RASPBERRY PI FOUNDATION
ANNUAL REVIEW 2015

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> " Our mission is to put the power of digital making into the hands of people all over the world "
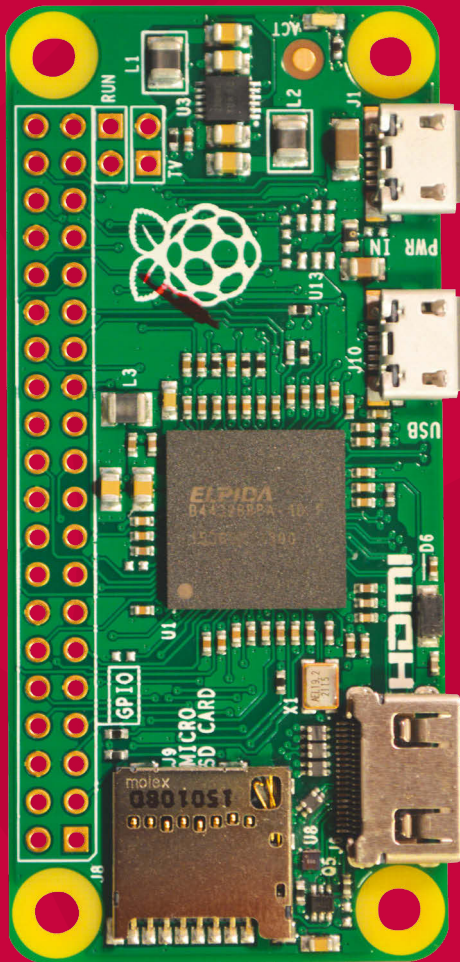
ABOUT US

The Raspberry Pi Foundation was established in 2008 as a UK-based charity with the purpose "to further the advancement of education of adults and children, particularly in the field of computers, computer science, and related subjects". Through our trading subsidiary, Raspberry Pi Trading Limited, we invent and sell low-cost, high-performance computers that people use to learn, to solve problems, and to to have fun. Since launching our first product in February 2012, we have sold eight million Raspberry Pi computers and have helped to establish a global community of digital makers and educators. We use profits generated from our commercial activities to pursue our educational goals; we also receive funding and in-kind support from generous partners and donors who share our mission.

> 66 We invent and sell low-cost, high-performance computers that people use to learn, to solve problems, and to to have fun 99

Our mission

Our mission is to put the power of digital making into the hands of people all over the world.

We think this is essential so that people are:

- Capable of understanding and shaping an increasingly digital world
- Able to solve the problems that matter to them, both as makers and entrepreneurs
- Equipped for the jobs of the future

We pursue our mission through three main activities:

- We provide low-cost, high-performance computers that people use to learn, to solve problems, and have fun
- We make computing and digital making more relevant and accessible to more people through outreach and educational programmes
- We help people to learn about computing and how to make things with computers through resources and training
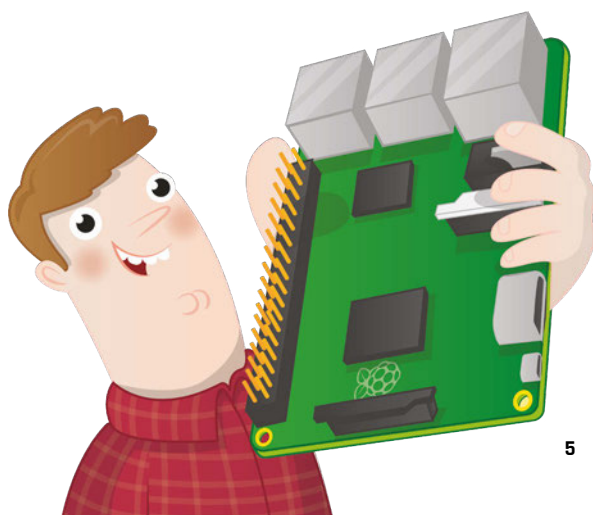
INTRODUCTION
FROM THE CHAIRMAN

DAVID CLEEVELY

It's now four years since we launched the first Raspberry Pi computer, thinking that perhaps we might sell a few tens of thousands and that maybe we could encourage more children to think about learning computer science. We have now sold over 8 million computers and helped many more people of all ages get interested in programming. We are part of a global movement of educators and makers who are changing the world. It's an achievement of which the Founders, staff, partners, sponsors, and the wider community should all feel very proud.

2015 was a big year for the Raspberry Pi Foundation. We launched the Pi 2 and the Pi Zero. We recruited a new CEO – Philip Colligan – and have new clarity for our mission and strategy. We merged with Code Club so we can enable many more children to discover the fascinating and fun world of programming. ESA took two Raspberry

> **❝** We have now sold over 8 million computers and helped many more people of all ages get interested in programming **❞**

Pi computers to the International Space Station, where astronaut Tim Peake is now running programs and experiments designed by schoolchildren.

And the pace has not slowed. The Raspberry Pi 3, launched at the end of February 2016, sets a new benchmark for single board computers. We have great plans for working with Code Club and other partners as we help train teachers and get kids programming. We have welcomed the first of our members: a diverse and fascinating group who will help advise the Trustees and contribute to Pi's success. This year will be very exciting for the whole community.

Alan Mycroft, one of the original Founders, stepped down as Trustee at the end of 2015 and remains a Member. I'd like to thank him for all the help and support he has provided and look forward to working with him in his new role. I'd also like to welcome Sherry Coutu and Chris Mairs onto the Board of Trustees, and Clare Sutcliffe and colleagues from Code Club to the Raspberry Pi Foundation. And, of course, to thank all of you - founders, members, trustees, staff, partners, sponsors, and the wider community – for making the Raspberry Pi Foundation an amazing success.

It is a privilege to continue to be chair of the Trustees. It is also one of the most interesting and exciting things I have done in my career. I am really looking forward to 2016!

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" The Raspberry Pi 3, launched at the end of February 2016, sets a new benchmark for single board computers "
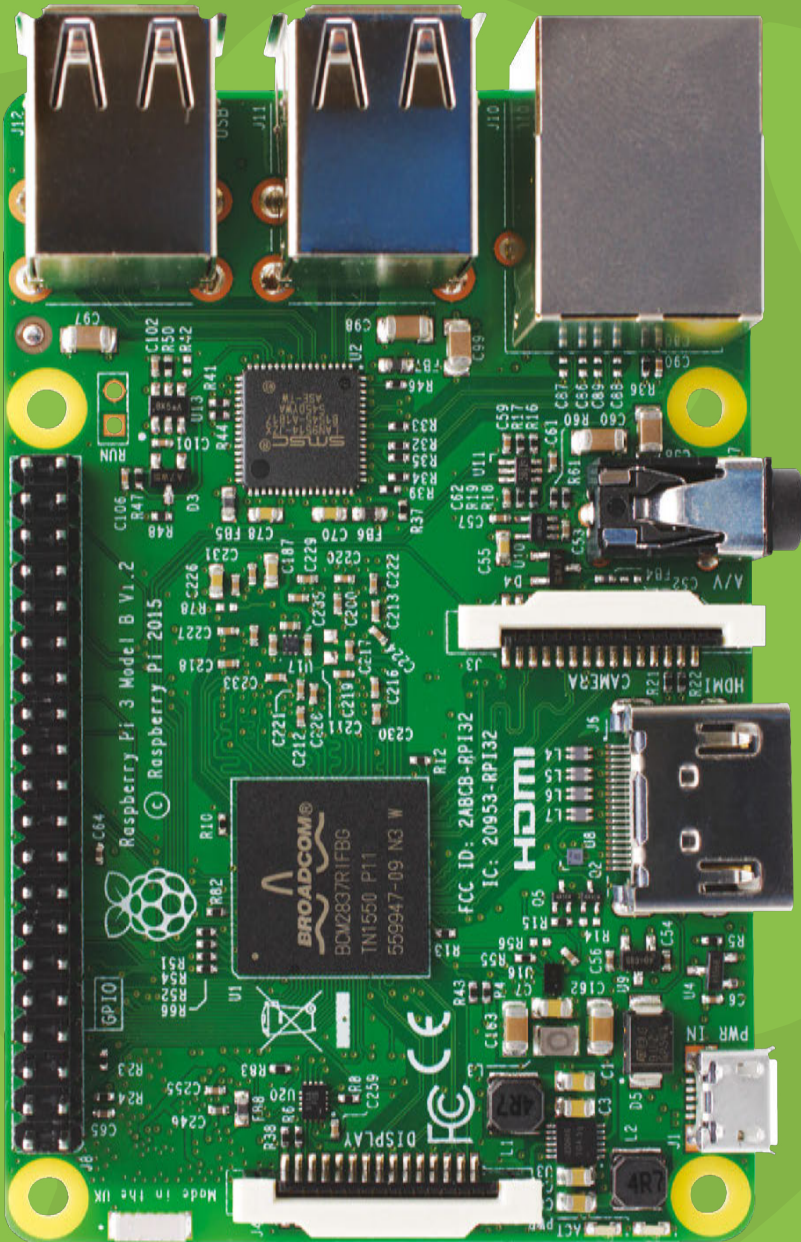
INTRODUCTION
FROM THE FOUNDATION CEO
PHILIP COLLIGAN

I'm delighted to present the latest annual review from the Raspberry Pi Foundation.

As you'll see, it's been a year of extraordinary achievements in terms of both our products and our educational mission. Creating the opportunity for schoolchildren to write code that will run on the International Space Station is just one example of how we're making computing more relevant and accessible to young people. You'll find many more in the pages of this review.

What you'll also find are stories about the extraordinary achievements of the people in the Raspberry Pi community – young people, educators, volunteers, makers – who share our mission to empower people to shape their world through digital technologies. It is an incredibly generous and supportive community that is a constant source of inspiration for us at the Foundation.

Our mission – to put the power of digital making into the hands of people all over the world – has never felt more relevant.

I joined the Foundation in July and one of my first tasks was to revisit our strategy and priorities. I spent a lot of time with the team, trustees, partners, and the wider community, thinking about how we can best contribute to the movement of digital makers that is growing around the world. Hundreds of people contributed their ideas and in December the Board of Trustees agreed the new strategy, which you can find on our website.

The new strategy involves two significant shifts in emphasis. First, we are focusing on digital making, meaning that we will help people of all ages learn how to make things with computers. Second, we are becoming an operating foundation, meaning that we will achieve impact directly through programmes that we run in partnership with others. It feels like we've got some real clarity about how we can make a difference and we're excited to be putting it into action.

As part of this new direction, the Foundation merged with Code Club at the end of the year. With over 6,000 active clubs, Code Club is already the world's largest network of volunteer-led after school coding clubs, and we're confident that we can see the reach and impact grow further. It's been great to welcome Code Club's staff, teachers, and volunteers to the Raspberry Pi community.

Our work is only possible because of the amazing community of people and organisations that share our mission and contribute their ideas, expertise, and resources. If you're already part of that community, thank you, we simply couldn't do it without you. If you're not yet part of that community, get involved.

> ❝ Our mission – to put the power of digital making into the hands of people all over the world – has never felt more relevant ❞

INTRODUCTION
FROM THE TRADING CEO

EBEN UPTON

This has been another fantastic year for Raspberry Pi. Hot on the heels of Raspberry Pi 2, launched in February 2015, we introduced the official Raspberry Pi case (which taught us more than we ever wanted to know about the intricacies of injection moulding), the Sense HAT (destined for great heights), and the 7" touch-screen display (which vied with the case for the title of our most troublesome product). We welcomed one or two new faces, and learnt a lot of new tricks.

to seventy and then a hundred pages, and swiftly recruited Rob as features editor. After a brief digital-only hiatus, we returned to print in July. The MagPi is now available in newsagents and supermarkets throughout the UK, and in Barnes & Noble and Micro Center in the US. It has been joined by a range of books, with more to come in 2016.

Dominating everything else in 2015 were the twin engineering efforts to produce Raspberry Pi Zero, our $5 entry-level machine, and Raspberry Pi 3, with its

> ❝ There's plenty to look forward to in 2016: new books, new software, and maybe even one or two new toys ❞

The Sense HAT was developed specifically to support the Foundation's 'Astro Pi' project. This flew two Raspberry Pi computers and Sense HATs in custom-designed aluminium cases to the International Space Station, and challenged UK schoolchildren to come up with experiments for British ESA Astronaut Tim Peake to run during his six-month sojourn there. Jonathan and Dave led the engineering effort, ably proving the maxim that you're not ready to fly until the paperwork outweighs the payload; they rounded out the year with a trip to Florida to watch the hardware go uphill on top of an Atlas V rocket.

At the start of 2015, at Liz's urging, we took over responsibility for the fan-produced magazine The MagPi. Russell joined the team as managing editor, grew the magazine first

integrated connectivity and 64-bit quad-core CPU. This was a full-team effort: Mike designed Zero; James designed Raspberry Pi 3; Gordon, Phil, and Dom wrote the drivers and firmware; Roger ran the wireless conformance campaign; Simon and Serge made everything fit together on the software side. This is the best team I've ever worked with, and together we've produced the two best products on the market.
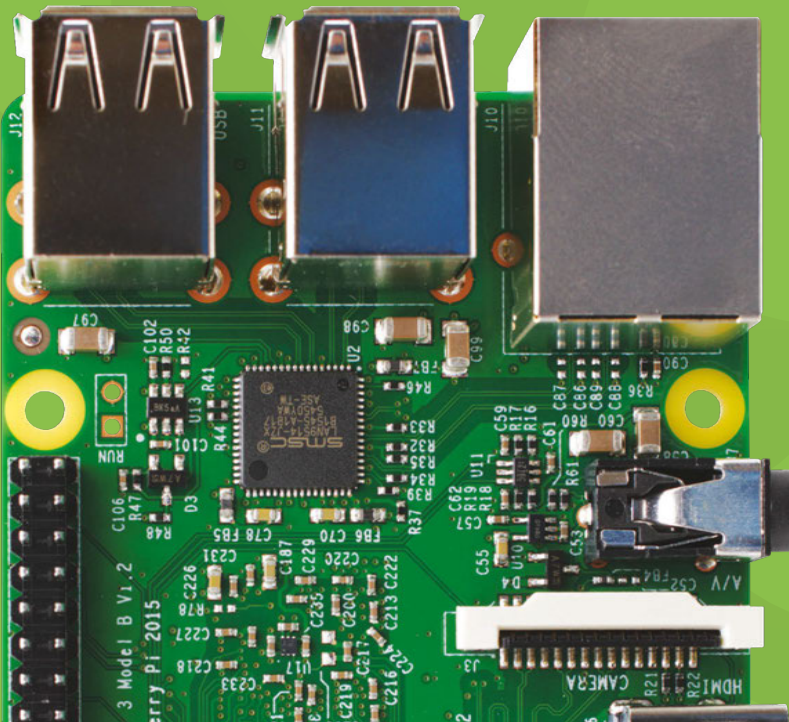
There's plenty to look forward to in 2016: new books, new software, and maybe even one or two new toys. We just hope you enjoy playing with them half as much as we enjoy making them.
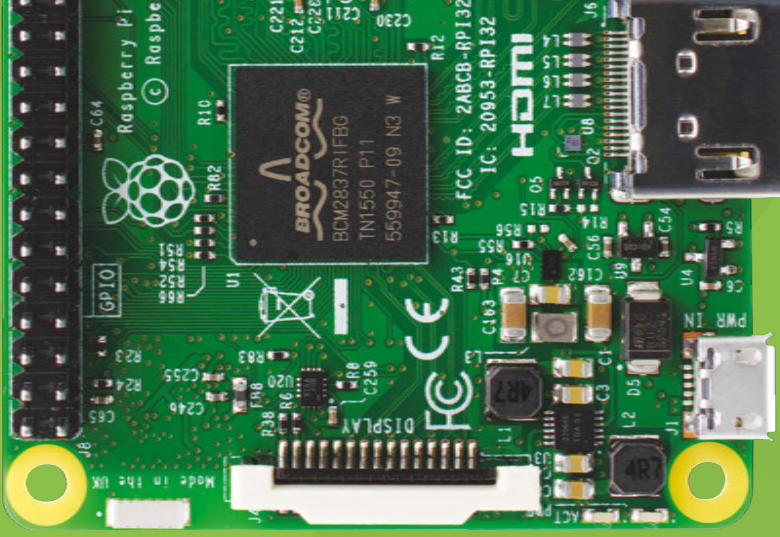
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COMPUTERS

> " We provide low-cost, high-performance computers that people use to learn, solve problems, and have fun "

THE RASPBERRY PI
COMPUTER

Since launching our first product in February 2012, we have sold eight million Raspberry Pi computers, making it the most popular British computer ever. In 2015 alone, we sold 3.1 million devices.

We work hard to make sure that Raspberry Pi computers are as low-cost as possible, providing access to high-performance computing that people use to learn, solve problems, and have fun.

We provide much more than affordable, powerful hardware. We also invest in free software and work with partners to provide access to some of the world's most powerful educational software, to help people learn how to program computers.

Growing power

With each new version the Raspberry Pi computer has continued to become more powerful and more capable. With the launch of Raspberry Pi 2 in early 2015, we demonstrated that low-cost computing does not mean low-performance computing. The Raspberry Pi 2 provides an incredibly rich experience to the end user; the projects we have seen this year which used it have consistently surprised us with their creativity and innovation.

Raspberry Pi 3, launched at the end of February 2016, continues the curve: 50% more powerful than its predecessor, it is an attractive proposition for those who want to use the computer as a productivity machine. It also introduces on-board connectivity for the first time, with the introduction of wireless LAN and Bluetooth, making IoT and mobile projects far more accessible.

One of our goals has been to remove price as a barrier to everyone being able to access powerful computers. This year,
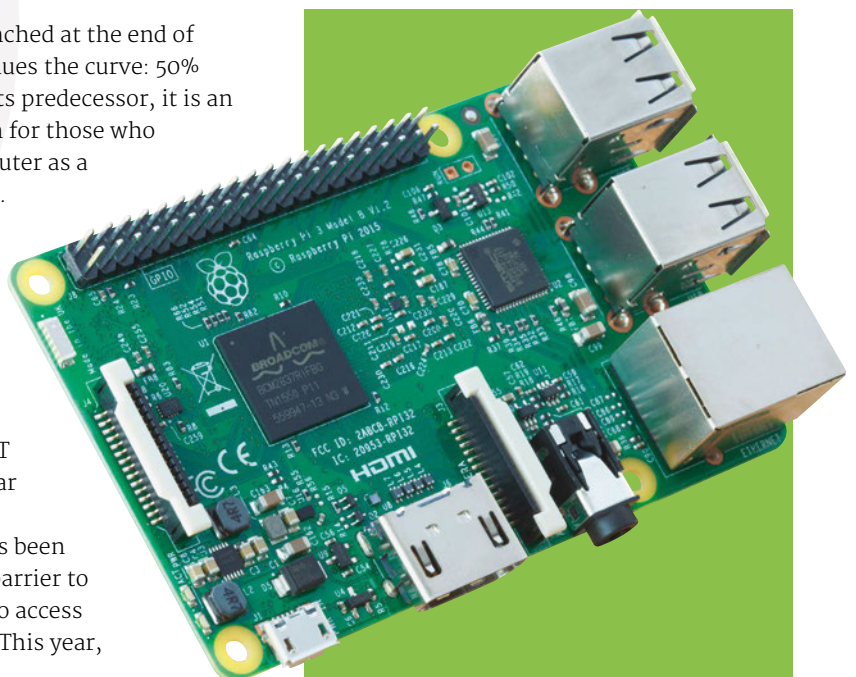
we achieved that goal. In November, we launched Raspberry Pi Zero, the world's first $5 computer, by giving the first 20,000 away free on the cover of our magazine, The MagPi. We knew it would be popular, but demand has far exceeded even our expectations, with units selling out as quickly as we can produce them.

Made in Wales

The Raspberry Pi Foundation is a British enterprise. We design our computers and develop software in the UK, and the vast majority of Raspberry Pi computers are also manufactured in the UK. Since the Model B Rev 2, we have worked with Sony's manufacturing plant in Pencoed, South Wales to manufacture our boards. They also ensure all the parts are sourced ethically and to the highest environmental standards.

Developing software

Our team of software and hardware engineers make constant improvements to Raspbian, ›

Steve Dalton OBE, Managing Director Sony UK Technology Centre; Jo Johnson MP, Welsh Minister of State for Universities and Science; and our CEO (Trading) Eben Upton mark the 5 millionth Raspberry Pi computer at the Sony factory in Pencoed, Wales.
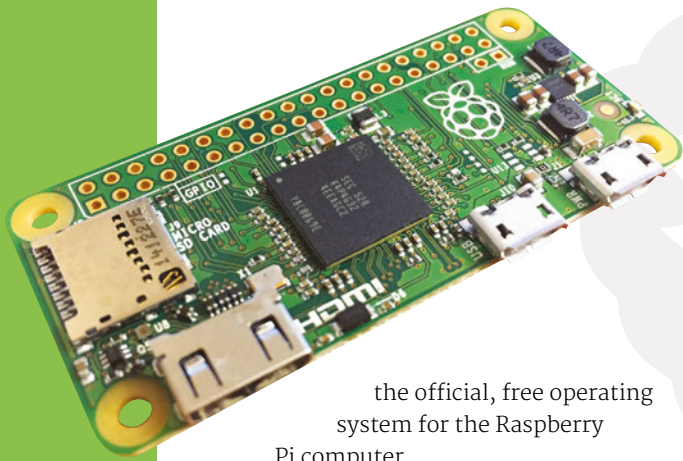
...the official, free operating system for the Raspberry Pi computer.

This year saw significant upgrades, which included considerable enhancements to the suite of educational software which ships with the Raspberry Pi computer. The Raspbian version of the popular primary computing package Scratch is instantly recognisable to any child who has used Scratch before, but it includes extra functionality for those doing physical computing. Now Scratch users can drive motors, switches, lights, and other electronic elements from their Raspberry Pi computer, adding a new dimension to coding.

Through partnerships with some of the world's biggest software companies, we have continued to bring free educational software to the Raspberry Pi. This year we introduced Greenfoot and BlueJ, both popular development environments for teaching Java, thanks to help from our friends at Oracle. We continue to provide a

> " Children all over the world are using Raspberry Pi computers to play games, listen to music, and watch videos "

wide range of other integrated development environments (IDEs), making the Raspberry Pi computer a tool which can be used to learn any programming language the user wants to try.

Wolfram Research very generously provide a free copy of their computational mathematics program, Mathematica, to each Raspberry Pi user. The last time Mathematica was bundled for free was when Steve Jobs' NeXT came with the software: those computers were used by the CERN physicists who invented the World Wide Web. Wolfram also licences the Wolfram Language to Raspberry Pi users for free.

Minecraft is one of the most popular applications for young people, and we are grateful to Microsoft for providing a free version to all our users. The Raspberry Pi version allows players to extend and change

the world of Minecraft using Python, bringing the power of programming to this already well-loved environment.

Through our partnership with Dr Sam Aaron of the University of Cambridge Computer Lab, we have continued to introduce children of all ages to the joys of making music through code with the fantastic Sonic Pi software. Compositions made with Sonic Pi have been featured on the BBC, played in nightclubs, and appeared on concert stages.

Growing impact

Children all over the world are using Raspberry Pi computers to play games, listen to music, and watch videos. This gives us a way to show them that they can also code their own games, make their own music, and create their own movies. They're also building robots, rockets, and talking Christmas trees; monitoring bee populations and environmental health; creating art and making themselves and the people around them happy. Millions of kids are learning and enriching their lives and surroundings with Raspberry Pi computers. We want to help them to continue to do just that.
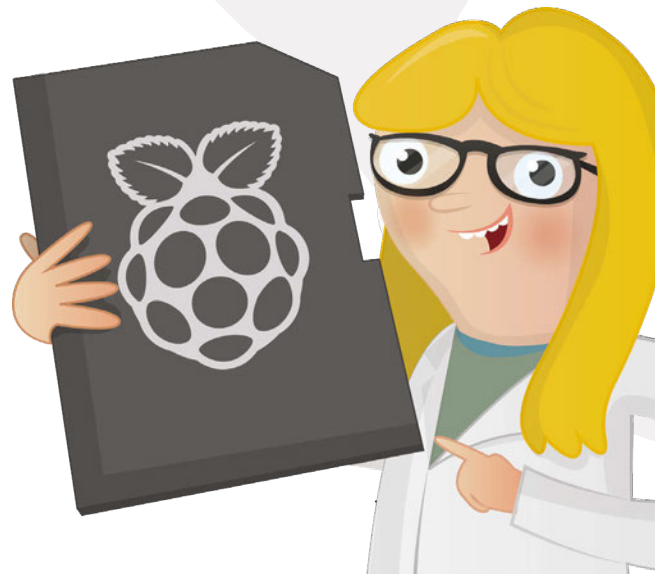
RASPBERRY PI
POWERED PROJECTS

The Raspberry Pi computer was always intended as a tool that people could use to solve the problems that matter to them and their communities. We continue to be amazed at their creativity.

Our forums at raspberrypi.org are full of people sharing their ideas, asking questions, and learning from each other, as well as making friends and having fun. Whether they are experienced programmers or totally new to digital making, the Raspberry Pi forums are an online space for people to tap into the community that has built around the Raspberry Pi Foundation.

The creativity of the maker community has few limits. As well as dealing with such important challenges, Raspberry Pi computers have made thousands of fun projects possible.

We've seen automatic chicken coop closers, laser-based dog training systems, and machines to solve Rubik's cubes. Those of a musical persuasion have been particularly inspired. They've transformed guitars into Game Boys, staircases into playable pianos, and a Raspberry Pi computer into a sampler capable of playing any recorded sound on a keyboard.

A RASPBERRY PI HYDROPHONE

At the cutting edge of learning about our planet, researchers at the University of São Paulo have used a Raspberry Pi computer to build an underwater recorder capable of tracking the sounds of whales, dolphins, and porpoises.

These species are considered to be a measure of the health of ocean ecosystems, but they are difficult to track and count. The hydrophone device the researchers have created helps them to track the animals to help them conserve their numbers.

A Raspberry Pi computer is well suited to this application due not only to its low cost, but also its open nature. This allows the way the hydrophone works to be adapted for different research methods. Whether it is out in the field or in a science classroom monitoring smaller sensors, Raspberry Pi computers are becoming an important tool for learning about how our world works.

Read more:
raspberrypi.org/blog/underwater-recording
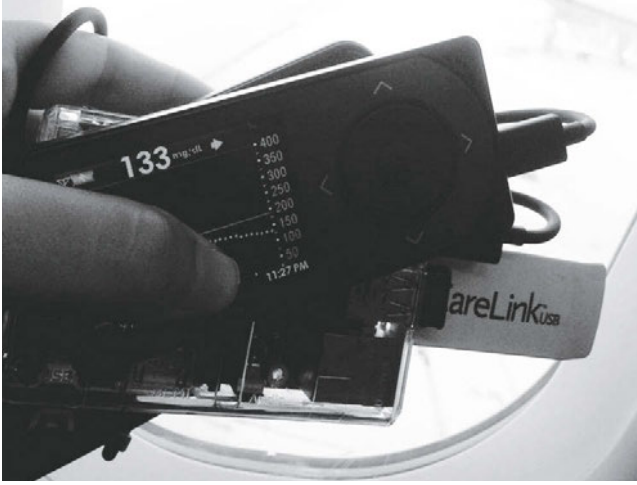
DIY PANCREAS

Dana Lewis has type 1 diabetes. This means her pancreas doesn't produce enough insulin, so she has to monitor her blood glucose levels and take insulin to regulate them.

Dana often slept through the alarm on her existing equipment, so she and partner Scott Leibrand designed a louder alarm using a Raspberry Pi. As tends to happen when you put a general-purpose computer to work, they expanded the features and ended up with an artificial pancreas.

The computer, connected to her glucose monitor, learns when she triggers a dose of insulin. It now automatically administers her insulin, even when she is asleep. Dana and Scott are working to get their plans for this device approved by the FDA. This project has already changed one life, and could soon be changing many others.

Read more:
raspberrypi.org/blog/artificial-raspberry-pi-pancreas

A ROMANTIC PI PROPOSAL

Matt Broach wanted to propose in a unique way, and decided a Raspberry Pi computer provided the opportunity to ask his girlfriend Jackie to marry him.

Matt handcrafted a box containing a built-in computer. This was triggered when the box was opened: a screen displayed an animation Matt had created, leading to the important question. Matt didn't stop at delivering the message, though: at just the right moment the computer also presented the ring, illuminating a hidden compartment in which it had been concealed.

Matt's Raspberry Pi computer didn't let him down, and Jackie said 'yes'. Now they are happily engaged, showing the potential of inventive thinking, technical skills, and a credit card-sized computer to create romance.

Read more:
raspberrypi.org/blog/she-said-yes

ANALOGUE LOOPING PIANO

Lancaster, PA is the self-proclaimed 'street piano capital of the world'. Its annual 'Keys to the City' project places pianos across the city to help people get creative, and build communities.

Street pianos encourage people to improvise, but their ideas are usually lost as players move on. This year, however, the event featured a piano hacked to capture people's creative expressions. Mike and Sean from MajorMega souped up their piano with a Raspberry Pi 2 and some magnetic pickups to make the recording happen.

The Raspberry Pi's ability to connect to the internet allowed the piano to upload and share recordings. Now nothing is lost, and analogue jams can reach a wider, digital audience.

Read more:
raspberrypi.org/blog/quaver-the-analogue-looping-piano
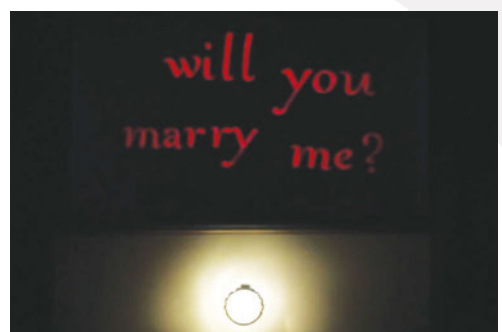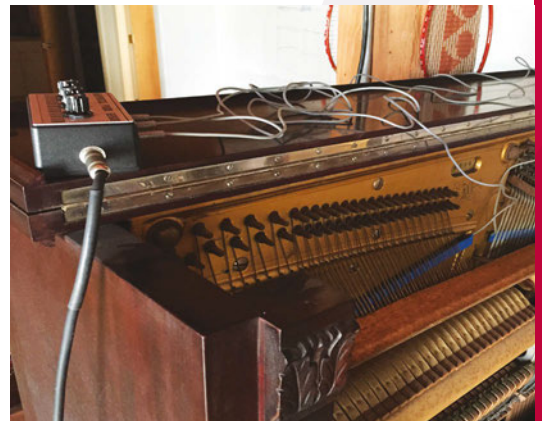
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OUTREACH

66 We make computing and digital making more relevant and accessible to more people through outreach and educational programmes 99

ASTRO PI
YOUR CODE IN SPACE!

December saw one of the most exciting developments in the history of the Raspberry Pi Foundation, as two Astro Pi units were sent to join British ESA astronaut Tim Peake on the International Space Station (ISS). The Astro Pi programme aims to engage young people with computing, programming, engineering, and science through involving them in Tim's mission, Principia. As you read this, code written by school-age children from the UK is running in space.

PARTNERS:

The hardware
This ambitious project saw the Raspberry Pi Foundation's engineers developing the Sense HAT board, which includes sensors for temperature, pressure, and humidity, as well as a gyroscope, an accelerometer, and a magnetometer, all for taking measurements in space. Initially developed specifically for the competition, the Sense HAT went on sale in August 2015, and educators and the Raspberry Pi community have since developed a large range of projects for it.

> ❝ As you read this, code written by school-age children from the UK is running in space ❞

As you'd expect, putting equipment onto the ISS isn't a trivial undertaking. It took hard work from our Education Resource Engineer Dave Honess and Senior Software and Hardware Engineer Jonathan Bell, as well as our partners in UK Space, UK Space Agency, and the ESA. A flight case was designed and manufactured from aerospace-grade aluminium. The units also had to pass rounds of tests to ensure they could survive in such unusual conditions.

What's perhaps most remarkable is that, apart from their special flight case, the Raspberry Pi units, Sense HATs, and camera modules in space are exactly the same as the ones being used by children here on earth.

The competition

In January we invited school-age children to submit ideas for projects and experiments they could undertake using the sensors and hardware on the Astro Pi units. Teachers took this opportunity to incorporate the competition into their lessons, and children from 390 schools sent us an enormous assortment of creative and clever ideas. The best ideas were sent their own Astro Pi classroom kits to create their project using the same hardware that was soon to be sent into orbit.

The final projects were judged by representatives from the leading UK Space companies, the UK Space Agency, the European Space Education Resource Office UK, and the Raspberry Pi Foundation. We followed the Blue Peter competition rules for the highest standards of fair judgement. The judges were blown away by the quality of the entries, and the winners now have their code in space.

We've also worked with a wide range of educational partners including the Royal Institution, Nesta, CoderDojo, and STEMNET, to continue to engage many more children and young people in the Astro Pi mission.

We're now working on extending the impact of Astro Pi with new competitions linked to Tim Peake's mission and, potentially, working with other astronauts in future.

British ESA
Astronaut
Tim Peake
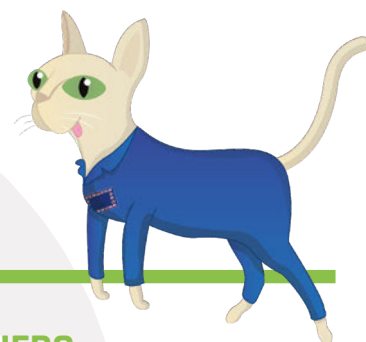
THE WINNERS

Cranmere Code Club, Cranmere Primary School, Key Stage 2.
Project: Crew Detector

Hannah Belshaw, Cumnor House Girls School, Key Stage 2.
Project: SpaceCRAFT

Space-Byrds, Thirsk School, Key Stage 3.
Project: Flags

Kieran Wand, Cottenham Village College, Key Stage 3.
Project: Watchdog

EnviroPi, Westminster School, Key Stage 4.
Project: Trees

Team Terminal, Lincoln UTC, Key Stage 4.
Project: Reaction Games

Arthur, Alexander, and Kiran, Magdalen College School, Key Stage 5.
Project: Radiation

Find out more about Astro Pi at:
astro-pi.org

CREATIVE
TECHNOLOGISTS

The Creative Technologists programme provides opportunities for young people to develop their skills in creative uses of technology, exploring new ways of combining digital technology with more traditional arts.

In February 2015 we opened applications for 16–21 year olds to take part in a programme of mentoring and support. Nine were selected in March, and joined our Creative Producer Rachel Rayns on the programme.

Creative backgrounds

The Creative Technologists have a range of backgrounds. They describe themselves as musicians, animators, programmers, computer engineers, writers, photographers, videographers, and even a magician. They have explored the crossover between the arts and technology by developing their own creative projects including creating tools for making music by manipulating light and aerial ropes,

> ❝ Being a part of the CT programme has opened my eyes to the world of open source and the benefits of working closely within a community; anything is possible if you work together and merge strengths ❞
>
> **Yasmin Curren**

KEY FACTS

Mentoring programme for nine 16-21 year olds. Participants from across the UK, from Belfast to Brighton.

- Four field trips
- Monthly online group chats
- Fortnightly one-to-ones with mentors
- One final project, showcased at the Creative Technologists exhibition

Find out more at:
www.rpct.io

understanding the internet through interactive games, and exploring stories of a possible future through robots.

The programme provides financial assistance, mentoring, technical advice, field trips, and workshops. The Creative Technologists have showcased their work and represented the Raspberry Pi Foundation at events like Picademy and Mozfest.

Graduation

The Creative Technologists will graduate in April 2016, after producing their own final exhibition showcasing their work.

WEATHER
STATION

WEATHER STATION SENSORS

- Air quality
- Wind speed
- Wind direction
- Wind gusts
- Ambient temperature
- Soil temperature
- Barometric pressure
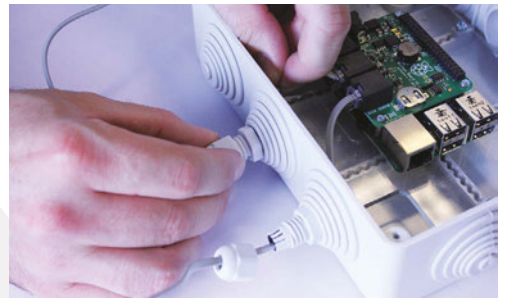- Rainfall
- Relative humidity
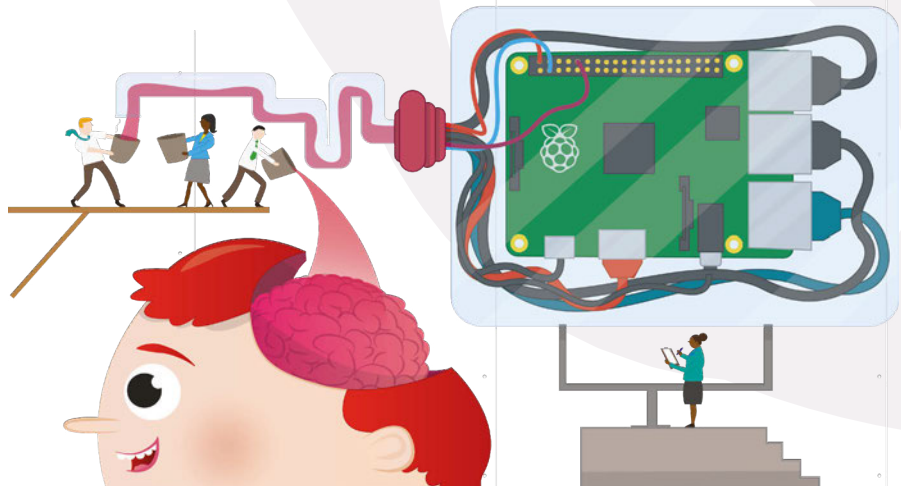
With the support of our partner Oracle, the Foundation has developed the Raspberry Pi-powered weather station project, which will see 1,000 schools in 88 countries build and program a weather station, bringing together science, geography, mathematics, and computing.

Sensing the world

The weather station project lets children and young people build their own device for collecting weather data. The station comes as a kit, which they assemble and install in their school. They will set up and program the software to collect weather data, with support from the Raspberry Pi Foundation's learning resources. Once the data is collected they analyse it, developing computing skills

In 2015 we developed the hardware and software for the weather station, created the educational resources, and recruited 940 schools in 88 countries. In 2016 schools will receive the hardware, get set up, and start recording, analysing, and contributing their findings to the Oracle database.

ORACLE®

along the way. This includes uploading their data to an Oracle database and comparing it to data collected by hundreds of other schools in different parts of the world. Students will learn about the science of weather, how to collect and manipulate real data using digital technology, and how weather differs around the world.

Developing the project

The Raspberry Pi Foundation's Dave Honess and Clive Beale developed a kit which brings a variety of sensors to the Raspberry Pi computer. Schools were recruited through an open call on the Foundation's website and we received a fantastic response. The project is aimed at Key Stages 3 and 4 and equivalent, i.e. the top four years of secondary school or high school internationally. The weather station is a great resource for teachers to base lessons on, but we have also developed assembly guides and a scheme of six lesson plans to help educators to get started. Half the kits will go to schools associated with Oracle Academy, Oracle's programme for supporting STEM (science, technology, engineering and maths) education.

BUILD
YOUR OWN

I n the Build Your Own project, we explored how digital tools are created and shared by people collaborating across generations, based on gardening and plants.

> Children, parents, and grandparents worked together to set up Raspberry Pi computers to monitor their garden

PARTNERS:

Robot Gardening

In a project supported by the Crafts Council, Norfolk Museums, and the Foundation of Creative Arts and Technology in Liverpool, Rachel Rayns developed a robot garden installation. This used Raspberry Pi computers to monitor a garden. The installation was designed to engage visitors in the potential for computers to sense the living world, and led to a series of workshops.

At these events, children, parents, and grandparents worked together to set up Raspberry Pi computers to monitor their garden, and to keep them informed of the needs of the plants. The theme of gardening was chosen to appeal to families, and the workshops were designed to require collaboration across the generations.

The project consisted of four public workshops in Liverpool and Norwich. In Norwich, we also ran two workshops for schools. In total, around 120 people of all ages experienced the ways in which digital making can be used to make a difference in the offline world. Parents got to engage with an area of digital learning they might often think is just for young people.
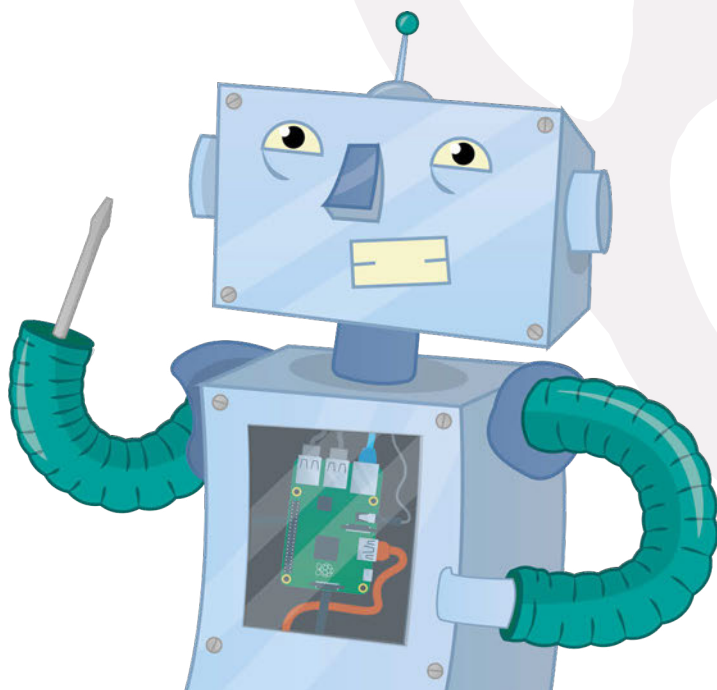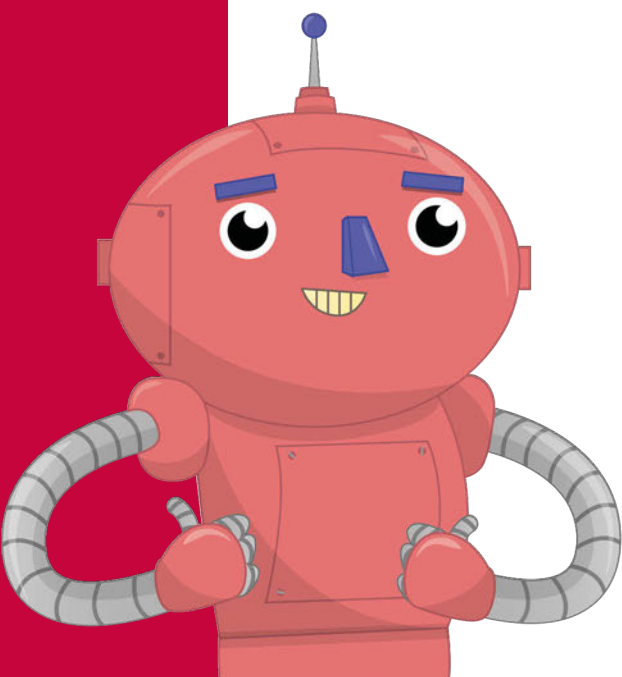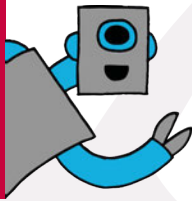
CODE CLUB

In November, Code Club and the Raspberry Pi Foundation joined forces in a merger that aims to give many more young people the opportunity to learn how to make things with computers.

Clubs across the world

Our goal is to establish a club in every community across the world to give children the opportunity to learn programming and create digital making projects. There are already over 4,000 clubs in the UK and over 1,000 clubs in 75 other countries. Projects and resources have been translated into 15 different languages.

Code Club really grew in 2015, with 1,295 new clubs starting in schools, libraries, and community venues across the UK. This brought the number of UK clubs to 3,472 by the end of the year, with clubs across all regions. These clubs have reached around 45,000 children, 40% of whom are girls.

> " There are already over 4,000 clubs in the UK and over 1,000 clubs in 75 other countries "

ABOUT CODE CLUB

Code Club is a global network of free, volunteer-led, after-school coding clubs for children aged 9-11. We coordinate volunteers to start a local club in a school or community venue, such as a library, for an hour a week to teach children coding projects. These projects are based on resources created by the Code Club team using Scratch, HTML and CSS, and Python. Code Club also provides training for volunteers and teachers in teaching the computing curriculum.

Evaluating impact

2015 also saw the start of an evaluation of the impact that attending Code Clubs has on children's programming and computational thinking skills, as well as on other transferable skills. The National Foundation for Education Research (NFER) has been working with Code Club to assess the skills of a group of children; the results are scheduled to be published in autumn 2016.

Spreading worldwide

Code Club in Australia, New Zealand, Brazil, and Ukraine were brought on board as part of the International Code Club community, bringing with them a total of about 800 clubs. In September, the first application process for new countries took place. New country co-ordinators joined Code Club for Poland, France, Spain, and Canada.

Code Club visit from the Rt Hon Nicky Morgan, MP, Secretary of State for Education

RASPBERRY
JAMS

Raspberry Jams are events organised by the community to share knowledge, learn new things, and meet other Raspberry Pi enthusiasts. They're a great way to find out more about Raspberry Pi computers and what you can do with them, with like-minded people. At a typical Jam, people from the local community bring their Raspberry Pi and other digital making projects to share and work on with others.

In 2015, Raspberry Jams carried on growing, with 375 registered Jam events and many more that took place as part of hackathons and maker faires. They now reach right across the UK, with 189 events

> **They're a great way to find out more about Raspberry Pi computers and what you can do with them**

from Dundee to Devon. There are also lots happening in the USA, with 82 events across the country. Raspberry Jams are growing all over the world, with 15 Jams in Taiwan,

WORLD FIRSTS

Many new countries were added to our map with their first ever Raspberry Jams this year: Cameroon, Egypt, Finland, France, India, Libya, Malaysia, Morocco, the Netherlands, Pakistan, South Korea, and Ukraine.

10 in Australia, 10 in India, and many more across Europe.

Raspberry Jams continue to grow organically across the world, bringing opportunities for more people to find out about Raspberry Pi computers and to learn from each other about computing and digital making.

Photo Credit James Mitchell

EVENTS
AND OUTREACH

A large part of our work at the Foundation is attending events where we can introduce people to our work. In 2015 we reached many tens of thousands of people across the world, from teachers, students, and parents to makers and hobbyists.

World Maker Faire Bay Area & NYC

- May & September, California & New York, USA
- Won 'Editor's Choice' award for our stand at Bay Area

SXSW Create

- March, Austin, USA
- Launched the DOTs board linking art and computing

Mozfest

- November, London, UK
- 1,700 attendees
- Workshops run by Raspberry Pi Foundation staff, community members & Creative Technologists

Raspberry Pi to Estonia

- Hardware & Arts hackathon in Tartu, February

White House Tech Jam

- December, The White House, Washington D.C.
- 70 educators, developers, and students attended by invitation
- Discussed and created ways to bring computer science to communities and schools across the USA

Estonian Prime Minister Taavi Rõivas

BETT 2015

- January, Excel Centre, London
- 34,000 visitors from 128 countries
- Foundation staff running workshops on Raspberry Pi Computers
- Launched Astro Pi with science television presenter Fran Scott

ISTE

- June–July 2015, Philadelphia, USA
- 21,000 attendees from 76 countries
- One of the largest education conferences in the world

Pycon Australia & Pycon UK

- July–August & September 2015, Brisbane, Australia & Coventry, UK
- Education track and keynotes from Foundation staff

Euro Python

- July 2015, Bilbao, Spain
- Opening keynotes from Foundation staff
- Supported first ever education summit

Astro Pi events

- Interactive stand at Principia launch event at London Science Museum with several thousand school children

Raspberry Pi 3rd Birthday Party

- Celebrating three years of Raspberry Pi computers in Cambridge
- 1300 attendees, 24 lecture theatre talks, 14 workshops, hundreds of projects, and 110 pizzas!
- Community members of all ages, and from several countries

ANNUAL REVIEW 2015

LEARNING

" We help people to learn about computing and how to make things with computers through resources and training "

PICADEMY

Enthusiastic, knowledgeable, and skilled educators create opportunities for young people to develop their understanding and passion for computing and digital making. Each educator we work with will reach many children or young people. Many go on to support other educators. Our Picademy training events provide encouragement, knowledge, and a community of support.

Teaching teachers

Picademy events provide a project-based, active approach to teaching computing and digital making. The two-day events prepare people to become Raspberry Pi Certified Educators. They take part in workshops with experts in computing education and teaching with Raspberry Pi computers. They spend time solving problems and developing ideas with other educators, and they collaborate to create their own projects. Picademy events are run by our in-house education team, with sessions from Carrie Anne Philbin, James Robinson, Clive Beale, Marc Scott, Dave Honess, and Ben Nuttall; our friends Sam Aaron, Les Pounder, and Martin O'Hanlon; and other community members.

These are free events and educators apply to attend, telling us about their role in working with young people and their ambitions as a Raspberry Pi Certified Educator. Many participants are school teachers, but we are also open to educators such as further and higher education lecturers, librarians, and youth workers. It's not just about computing either: in 2015 we have worked with teachers from design technology, digital arts, music, history, and science.

Picademy events are based on the ethos of the Raspberry Pi Foundation: that people learn best when they are actively involved and making things they care about. >

Growing demand

Since Picademy started in 2014 there has been huge demand, both in the UK and internationally. In 2015 we expanded the number of two-day events to twelve, and started to reach a more diverse group of educators. Picademy originally took place in our Cambridge headquarters, and we still run events there. Reaching educators across the UK requires events around the country, so in May we took Picademy on the road to York and Exeter.

We have also partnered with our friends at Google, who have provided financial and practical support to extend Picademy through their Google Digital Garage spaces. These are pop-up spaces to help British businesses to learn digital skills and use the power of the internet to grow faster.

"Google.org has supported the Raspberry Pi Foundation for the past two years in its mission to equip primary schoolchildren with affordable computers, and has been impressed with their outcomes. Raspberry Pi is leading the charge on what it takes to teach children computational skills, but perhaps more importantly how to equip teachers with much-needed subject matter expertise. We're thrilled to support them again."

Jacquelline Fuller Director of Google.org
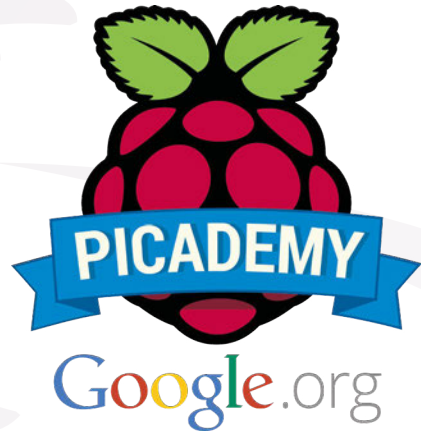
PICADEMY EVENTS IN 2015

■ Cambridge	February
■ Cambridge	April
■ Cambridge	July
■ York	May
■ Exeter	June
■ Leeds	June
■ Leeds	July
■ Leeds	August
■ Leeds	October
■ Birmingham	August
■ Birmingham	October
■ Birmingham	November
■ Birmingham	December

The 271 educators trained in 2015 will work directly with tens of thousands of young people per year, and encourage other educators to bring opportunities in computing and digital making to many more.

As we have run events further afield, we have reached an increasingly diverse group of educators, both in terms of geography and their interests and specialisms.

In 2015 we also worked with Barclays to teach 25 trainers in their Digital Eagles programme, showing them how to get involved in physical computing. These trainers will pass their skills on to Barclays staff across the UK, who are running Code Playground sessions for young people in Barclays branches. There have been over 12,000 Digital Eagles positions created, so the potential reach of this work is huge.

2015 was the year of Picademy growing from its roots in Cambridge. 2016 will see it continue to expand across the world. There are more UK events taking place in February and March, and early in the year we will be bringing Picademy to the USA for the first international events. Picademy@Google also continues, with a new Google Digital Garage running in Manchester where we will be working with even more educators.

> ❝ Since Picademy started in 2014 there has been huge demand, both in the UK and internationally ❞

SKYCADEMY

People have been really inspired by enthusiasts like Dave Akerman sending Raspberry Pi computers to near space in high-altitude balloons (HABs). Teachers and schools soon saw the opportunities to learn by collecting photos and measurements from above the clouds. This is a step beyond abstract classroom learning and simulations: it's real science which is breaking new ground. In August, we ran our first Skycademy event to train 24 teachers in the ups and downs of running a flight.
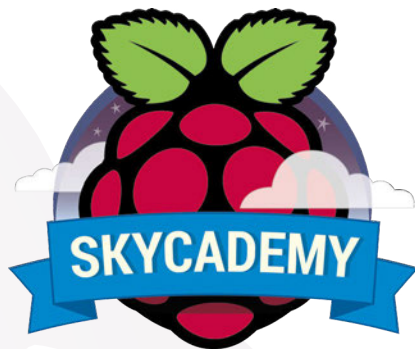
> **❝** I plan to run an ongoing project within our local CoderDojo, empowering our youth mentors by giving them set roles and responsibilities **❞**
>
> **Sarah** Scout Leader and CoderDojo instructor

Building capacity

Balloon flights are very achievable by teachers, but they have to have the confidence to experiment, knowledge of the issues they might encounter, access to a support community, and the right equipment. Skycademy supported teachers with these challenges by providing a day of face-to-face training including a test flight, bringing together a group of teachers and providing the equipment for them to complete a follow-up flight with their students.

Our first cohort included 24 educators who were given access to all the flight equipment they needed, including Raspberry Pi computers and the 'Pi in the sky' board for GPS and communications. They spent the first day learning how to run a launch, and on day two they worked in teams to conduct their practice launch, including a chase across England to find and recover their craft.

Ongoing launches

Twenty-four launches are planned, all involving groups of children and young people across the UK. By the end of 2015, four had taken place, with 40 young people directly involved in launches and several hundred spectating and following the events at their schools. The rest are planned for later in 2016.

RASPBERRY PI
# CERTIFIED EDUCATORS

SWAY GRANTHAM
Primary teacher, Specialist Leader in Education, Milton Keynes

Sway was one of the lead learners at our first Picademy in 2014. She was selected as she had already been developing teaching with Raspberry Pi computers in her school.

Since Picademy, Sway has been using Raspberry Pi computers across her school from years 3 to 6. She's not alone in teaching with them; she has been coaching and working alongside her colleagues to help them develop skills and confidence. A team of children at the school have been appointed as Digital Leaders. They are running their own club with Raspberry Pi computers, supporting teachers and encouraging other classes to use them in lessons. They have even had a visit from a Swedish television news team to film the new Pi-based developments at their school.

Sway has also been spreading her great ideas and computing skills beyond her own school. She has set up a local network of computing teachers, and helped the local secondary school to develop their teaching in this area. This is in addition to talks at TeachMeets and Raspberry Jams, writing articles for teaching magazines, and creating a book.

"You are no longer constrained by what a computer or program can already do: you can make it do whatever you want! Let your imagination run wild! What subject is more creative than that?"
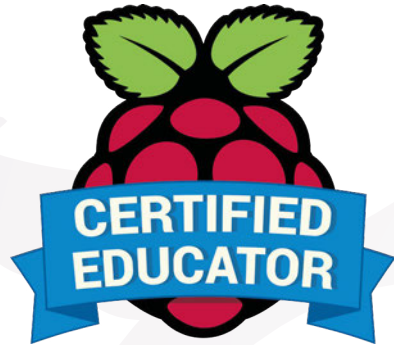
NICHOLAS HUGHES
Primary teacher, ICT lead and Advanced Skills Teacher, London

Nic was a graduate of one of our Cambridge-based Picademy events in 2015. He also attended Skycademy and experienced a successful balloon launch. Since then, Nic has been enthusiastically exploring physical computing in lessons in his schools. He has also run the regular Computing at School hub events in Hammersmith.

Nic has become a regular at Raspberry Pi community events, getting involved with Raspberry Jams to share his projects and learn from others. He attended Pycon UK 2015 and his team launched a high-altitude balloon on the children's day at the conference to inspire exploration of the possibilities of physical computing.

He continues to be excited by all the opportunities that are being developed for physical computing, including the Pi Zero.

"Children's understanding of programming is much more effective when they have made something move, bleep or buzz. That is the power of physical computing."

THE MAGPI
MAGAZINE

The MagPi started life in 2012 as a community fanzine created by a small but dedicated team of Raspberry Pi enthusiasts. The founders of the magazine were community members Ian Macalpine, William Bell, Aaron Shaw, and Ash Stone. Available as a free 30-page PDF download, it quickly gained traction within the burgeoning Raspberry Pi community and even successfully crowdfunded limited runs of the magazine in print form over the following 18 months.

The official Raspberry Pi magazine

We agreed with the Founders that the Foundation would take on the magazine, and in February 2015 we launched The MagPi as the official Raspberry Pi Foundation magazine. It's still written by and for the community, to inspire and educate readers of all ages to have fun with digital making using the Raspberry Pi computer. The magazine specialises in championing the incredible achievements of the community, giving its members the platform they need to share their skills, ideas, and experience with readers all over the world.

Continued growth and world firsts

After a very successful launch, plans were quickly put in place to print the magazine for newsstands in the UK and America, with the first print edition hitting the shelves in July 2015. Despite still offering the Creative Commons-licensed free PDF download – a model that flies in the face of conventional publishing paradigms – the print magazine soon proved to be a resounding success. By Christmas 2015, The MagPi turned the publishing world on its head once again by becoming the first magazine in history to mount a fully-fledged computer on its cover to celebrate the launch of the Raspberry Pi Zero.

Challenging the publishing industry

The Raspberry Pi Foundation's publishing arm isn't just focused on magazine publishing. Much as we aim to lower the barriers of entry and ultimately democratise computing, the publishing arm is dedicated to lowering the price and accessibility of computer literature, which – especially in the STEM fields – can be incredibly expensive and difficult to obtain. With five affordable entry-level books already on offer, 2016 will see the release of our first long-form computer science books, designed to educate and inform tomorrow's computer scientists at a price they can afford today.

THIS YEAR IN NUMBERS

- 1,000,000 downloads since relaunch
- First magazine to give away a fully-fledged computer
- Two copies of the magazines are downloaded every second

FIVE AFFORDABLE BOOKS ALREADY AVAILABLE

- The Official Raspberry Pi Projects Book
- Makes Games with Python
- Conquer the Command Line
- Experiment with the Sense HAT
- Code Music with Sonic Pi

{code club} TEACHER TRAINING

CODE CLUB
TEACHER TRAINING

As well as creating opportunities for children to learn programming, Code Club also trains teachers to deliver this new aspect of the school curriculum. One of the challenges facing schools as they start to teach computing is the confidence and subject knowledge of teachers. Our goal is to train teachers to feel confident and excited about delivering the computing curriculum. Informed and inspiring teachers help create students who have computational thinking skills and a thorough understanding of how technology works.

Teachers register on the website and we track the levels of enthusiasm in different areas, running sessions wherever there is enough interest. Sessions are free at the point of access for teachers.

We recruit computer science experts who want to share their enthusiasm and expertise with teachers. We recruited and trained 93 volunteers in 2015, who worked together to run 70 training sessions.

Teachers at a Department for Education-sponsored training session, April 2015

CODE CLUB TEACHER TRAINING SESSIONS

Computational Thinking
Introducing computer science concepts, Key Stage One computing through mazes, lesson ideas for cross curricular computing.

Programming
Chatbots using Scratch, interactive approaches to Key Stage Two programming, 'unplugged' computing ideas for teaching concepts through physical activities.

Networks and the Internet
HTML (the language of websites), how the internet and networks work, the principles of web search.

Updated programme
In Autumn 2015 the Code Club teacher training was updated to focus on more interactive sessions to encourage participation and active learning from the teachers.

Our teacher training has now reached over 1,300 teachers across the UK, building their skills for teaching computing to the 30,000 students they work with.

RESOURCES
AND CURRICULUM

Whether you are a teacher or an independent learner, resources are an important starting point.

Learning to make, making to learn

We produce resources using both Raspberry Pis and cross-platform applications like Scratch, and encourage people to learn through making and problem solving. Some resources cover areas that are part of formal computing curricula, but many link to other school subjects and beyond. Seeing how computing can be used to solve problems across subjects, is a key part of our approach.

In 2015 we created many new resources, including some linked to the Astro Pi programme, helping learners explore the context of space using a Raspberry Pi.

Open source

Our resources are open-source, and free on our website. They are also on GitHub in an editable form; this year we have seen a growth in people visiting our GitHub repositories. We have also produced the resources in PDF format and posted them on TES Resources, one of the most popular sharing websites for teachers, and the Computing At School network site.

Wide reach

The Resources section of the Raspberry Pi Foundation website had 6.7 million unique views in 2015. In 2016 we will continue to reach more people and provide them with even better learning experiences.

Future resources will be linked both to our educational programmes, such as the weather station, and to a wider range of interests. Our curriculum is being developed to increase support for moving between resources, creating a learning journey through the world of computing and digital making.

EXAMPLE RESOURCES

Gravity Simulator
Use Scratch to create a low-gravity environment for an animated character. Learn about calculating gravity, storing your data in variables, and using 'if' conditions and multiplying operators.
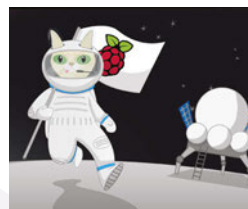
Sense HAT puzzle box
Use a Raspberry Pi computer and a Sense HAT to create a box that requires you to complete a puzzle to open it. Learn ways to keep information secret, using loops, conditional statements, and functions in Python.

Visualising sorting with Python
A lesson plan for educators to teach students how popular sorting algorithms work. Students use Matplotlib to create visual examples of how the algorithms run, so they can clearly understand them.

Sensing space
A series of lessons that teaches students about science concepts relating to space including weightlessness, centripetal forces, gravity, and environmental factors on the International Space Station (ISS). Students create a model of the ISS, perform experiments, and graph data.
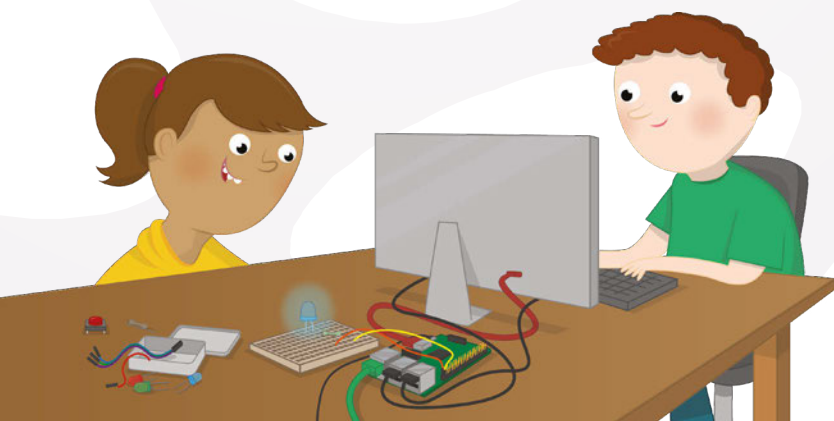
ANNUAL REVIEW 2015

GOVERNANCE AND PARTNERSHIPS

"" The Board of Trustees is responsible for ensuring that we use our resources effectively to achieve our charitable goals ""

TRUSTEES
AND MEMBERS

The Raspberry Pi Foundation is a UK charity (number 1129409), formed as a company limited by guarantee. It is governed by a Board of Trustees responsible for ensuring that we use our resources effectively to achieve our charitable goals.

In 2015 we expanded the Membership of the Foundation. In future, trustees of the Foundation will be elected by the Membership.

Members play an important role in supporting the Board of Trustees, contributing to the Foundation's strategic direction, holding the Foundation to account, and advocating our mission. Membership of the Raspberry Pi Foundation is a voluntary position.

Patron

- **His Royal Highness the Duke of York**

Trustees and Members December 2015

- **Alan Mycroft** is Professor of Computing at the University of Cambridge *(Trustee & co-founder)*
- **Andy Rice** is Senior Lecturer at the University of Cambridge Computer Science Lab
- **Annika Small** is a Trustee of the Design Council, Wayra, and the Access Foundation
- **Chris Mairs** is Chief Scientist at Metaswitch Networks *(Trustee)*
- **Christine Swann** is Director of ICT and Enterprise at the Stourport High School and Sixth Form Centre
- **David Braben** is CEO of Frontier Developments *(Trustee & co-founder)*
- **David Cleevely** is Chairman of the Raspberry Pi Foundation and co-founder of Cambridge Angels *(Trustee)*
- **David Willetts** is Executive Chairman of the Resolution Foundation and a Visiting Professor at King's College London
- **Eben Upton** is creator of the Raspberry Pi Computer *(co-founder)*
- **Ian Livingstone** is Non-executive Chairman of Sumo Ltd
- **Jack Lang** is an entrepreneur in residence and Fellow at the Judge Business School *(Trustee & co-founder)*
- **Lord Jim Knight** is Chief Education Adviser at TES and a member of the House of Lords
- **Jon Drori** is Chair of Ravensbourne College
- **Limor Fried** is CEO of Adafruit Industries
- **Louis Glass** is Senior Partner at law firm Olswang LLP *(Trustee)*
- **Martha Lane Fox** is CEO of doteveryone and a member of the House of Lords
- **Matthew Postgate** is the Chief Technology Officer for the BBC
- **Miles Berry** is Principal Lecturer for Computing Education at the University of Roehampton
- **Pete Lomas** is DoE at Norcott Technologies *(Trustee & co-founder)*
- **Richard Sharp** is the Chief Technology Officer for Yieldify and Director of Studies for Computer Science at Robinson College, Cambridge
- **Rosemary Francis** is the creator and CEO of Ellexus Ltd
- **Sarah Wood** is Co-founder and CEO of Unruly
- **Scott McGregor** is former President and CEO of Broadcom Corporation and former President of the Broadcom Foundation
- **Sherry Coutu** is an entrepreneur, investor, and advisor to universities and charities *(Trustee)*
- **Simon Peyton Jones** is Principal Researcher for Microsoft UK and Chair of Computing at Schools *(CAS)*
- **Sway Grantham** is a primary school teacher specialising in computing
- **Tilly Blyth** is keeper of technologies and engineering at the Science Museum, London
- **Tim Peake** is a British ESA Astronaut currently on the International Space Station and will formally become a member of the Foundation when he returns to Earth

PARTNERS
AND SPONSORS

The work of the Raspberry Pi Foundation is only possible because we are part of a fantastic and growing community that shares our mission. Partners and sponsors are an important part of that community, providing us with additional expertise, resources, and support that enables us to reach and benefit many more people.

The Raspberry Pi Foundation

Pro bono partners

Mythic Beasts

Olswang

University of Cambridge

Educational software partners

Microsoft

Oracle

Wolfram

Astro Pi

Airbus Defense & Space

CGI

Esero

European Space Agency

Nesta

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Surrey Satellite Technologies

The Knowledge Transfer Network

UK Space Agency

UK Space: The Space Trade Association

Bring Your Own

Craft Council

Foundation of Art and Creative Technology

Norfolk Museum

Norwich Castle Service

Creative Technologists

Future Everything

Hellicar & Lewis

Pimoroni

Saladhouse

V&A Digital Programmes

Writers' Centre Norwich

Picademy

Google

Weather Station

Oracle

Code Club

ARM

Cabinet Office

Canary Wharf Group PLC

Google

Nesta

Salesforce

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Notable Donors

Adobe

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EDGE Conference

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Gallomanor

Gloo Communications

Motorola

Three Rings

VMWare

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Bytemark

DotMailer

GitHub

Mailtrap

New Relic

Postcode Anywhere

Sentry

Typekit

Vzaar

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