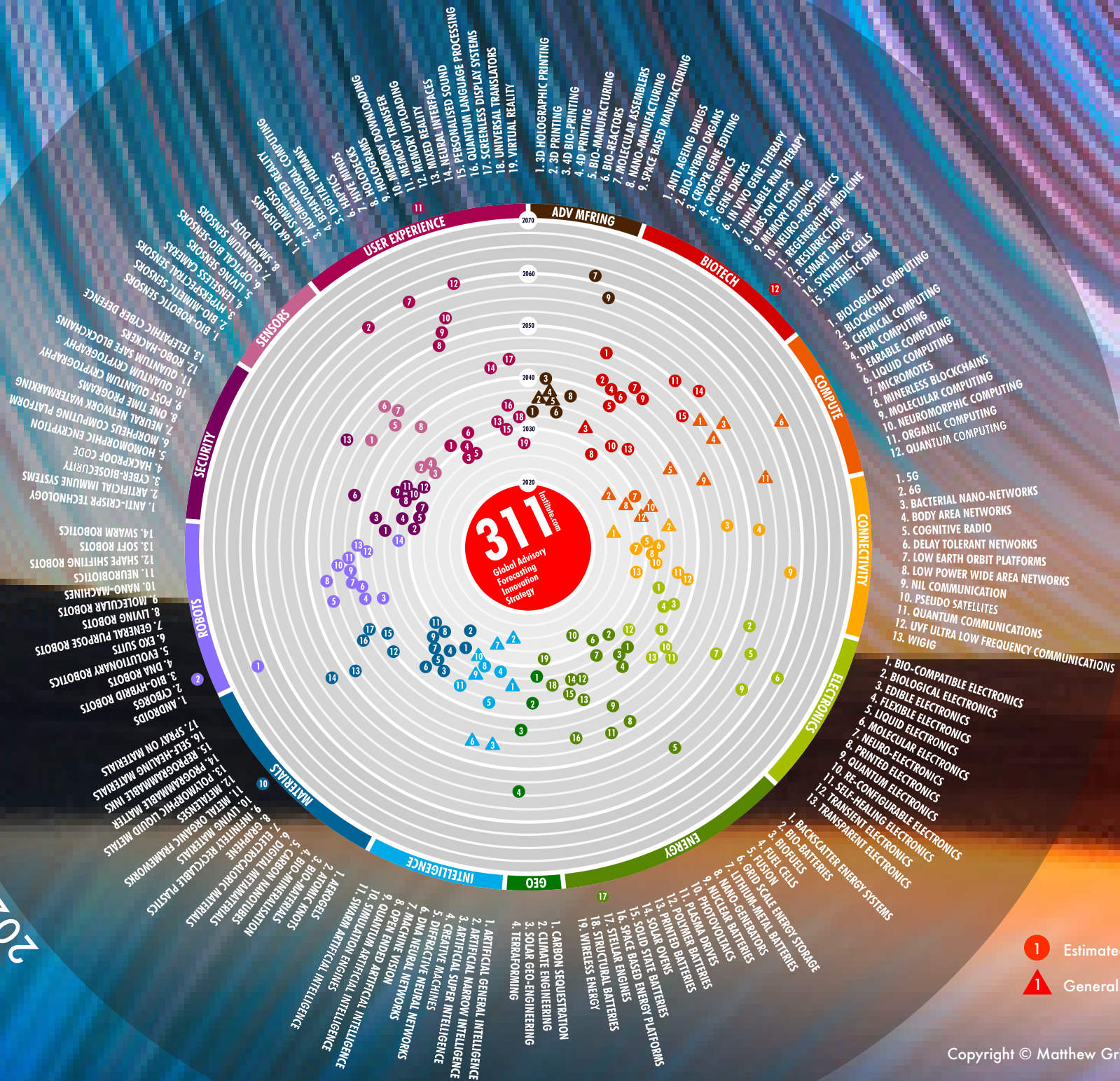
2022's breakthroughs and stand out world firsts included: 100% effective personalised cancer therapies • AI designs new chemical weapons and simulates all known proteins • AI redistributes wealth better than politicians • AI generated content and

Digital Humans move mainstream • Chromosome Engineering accelerates biological evolution millions of years • First decentralised social network launches • First flexible ceramic • First lab grown blood cells • First Mechanical AI • First stress measuring wearable • First light based blood test • First tunnel dug by autonomous swarm robots • First telekinetic and telepathic materials • Google staffer claims AI is sentient • Lawyers drop NFTs to serve anonymous crims • Human mini-brains beat machine AI • Lab grown meat gains FDA approval • Military drone fleets emerge • Molecular computers break records • Russia first nation to use hypersonic weapons in wartime • Self-assembling space structures ace tests • Starlink achieves global network coverage. And many more.

## TIMELINE:

### 2022 to 2070

# 2021 GRIFFIN Emerging Technology Starburst



1 Estimated Wide Spread Use  
 ▲ General Purpose Technology



# 2021 STARBURST REVIEW



**I**N THE 2021 Griffin Emerging Technology Starburst, which displays 167 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, up to a timeline of 2070, I promoted 17 new emerging technologies and demoted 17 - the lowest of any year so far.

In 2021 there were fewer notable world firsts than in 2020 which, as in 2020, I again attribute to the fact that much of the world's investment and R&D flows were re-aligned to fight the global pandemic, COVID-19. There was also a marked decrease, of approximately 23 percent year on year, in the number of new emerging technologies that appeared, and this marks the first consecutive year on year decline I've seen since I've been keeping records.

Unsurprisingly Biotech, Compute, and Energy saw the largest gains, and this was the year that many emerging technologies showed the world what they were capable of - whether it was using

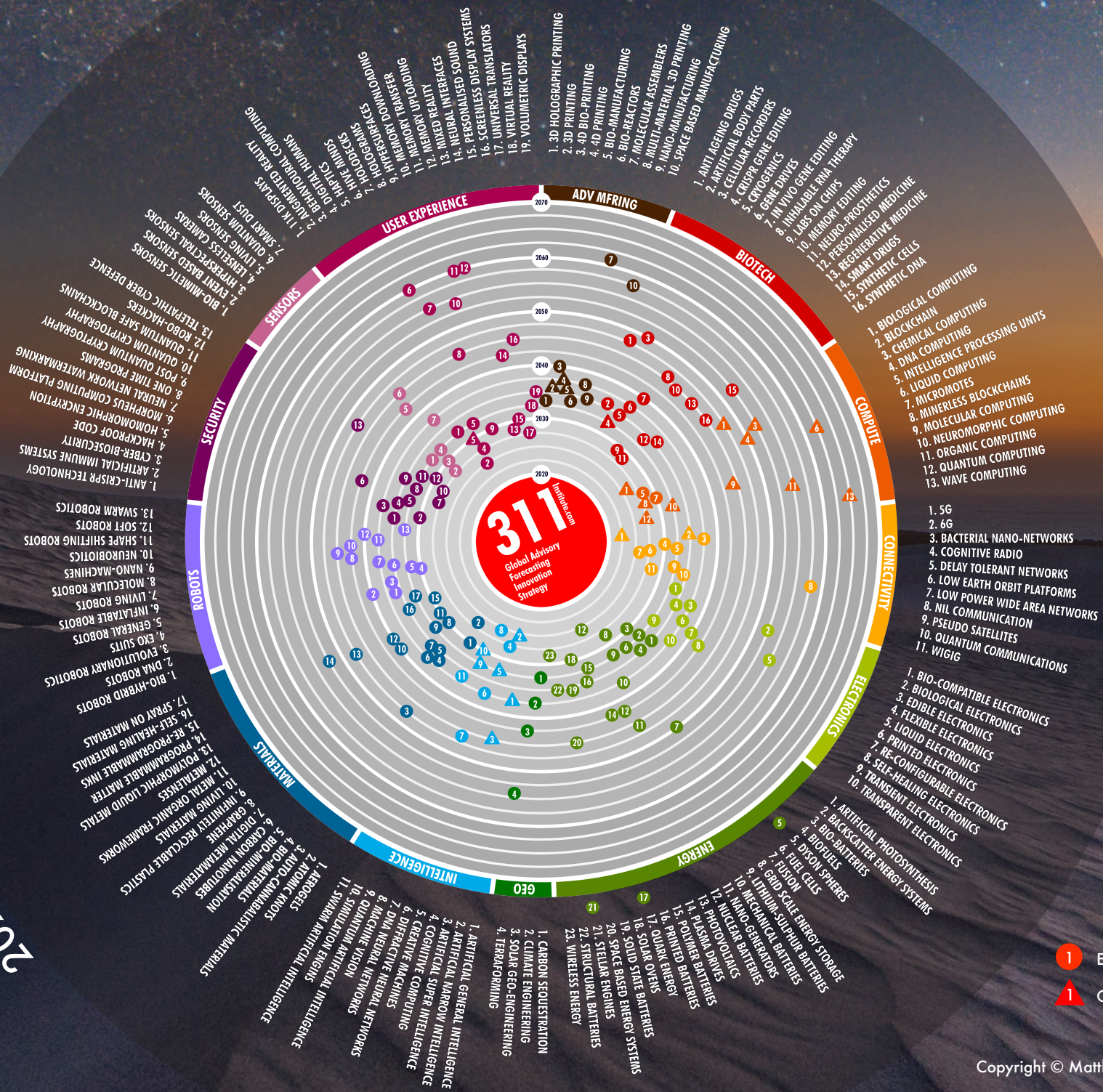
AI to develop vaccines or 3D printing to print out of stock parts for ventilators.

2021's stand out world firsts included:  
AI learning the art of "Diplomacy" • First 2nm computer chip • First 5G NR installation • First 5 minute EV charging system • First AI credited as an inventor • First autonomous Hunter-Killer drone kill • First Bio-Artificial Kidney • First empathetic first person VR surgery preview • First EV with 1,000km range • First green steel • First unethical Human burgers • First Internet of Electricity material • First mass biometric spoofing cyber attack • First Metaverse city • First re-programmable satellite • First spontaneously replicating living robot. And many more.

## TIMELINE:

### 2021 to 2070

# 2020 GRIFFIN Emerging Technology Starburst



**1** Estimated Wide Spread Use  
**▲** General Purpose Technology



# 2020 STARBURST REVIEW

**I**N THE 2020 Starburst I extended the timeline to 2070, an increase from the 2019 Starburst which only extended to 2060, and tracked the development of 167 of the years most significant emerging exponential technologies, each with an addressable market value of over \$500 Billion spread across 13 major categories, one of which “Electronics” was a new addition. I also promoted 44 new emerging technologies, and demoted 45.

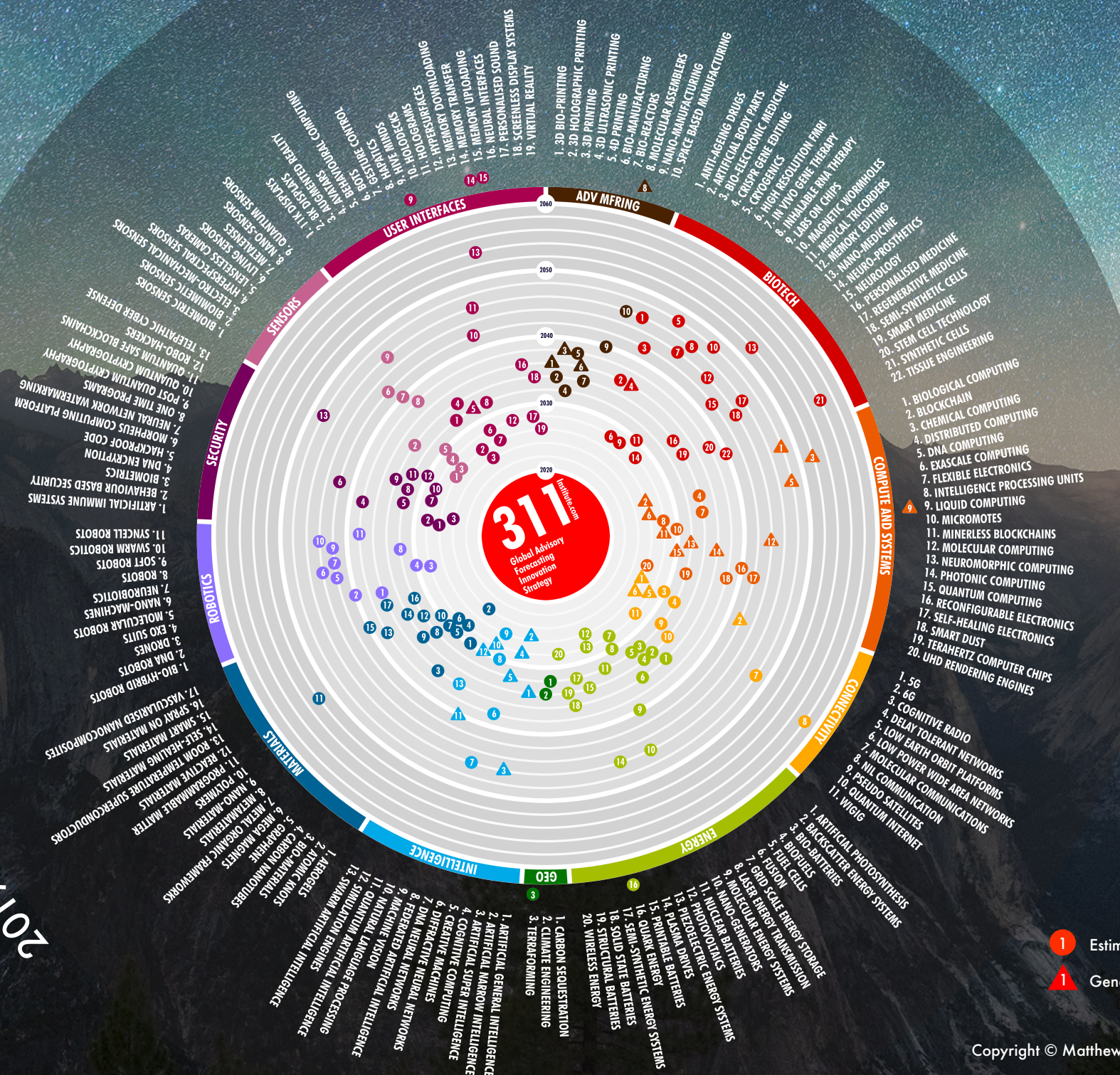
In 2020 there were fewer notable world firsts than in 2019 which I attribute to the fact that much of the worlds investment and R&D flows were re-aligned to help the world conquer the debilitating global pandemic, COVID-19. There was also a marked decrease, of approximately 40 percent year on year, in the number of new emerging technologies that appeared this year and this is reflected in the 2021 Starburst that saw the lowest number of new entries since my records began. Unsurprisingly though the Biotech and Intelligence categories saw the largest gains.

2020’s stand out world firsts included:  
Advanced DeepFakes • First 3D printed mini human heart • First 6G satellite test • First AI generated interactive procedural VR game • First AR smart contact lenses • First artificial living cells • First Bio-Synthetic network • First CRISPR in vivo gene editing • First hypersonic weapons deployment • First in vivo 3D Bio-Printing robot • First novel Cancer vaccine • First pilotless commercial aircraft • First protein folding AI • First reversal of human ageing • First room temperature superconductor • First virtual food. And many more.

## TIMELINE:

### 2020 to 2070

# 2019 GRIFFIN Emerging Technology Starburst



1 Estimated Wide Spread Use  
 1 General Purpose Technology





# 2019 STARBURST REVIEW

**I**N THE 2019 Starburst I extended the timeline to 2060, an increase from the 2018 Starburst which only extended to 2040, and tracked the development of 169 of the years most significant emerging technologies, across 12 major categories, one of which “Intelligence” was a new addition. I also promoted 28 new emerging technologies, and demoted 28. For the first time the Starburst also visualised 25 General Purpose Technologies (GPT) that will drive innovation and disruption across multiple sectors.

In 2019 there were more notable world firsts than in 2018, especially in the field of Artificial Intelligence (AI). However, there were also noticeable breakthroughs in Advanced Manufacturing, Computing, Robotics, and Synthetic Biology.

2019’s stand out world firsts included: Achieving Quantum Supremacy • AI beats superstar human gamers • An evolving AI that developed new tools • Beef 3D printed in space • First 8 base pair synthetic DNA organism • First

aerosol based mRNA in vivo genetic engineering therapy • First AI counsellor • First AI designed vaccine • First AI signed by a record label • First AI strategy development platform • First AI written book • First fully autonomous EV energy grid • First fully autonomous vertical farm • First in vivo autonomous robot voyage • First lab grown fillet steak • First living metabolising material • First metamaterial invisibility cloak • First plasma light sabres • First programmable DNA computer • First programmable living robots • First replicating synthetic cells • First synthetic human genome designed by an AI • First ultrasound tractor beam. And many more.

## TIMELINE:

### 2019 to 2060

# 2018 GRIFIN Emerging Technology Starburst



1 Estimated Wide Spread Use



# 2018 STARBURST REVIEW

**I**N THE 2018 Starburst, which displays 169 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 11 categories, I expanded the timeline from 2035 to 2040, promoted 42 new emerging technologies and demoted 42.

In 2018 I saw a notable increase in the number of world firsts compared to 2017, especially in the fields of Computing and Materials. There were also notable worthy breakthroughs in Advanced Manufacturing, Artificial Intelligence (AI), Computing, Neural Interfaces, and Synthetic Biology.

2018's stand out world firsts included: A million core Neuromorphic computer that simulated a whole mouse brain • An AI made out of DNA • An AI made out of glass • Development of the world's most durable material • Estonia becoming the first nation capable of re-booting itself • First 3D printed AI • First 5G robot remote surgery • First AI generated art sold at auction • First AI politician •

First AI Robo-Coder • First AI Synthetic Content generators • First conscious robot • First game of human telepathic Tetris • First million core Neuromorphic computer • First Quantum Compass • First space elevator trials • First successful regenerative medicine trial to re-grow severed frog limbs • Living human memories edited for the first time • Memories transferred between living animals • Video's replayed from bacterial biological computers • Weaponisation of neural networks. And many more.

## TIMELINE:

### 2018 to 2040

# 2017 GRIFFIN Emerging Technology Starburst



1 Estimated Wide Spread Use



# 2017 STARBURST REVIEW



**I**N THE 2017 re-designed Starburst, which displays 169 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 11 categories, I expanded the timeline to 2035, promoted 38 new emerging technologies and demoted 38.

2017 lagged 2016 for technology world firsts which, but it has to be said that many of those world firsts were Artificial Intelligence (AI) related.

Despite this though unlike 2016 the world firsts I witnessed in 2017 were spread across a much broader range of themes including Advanced Manufacturing, AI, Computing, Creative Machines, Food Manufacturing, Holography, Nano-Medicine, Quantum technology, Robotics, and Synthetic Biology.

2017's stand out world firsts included:  
A biological teleporter • An AI created by another AI • An AI run autonomous organisation • Brain controlled drug delivery Nanobots • Designer babies •

First human in vivo cancer vaccines and gene editing trials • First inter-continental Quantum network • First self-evolving self-fabricating robots • Self-coding and self-learning AI's • The creation of a six DNA base pair alien life form.

2017 was also the year we saw the first architectures, and prototypes, for the first Artificial General Intelligence (AGI) agent, a serious Blockchain competitor, and the emergence of the first viable DNA, Chemical, Liquid, and Photonic computing platforms. And I am just getting started!

## **TIMELINE:**

# 2017 to 2035

# CONCLUSION



**P**EOPLE SAY change is a constant, but in today's technology fuelled world this simple phrase is a deceiving, and often comforting, misnomer because change isn't constant, it's exponential, and the only boundaries to what we can achieve as individuals and as a global society are the ones that we invent for ourselves.

As researchers and scientists increasingly prove that nothing is impossible, that yesterdays science fiction is simply the future generations status quo, and as we all continue to bear witness to an increasingly rapid rate of change that's affecting and transforming every corner of global culture, industry, and society the future belongs to all of us equally, and we should never loose sight of that.

As you race into your own future I wish you well, and never forget you have all the friends and support you need around you as we all voyage through time and space together on this fragile living spacecraft we call Earth.

Explore More,

**Matthew Griffin**  
Founder, 311 Institute

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Notes:



A full-page background image of an astronaut in a white spacesuit floating in space. The astronaut is positioned on the left side, floating towards the right. The background is a vast field of stars and a bright, glowing nebula or galaxy structure on the right side. The bottom of the image shows the Earth's surface with white clouds and a blue horizon.

**THIS IS NOT THE END.**  
**EXPLORE MORE.**

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