

'Was there life on mars?' UK scientists play key part in NASA mission to Red Planet

The rover's mission – backed by the UK government – is to explore and collect samples for future return to Earth from diverse ancient environments on Mars. Supported by over £400,000 in funds from the UK Space Agency, researchers at Imperial College London and the Natural History Museum will help to decide which samples are sent to Earth in a search for evidence of ancient microbial life on Mars.

The research destination is Jezero crater, a 28-mile-wide depression containing sediments of an ancient river delta. At this location, evidence of past life could be preserved. The Perseverance rover will gather samples of Martian rocks and soil using its drill. The rover will then store the sample cores in tubes on the Martian surface ready for a return mission to bring around 30 samples to Earth in the early 2030s.

Jezero crater on Mars, Perseverance's landing site. Credit: ESA_DLR_FU-Berlin

It takes scientists, artists and engineers from all around the globe, all working together to lead a successful mission.

Find out their story, and how you can get involved at stem.org.uk/mars.

Back on Earth, Professor Sanjeev Gupta from Imperial College London will help NASA oversee mission operations from a science and engineering point of view and Professor Mark Sephton, also from Imperial College London, will be helping to identify samples of Mars that could contain evidence of past life.

Meanwhile, Professor Caroline Smith, from the Natural History Museum, will be studying the mineralogy and geochemistry of the different rocks found in Jezero Crater. Dr Keyron Hickman-Lewis, also from the Natural History Museum, will be studying the environments reflected by sedimentary rocks exposed in Jezero Crater and the potential for the preservation of ancient microbial life within.

[UK scientists play key part in NASA mission to Mars](#)

Science Minister Amanda Solloway said:

The Red Planet has been a source of fascination for centuries, and it is thrilling to be that little bit closer to finding out if there is life on Mars.

I am incredibly grateful to the scientists, researchers and engineers involved in this effort from the UK and around the world, and trust that it will inspire a new generation of space scientists across the country.

NASA's Perseverance rover was one of three space missions sent towards Mars during a July 2020 'launch window'. This minimum-energy launch period occurs approximately once every two years and two months and is the most economical time in which a rocket can be launched in order to reach its intended target. The next window in 2022 will see the UK-built Rosalind Franklin rover blast into space.

Perseverance will also study Mars' geology and climate. Credit: NASA/JPL-Caltech

The Perseverance mission has several science goals. It is carrying instruments geared to search for the carbon building blocks of life and other microbial biosignatures (morphological and chemical traces of life) and to reconstruct the Red Planet's geological history.

Sue Horne, Head of Space Exploration at the UK Space Agency, said:

It is great to see a strong representation of UK scientists and engineers involved in the Perseverance mission. Over the next few years, our scientists will play a leading role in this international endeavour, from managing science operations to deciding which samples are to be returned to Earth.

Perseverance will bring us one step closer to answering the question that's been on the lips of Bowie fans and scientists for the last forty years.

Its instruments will analyse scientifically interesting samples at the Martian surface. Selected samples will be collected by drilling down to several centimetres and then sealed in special sample tubes and stored on the rover.

When the rover reaches a suitable location, a cache of the tubes will be dropped on the surface of Mars to be collected by the Sample Fetch Rover, currently being developed by Airbus in Stevenage, which will take them to the NASA Mars Ascent vehicle. Professor Caroline Smith is involved in working with NASA and ESA scientists planning for how the samples will be curated upon their return.

Professor Caroline Smith, Planetary scientist at the Natural History Museum, said:

It's a great honour and so exciting to be working with a fantastic team of international scientific and engineering experts on this ground-breaking mission. We have the best opportunity with the fantastic instruments on board Perseverance and with the prospect of amazing samples being returned to Earth to finally answer the tantalising question of "Was there life on Mars"!

The rover also carries the Ingenuity Mars Helicopter, which will fly short distances from the rover and marks the first attempt at powered, controlled flight on another planet. A successful test of the helicopter could lead to more flying probes – to survey the landscape on other planets.

Perseverance carries the Ingenuity helicopter, light enough to fly in Mars' thin atmosphere. Credit: NASA/JPL-Caltech

Perseverance will be trialling technologies to help astronauts make future expeditions to Mars. These include testing a method for producing oxygen from the Martian atmosphere, identifying other resources, such as subsurface water, improving landing techniques, and characterising weather and other environmental conditions that could affect future astronauts living and working on Mars.

Professor Sanjeev Gupta, a geologist at Imperial College London, will be studying the ancient delta and lake sediments exposed in Jezero crater to reconstruct its evolution.

Prof Gupta is also one of the ten Long Term Planners for the mission. He will be working closely with the science team to develop the mission's strategic science vision, making sure that it fulfils its science objectives. Day-to-day he will work with the engineers in rover operations to search for samples of rocks for a future return to Earth.

Professor Sanjeev Gupta, Professor of Earth Science at Imperial College London said:

It is crucial to understand what the Martian climate was like early in Mars' history and whether it was habitable for life. Analysis of data from instruments onboard Perseverance will help us define the best spots to collect rock samples for future return to Earth.

Laboratory analyses of such samples on Earth will enable us search for morphological and chemical signatures of ancient life on Mars and also answer key questions about Mars' geological evolution.

Professor Mark Sephton, also from Imperial College London, is an astrobiologist who specialises in recognising the organic records of past life in rocks and will help the team select samples for eventual return to Earth.

Professor Mark Sephton, Head of the Department of Earth Science and Engineering at Imperial College London said:

This could be the mission that answers the question of whether life ever existed on Mars. Evidence of biology on another planet would mean that life on Earth was not alone.

We need to choose the best samples from a planet's worth of opportunities and return around half a kilogram of material from Mars. The molecular fingerprints of Mars life need not only to have been generated, but also preserved over billions of years.

Once safely back on Earth the samples of Mars will reveal their secrets when examined by the most powerful instruments available.

Palaeontologist Dr Keyron Hickman-Lewis, also from the Natural History Museum, will be working as part of the Returned Sample Science team, concentrating on identifying geological materials with high biosignature preservation potential. Put simply, these samples improve our chance of finding traces of life and revealing secrets from the past environments of Mars and what sort of ecosystems may have existed.

Dr Keyron Hickman-Lewis, UK Space Agency Aurora Fellow at the Natural History Museum, said:

Jezero Crater hosts a wide array of rock types from settings that may have hosted life: fine-grained sediments, carbonates and siliceous rocks, all of which are known to preserve fossilised traces of life on Earth with exceptional fidelity. We hope that the same may be true on Mars, and that these may provide us with unparalleled opportunities to understand environments, and potentially a biosphere, during the early history of Mars.

UK company Teledyne e2v has provided the image sensors to drive two of the instruments onboard Perseverance, SuperCam and SHERLOC. Teledyne's sensors have previously been used in the ChemCam instrument on-board NASA's Curiosity rover. The SuperCam and SHERLOC instruments of Perseverance will advance this capability by searching for organic compounds and minerals denoting alteration by watery environments, demonstrating habitable environments that may have hosted past microbial life on the Red Planet.

Dr Miles Adcock – President Space and Quantum at Teledyne e2v said:

Teledyne e2v has somewhat of a long and very proud tradition in supplying imaging technology for Mars missions, for both orbital and rover type vehicles and are also providing sensors for the Rosalind Franklin rover too. Our Essex based team work tirelessly to develop the technology to meet the demanding performance

requirements for missions such as going to Mars and on behalf of everyone I wish the mission every success.

Next year the Rosalind Franklin rover – named after the pioneering British chemist – will go to Mars as part of the European Space Agency’s ExoMars mission to examine the subsurface geological environment on Mars and search for signs of life, past or present.

The Rosalind Franklin rover, which was built by Airbus in Stevenage, will be able to drill two metres depth, gathering samples from regions not affected by radiation or oxidation at the surface.

[UKEF supports offshore wind deal in Taiwan and UK green jobs with £200 million](#)

- Two UK firms in the West Midlands and East Anglia win contracts in Taiwan
- UKEF has now provided credit guarantees of £500 million to finance several offshore wind projects in Taiwan
- Government backing part of plan for cleaner, greener trade focus for UK firms

UK Export Finance (UKEF), the UK’s export credit agency, is providing a £200 million buyer credit guarantee to help finance the Greater Changhua 1 Offshore Wind Farm in Taiwan, unlocking the export potential of the UK’s offshore wind sector.

To help the UK build back greener from the pandemic, the UK government has outlined a [Ten Point Plan](#) for a Green Industrial Revolution and supporting the UK’s offshore wind sector is a key part of its strategy.

UKEF has now provided £500 million of financing for three offshore wind projects in Taiwan alone since late 2019, creating trading opportunities for UK renewable energy companies and supporting green jobs.

Two UK renewable energy companies, Seajacks and Trelleborg’s applied technologies operation in the UK, have already capitalised on UKEF’s support by winning export contracts with Ørsted, the company leading the development of the wind farm.

Liz Truss, International Trade Secretary, said:

Harnessing the power of renewable energy is a vital part of our

plan to build back greener from the pandemic. By supporting projects like these we can help the UK lead the world in green growth and drive an exports-led, jobs-led recovery from Covid here at home.

The Greater Changhua 1 Offshore Wind Farm has a capacity of 605 MW, powering more than 650,000 households. This will help Taiwan to achieve its goal of generating 20% of its power from renewable sources by 2025.

Many international offshore wind companies have set up operations in Taiwan to help meet the market's ambitious energy transition target and UKEF's financing enables UK firms to better access these opportunities.

Seajacks, an East Anglia-based company, will ship the material needed to install the turbines and Trelleborg's applied technologies operation in the West Midlands will provide protection systems for the cables which connect the turbines to the mainland.

Sebastian Brooke, Seajacks COO, said:

This contract is an important milestone for Seajacks. This is the second major UKEF-backed project we have supplied to in Taiwan, and we are proud that British vessels will be installing these offshore turbines that will help power Taiwan's green energy revolution.

Richard Beesley, Business Development Director at Trelleborg's applied technologies operation, UK, said:

UKEF involvement on this project has helped us to further grow our renewable energy business here in the UK. This contract award is a significant achievement, in a market we recognise is crucial for future energy needs.

About UK Export Finance

[UK Export Finance](#) is the UK's export credit agency. It exists to ensure that no viable UK export lacks for finance or insurance from the private market, providing finance and insurance to help exporters win, fulfil and get paid for export contracts.

In 2020 UKEF received a [£2 billion uplift to its direct lending power](#) specifically for clean growth and renewable energy projects. This additional finance will support sustainable projects as global economies shift away from fossil fuels to renewable and low carbon solutions.

About Seajacks

Seajacks is an East Anglian-based offshore installation company. This is the

second UKEF-supported project that it has won business on in Taiwan and the first two outside of Europe. It will be providing transportation vessels for the installation of the turbines.

About Trelleborg's applied technologies operation

As part of the Offshore operation of Trelleborg Group, Trelleborg's applied technologies operation in Skelmersdale, UK, manufactures and designs innovative and reliable polymer and syntactic material solutions for the renewables industry. They will be providing NjordGuard cable protection systems and bellmouths to protect over 222 inter array and export cables which connect the turbines to the mainland.

Nursing applications in England up by over a third to 48,830

- UCAS figures published today show a 34% increase in applications to nursing courses in England
- Government continues to work to deliver on the manifesto commitment for 50,000 more nurses in the NHS

Health and care ministers have welcomed the latest figures out today showing the number of applications to undergraduate nursing courses this year is a third higher than last year.

UCAS has received 48,830 applications to nursing courses in England, up from 35,960 at the same point last year, representing a 34% increase.

Last year, the number of people accepting a place on a nursing course increased by 27% compared to 2019. Health Education England is working with health and education sector partners to make sure there are enough places for all suitable applicants who will go on to take up vital jobs in the NHS or social care sector.

The figures for England also show:

- an increase in applications of more than 50% among 25 to 34 year olds and 43% among 35-and-overs
- a 41% rise in male applicants

Minister for Care, Helen Whately said:

I'm delighted to see such an incredible boost in this year's applications, with more mature applicants helping to contribute to a diverse and truly representative nursing workforce. Thank you to everyone who has stepped up to support our health and social care

services.

These are the nurses of the future who will help the NHS and social care recover from this pandemic and continue to deliver world-class care to patients for years to come.

These figures are a testament to the work of Health Education England and UCAS in highlighting nursing as a rewarding and accessible career path, as well as the remarkable achievements of all health and care professionals over the past year.

We're another step closer to delivering 50,000 more nurses for our NHS and providing better healthcare for everyone.

Last year, the government introduced a new training grant for eligible nursing, midwifery and allied health profession (including paramedic) students of at least £5,000 a year, which does not need to be paid back.

Nursing students will also benefit from additional financial support for childcare and for those who study specialisms which typically have fewer applicants such as mental health or learning disability nursing. Eligibility for this is in line with existing criteria for tuition fee and maintenance support from the Student Loans Company.

The data is for applications received by 29 January 2021 which was the equal consideration deadline for full-time undergraduate applications for university and college courses that start this autumn.

UK-wide figures show total applications for nursing courses have risen by almost a third (32%) to reach 60,130.

[Record year for UK's £8.9bn cyber security sector](#)

- New report shows almost 50,000 people are now employed in UK cyber security
- Number of active cyber security firms in the UK increased 21 per cent on last year
- Sector contributed more than £4bn to the economy, attracting £800m of investment
- Cyber firms have stepped up to help the NHS in the national fight against coronavirus by providing vital technical support

The UK's growing cyber industry attracted record investment last year despite the global pandemic, according to a new government report.

With Covid-19 forcing more business and social activity online, the new figures reveal an increase in the number of cyber security companies and people working for them, as the government continues its drive to build back safer from the pandemic.

The [DCMS Annual Cyber Sector Report](#), which tracks the UK's cyber security industry across a range of indicators between April 2019 and December 2020, reveals a 21 per cent increase in firms operating in the field, bringing the total number to 1,483.

There was a nine per cent rise in employment in the industry with more than 3,800 new full time jobs created, bringing the total number of people working in the sector to 46,683.

The sector is now worth an estimated £8.9 billion, with a record £800 million of investment raised by firms.

Digital Minister Matt Warman will announce the findings at a CyberASAP event today, which gives UK researchers the opportunity to showcase their innovative new cyber security products to potential buyers.

Ahead of the virtual event, Digital Minister Matt Warman said:

The need for cutting-edge cyber security has never been greater and this resilient sector is growing, diversifying and solidifying its status as a jewel in the UK's tech crown.

With more than 3,800 new jobs created, firms – large and small – are doing vital work keeping people and businesses secure online so we can build back safer from the pandemic.

I am committed to supporting the industry to reach new heights, create more jobs and lead new innovations in this field.

The main findings from the report are:

- Despite the current economic climate, 2020 was a new record year for cyber security investment with UK cyber security businesses raising over £821 million across 73 deals – more than twice that raised in 2019
- The sector's total annual revenue has continued to rise (by 7 per cent), reaching £8.9 billion within the most recent financial year
- The sector contributed more than £4 billion to the economy – up 6 per cent in the last year, with mainly mature firms driving growth
- The majority (65 per cent) of the 46,683 cyber workforce are employed by large firms (250+ employees).

This year's survey also suggests that more than half of firms (54 per cent) are now based outside of London and the South East, with cyber security clusters flourishing across the country in areas such as Scotland, Northern Ireland and North West England.

The most commonly provided cyber security products and services include cyber professional services, threat intelligence, monitoring, detection and analysis. The research highlights particular growth in firms offering solutions for industrial control systems and IoT security, demonstrating the sector's ability to adapt and meet emerging challenges, such as the need to secure smart cities.

The data reveals that while nine in ten companies (89 per cent) felt Covid-19 had impacted their business, many of these firms have quickly adjusted and innovated within the current economic climate.

Despite some firms in the sector feeling the pressure, many have still found the capacity to offer vital technical support to the NHS, and other critical national services, sometimes on a pro-bono basis.

Edinburgh firm Quorum Cyber helped strengthen the cyber defences of the NHS and local councils during the pandemic and created a number of skilled jobs. Meanwhile SureCert, who have offices in London, Edinburgh and Belfast, helped ensure the rapid deployment of hundreds of Covid volunteers through its background check service.

Ian Savage, Founder and CEO of SureCert, said:

SureCert won one of the TechForce 19 competitions from NHSx in May. This competition provided funding for solutions that could find, background check and deploy hundreds of volunteers to support vulnerable people in communities across Scotland and Northern Ireland. SureCert focused on processing identity, reference and criminal record checks for volunteers, maximising trust during the pandemic.

Federico Charosky, Managing Director of Quorum Cyber, said:

Quorum Cyber have been incredibly lucky to be in a position to help, both directly and indirectly. Whether it was through providing cyber security services to the public and private sector, including delivering Security Operation Centre and Incident Response capabilities to local authorities and the NHS, or by hiring well over 25 people since the beginning of lockdown, including taking three graduate apprentices. Quorum Cyber continues to pursue our mission: we want to help good people win.

While the number of cyber security firms continued to grow despite the pandemic, the government recognises the importance of making sure small and medium-sized scale-ups can continue to access support to grow in the years ahead.

UK startup businesses driving innovation and development have been helped through the coronavirus outbreak with a £1.25 billion government support

package and the government has continued to back cyber security startups through programmes such as the LORCA cyber accelerator and the NCSC Accelerator to ensure early stage cyber businesses have the support they need to continue.

The DCMS-funded CyberASAP programme supports the commercialisation of cyber security research from UK universities. Its event today will see a fourth cohort of teams demonstrate their new products to an audience of potential customers, investors and other key figures in the cyber security sector.

Julian David, Chief Executive Officer, techUK said:

Reliable Cyber Security is essential for all organisations as they accelerate digital transformation in the wake of ongoing COVID-19 disruption and the UK industry is responding to that need. This research shows a sector going from strength to strength, with increasing investment in our growing cyber ecosystem and, perhaps most significantly, uptake of the technologies and services keeping UK citizens and business safe.

One key finding is that 54% of cyber companies are now based outside London and the South-East, an encouraging change which will improve cyber resilience across all the nations and regions of the UK, as well as sharing the economic prosperity offered by this fast-growing sector. This regional development is one area which techUK will continue to actively partner with DCMS, through initiatives like Cyber Exchange, as Government and industry continue to strengthen the UK's position as a leading cyber nation.

Notes to Editors:

- The [UK Cyber Security Sectoral Analysis 2021 can be found here](#).
- The Government's £1.9 billion National Cyber Security Strategy is protecting the nation in cyber space and helping to make the UK the safest place to live and work online.
- The Department for Digital, Culture, Media and Sport (DCMS) commissioned Ipsos MORI, in conjunction with Perspective Economics, the Centre for Secure Information Technologies (CSIT) at Queen's University Belfast, and Professor Steven Furnell (University of Plymouth) in January 2020 to undertake this updated analysis of the UK's cyber security sector.
- The study tracks the UK's cyber security industry across a range of indicators between April 2019 and December 2020. This includes economic and financial statistics covering April 2019 – March 2020 (FY19/20), survey data gathered between May and July 2020, and modelling conducted

between August and October 2020. Investment data analysis was conducted in January 2021 and captures investment activity for the full year of 2020 (January – December 2020).

- This latest analysis builds upon the baseline UK Cyber Security Sectoral Analysis which used data from 2019 and was published in January 2020. The 2018 report provided a baseline for the number of UK cyber security companies; the cyber security sector's contribution to the UK economy; the number of personnel employed in the cyber security sector; and an overview of the products and services offered by these firms.
 - The [Cyber Security Sectoral Analysis 2020 report can be found here](#) and the [first sectoral report from 2018 can be found here](#).
 - As part of its levelling up agenda the government is investing heavily in the country's digital skills, R&D capabilities and world-class digital infrastructure to make sure cyber firms have the right environment to succeed.
 - The government's Cyber Skills Immediate Impact Fund incentivises organisations to develop cyber security training to boost diversity and attract more people to the profession. Initiatives such as Cyber Discovery, an online game that helps teens learn cyber skills in engaging ways, and the CyberFirst Girls Competition, which inspires school girls to enter the profession, are helping make sure UK businesses have a strong pipeline of diverse talent for years to come.
 - In the summer the government announced a £10 million fund to help develop secure future technologies through its Digital Security by Design Challenge. The programme has the potential to prevent hackers from remotely taking control of digital systems such as autonomous cars, personal computers or smart home security systems, meaning people and online businesses are better protected.
 - The UK boasts world-class universities that are pioneering cutting-edge academic research, including 19 which have been recognised as Academic Centres of Excellence in cyber security research. Bristol and London are also home to three Centres for Doctoral Training, funded by the EPSRC Research Council, which are training the next generation of cyber security research leaders.
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February interim findings from COVID-19 REACT-1 study published

- Over 85,400 volunteers tested in England between 4 and 13 February 2021 as part of one of the largest COVID-19 studies
- Initial findings from Imperial College London and Ipsos MORI show infections fell by more than two-thirds from the last REACT report, with 1 in 196 people infected
- Infection levels remain high and it is critical everyone continues to follow the rules to help bring down infections even further and reduce pressure on the NHS

The [interim findings from the ninth report of REACT-1](#), one of the country's largest studies into COVID-19 infections in England, have been published today by Imperial College London and Ipsos MORI.

Over 85,400 volunteers were tested in England between 4 and 13 February to examine the levels of infection in the general population. The findings show infections in England have fallen significantly since the last report in January.

These latest findings demonstrate the impact lockdown restrictions are having on reducing infections across the country. Infections still remain high with more people in hospital than at the peak last April and hospital admissions for COVID-19 are at around 1,600 a day. It is vital everyone continues to play their part by staying at home and getting vaccinated when invited.

The main findings from the ninth REACT study show:

- national prevalence fell by two thirds from 1.57% to 0.51%, or 51 per 10,000 infected, compared to the last REACT report from 6 to 22 January
- a halving time of 15 days and an R number of 0.72, based on the prevalence observed at the end of the last report and today's interim findings
- regional prevalence fell in all areas compared to the last REACT report from 6 to 22 January. It was highest in the North West (1.38% to 0.91%) and North East (1.22% to 0.82%). There were substantial falls in prevalence compared to the last report in January in London (2.83% to 0.54%), West Midlands (1.66% to 0.33%), East of England (1.78% to 0.54%), South East (1.61% to 0.30%), East Midlands (1.16% to 0.51%). There was a smaller fall in Yorkshire and the Humber (0.80% to 0.61%)
- prevalence fell substantially across all age groups compared to the last REACT report from 6 to 22 January. Prevalence fell from 0.93% to 0.30% among the over-65s. Highest prevalence is among 18 to 24-year-olds at 0.89% and those aged 5 to 12 at 0.86%
- large household size, living in a deprived neighbourhood, and areas with higher numbers of Asian ethnicity individuals were associated with increased prevalence
- healthcare and care home workers were more likely to test positive

compared to other workers

Health and Social Care Secretary Matt Hancock said:

“These findings show encouraging signs infections are now heading in the right direction across the country, but we must not drop our guard.

“Cases and hospital admissions remain high – over 20,000 COVID-19 patients are in hospital – so it is vital we all remain vigilant and follow the rules as our vaccination rollout continues at pace.

“I urge everyone to continue to stay at home – remember hands, face, space – and get your jab when you receive your invite.”

While the vaccine programme continues to expand to protect as many people as possible, with over 15 million people vaccinated, we do not yet know whether being vaccinated stops someone from passing the virus on to others. It will also be some time before the impact of the vaccination programme reduces pressures on hospitals.

It is critical everyone continues to follow the rules, stays at home, reduces contact with others and maintains social distancing – remembering hands, face, space.

Professor Paul Elliott, director of the programme at Imperial, said:

“These encouraging results show that lockdown measures are effectively bringing infections down. It’s reassuring that the reduction in numbers of infections occurred in all ages and in most regions across the country. “While the trends we’ve observed are good news, we need to all work to keep infections down by sticking to the measures which are designed to protect us and our health system.”

Kelly Beaver, Managing Director, Public Affairs at Ipsos MORI, said:

“The reduction in prevalence from our last REACT round is very welcome, particularly the very large reduction in London. But it’s important that we continue following all the measures that the government has set out so that we can continue to see further reductions, and make progress in beating the pandemic.”

This report is the latest from the REACT study which was commissioned by DHSC and carried out by a world-class team of scientists, clinicians and researchers at Imperial College London, Imperial College Healthcare NHS Trust and Ipsos MORI.

Background information

Read more information on the [Real-time Assessment of Community Transmission \(REACT\) programme of work](#)

This study falls under pillar 4 of the COVID-19 National Testing Programme, which focuses on mass surveillance in the general population.

See the [REACT-1 studies on GOV.UK](#).