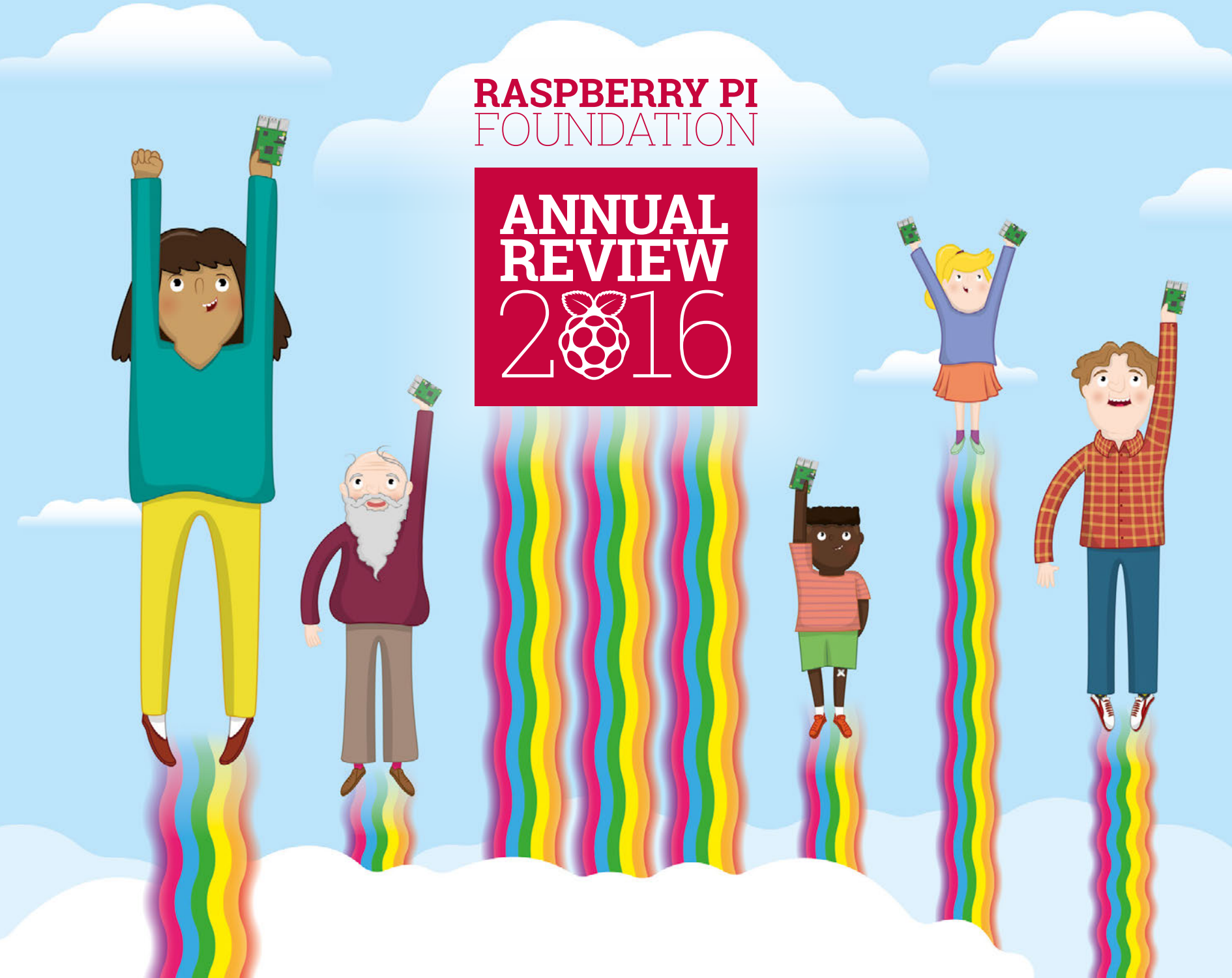
RASPBERRY PI FOUNDATION

ANNUAL REVIEW 2016



ANNUAL REVIEW 2016

CONTENTS

About us 5

Introductions 7

Computers 10

Outreach 16

Learning 36

Governance and partnerships 52

ANNUAL REVIEW 2016

> We put the power of digital making into the hands of people all over the world

ABOUT US

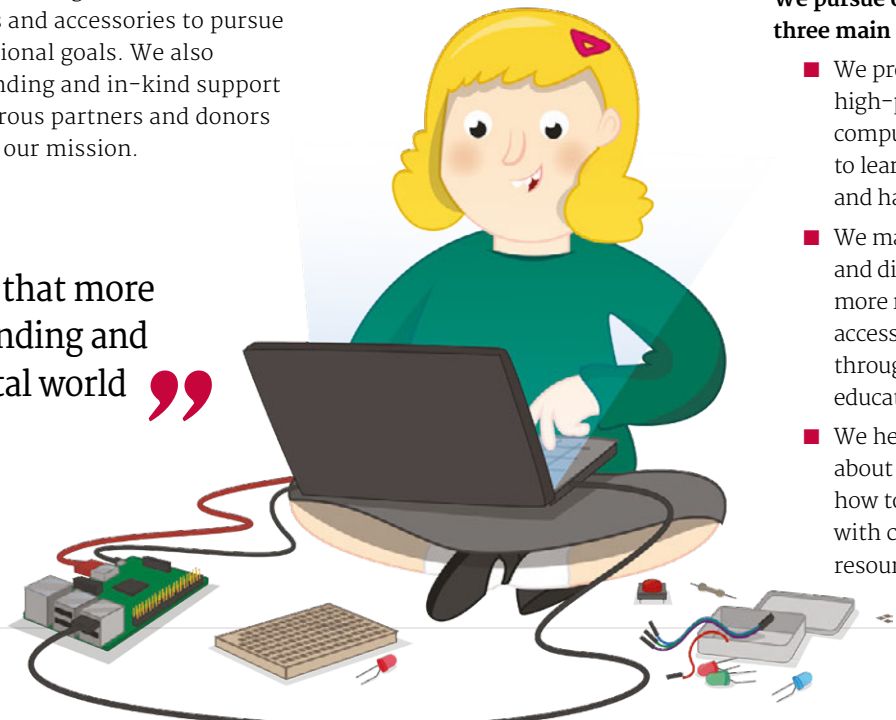
The Raspberry Pi Foundation works to put the power of digital making into the hands of people all over the world. We believe this is important so that more people are capable of understanding and shaping our increasingly digital world; able to solve the problems that matter to them; and equipped for the work of the future.

We provide low-cost, high-performance computers that people use to learn, solve problems, and have fun. We provide outreach and education to help more people access computing and digital making. We develop free resources to help people learn about computing and how to make things with computers. We train educators who can guide other people to learn.

Since launching our first product in February 2012, we have sold 12 million Raspberry Pi computers and have helped to establish a global community of digital makers and educators.

We use profits generated from our computers and accessories to pursue our educational goals. We also receive funding and in-kind support from generous partners and donors who share our mission.

> “We believe this is important so that more people are capable of understanding and shaping our increasingly digital world”



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

ANNUAL REVIEW 2016

> The commercial success of Raspberry Pi continues to support our wider mission

INTRODUCTION
FROM THE CHAIRMAN

DAVID CLEEVELY

In the five years since the first Raspberry Pi was launched, this little computer has gone further than we ever imagined. We have now sold more than 12 million devices, giving people all over the world access to affordable tools to solve problems, help their communities, and learn about computing and digital making. I am consistently amazed by the creativity and ingenuity the Raspberry Pi has unleashed.

The commercial success of Raspberry Pi continues to support our wider mission. Our educational programmes and materials have given many more people the opportunity and support to learn how to create with technology.

It is my great privilege to chair the boards of both the Raspberry Pi Foundation and Raspberry Pi Trading Limited. We benefit from the expertise and wisdom of an exceptional group of Trustees, Directors, and Members, who make a significant contribution to our work and advocate for our mission. In November 2016 the Members elected Tilly Blyth, the Head of Collections and Principal Curator at the Science Museum in London, to serve as a Trustee. I am delighted to welcome Tilly to the Board.

As you will see in this Annual Review, 2016 has been a year of growth in the reach and impact of both our commercial business and our education activities. It has also seen major change in the organisation, with many talented people joining, and a significant expansion of our educational work in North America and Europe.

With the strength of our team, our partners, and our community, I am confident that we will build on the progress we made last year, and achieve even more in 2017.

> “2016 has been a year of growth in the reach and impact of both our commercial business and our education activities”

INTRODUCTION
FROM FOUNDATION CEO

PHILIP COLLIGAN

I am excited to share with you our latest Annual Review. By any measure, the Raspberry Pi Foundation has enjoyed an outstanding 2016. At the start of the year, we had just launched a new strategy and direction for the Foundation, completed a merger with Code Club, and started to build the capacities and capabilities that we needed.

We ended 2016 with millions of people using our free educational resources; almost 1,000 Certified Educators trained through Picademy; more than 2,000 primary school teachers inspired by our Code Club Teacher Training; and hundreds of thousands of young people engaged in our programmes.

We have been busy developing partnerships and launching new resources. Our space programme, Astro Pi, has been extended to the whole of Europe. We launched Pioneers, our first programme focused on getting more teenagers involved in computing and digital making. We developed our first online training courses for educators, and published a new free magazine for educators.

We've also worked hard to bring more rigour to our work, publishing our digital making curriculum, gathering feedback from users, and working with independent partners to evaluate our programmes.

I've been delighted to see our community continue to grow. We have a large group of partners and sponsors who provide resources and expertise to support our efforts. We continue to mobilise thousands of volunteers and community members every week, who support our mission in so many ways.

I want to say a huge thank you to everyone who has contributed to our work this year.

INTRODUCTION
FROM TRADING CEO

EBEN UPTON

> “Raspberry Pi has become an international phenomenon. Over the last five years we’ve sold units in 128 countries”

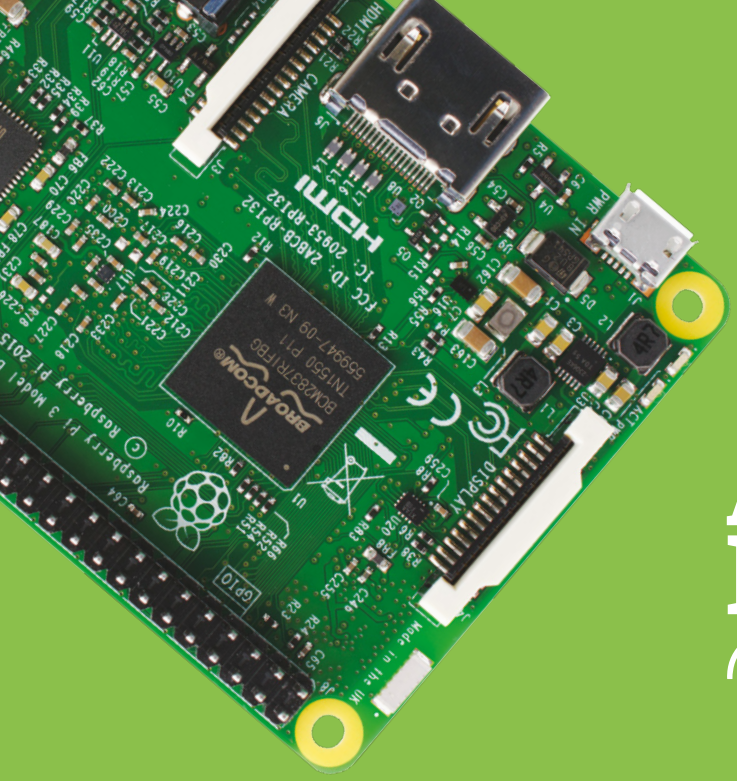
This has been another incredible year for the business of Raspberry Pi. We launched the Pi 3 in February 2016; already there are more than 4 million in the wild. In April, we followed this with a new generation of visible-light and IR cameras, and an updated Pi Zero with a camera connector. In October, we launched our shiny new PIXEL desktop environment. To round things off, last week we released the $10 Raspberry Pi Zero W, which adds wireless LAN and Bluetooth.

Our publishing efforts have gone from strength to strength too: an issue of The MagPi each month, six new Essentials books, and a second Projects book. A licensed bi-monthly version of The MagPi is now available in Germany, and we’ve launched our own 20-page translated MagPi Mini magazines in French, Spanish, Italian, and Hebrew. The coming year will see the launch of our first original titles.

Raspberry Pi has become an international phenomenon. Over the last five years we’ve sold units in 128 countries. Over 85 percent of Pi units are sold outside the UK, with the US and Germany being our largest export markets.

We’ve doubled the size of our engineering staff, so we can design more hardware and software products. We’ve added editorial and design staff, to produce better support material. And we’ve started to build a product management team, to ensure Raspberry Pi is available to more people, in more places, through more channels.

For all that, so much of what we do relies on you, the Raspberry Pi community. With your help, we’re continuing to build a world where everyone has a chance to understand the magic of computing.

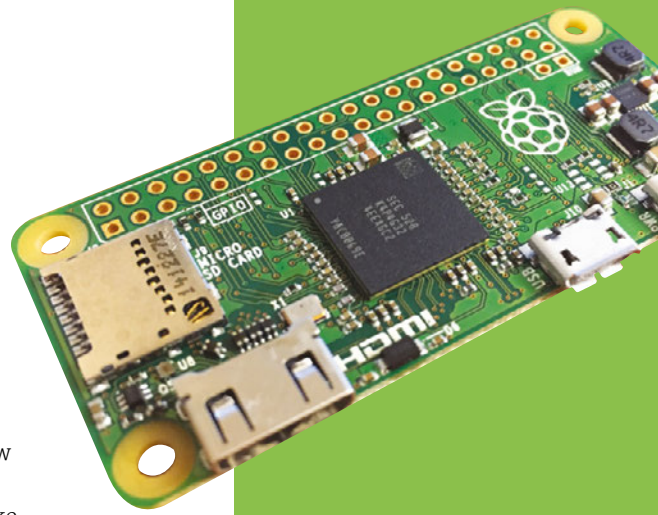


ANNUAL REVIEW 2016

COMPUTERS

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

THE RASPBERRY PI COMPUTER



The Raspberry Pi computer launched in February 2012 with what now seems the modest goal of improving the applications to study computer science at Cambridge University. We thought we might sell ten thousand units, and encourage some more young people to develop their computing skills before university. With 12 million of our low-cost, high-power computers now sold, and people of all ages across the world using them to learn and solve problems in their lives, our goals have become even more ambitious.

Hardware and software

We work hard to make sure that Raspberry Pi computers are as low-cost as possible, giving 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 open software and work with partners to provide free access to some of the world's most powerful educational software.

Baking a new Pi

The Raspberry Pi computer keeps on evolving, and 2016's Raspberry Pi 3 is the most ambitious board yet. With 50 percent more computing power than its predecessor, it's a low-cost computer that can be used to learn, and to build increasingly demanding projects. With the Chromium browser and LibreOffice included, it can even replace many people's day-to-day computers. Raspberry Pi 3 also has wireless LAN and on-board Bluetooth, making internet-connected projects and Internet of Things gadgets accessible without extra hardware.

A computer for $5

One of our key aims is to make sure that price is no barrier to learning, or to using powerful computers. Nothing demonstrates this better than the $5 Raspberry Pi Zero. First given away with The MagPi magazine in 2015, the Zero has been incredibly popular this year. It soon grew a camera connector, perfectly timed to take advantage of the new and improved eight-megapixel Raspberry Pi camera, launched this year. Building your own wildlife cameras, home-made security systems and photo booths has never been so accessible. With the launch of the $10 Raspberry Pi Zero W in early 2017, our ultra-low-cost computer now has wireless LAN and Bluetooth, opening up even more possibilities for mobile and Internet of Things projects.

Creative projects

We built the Raspberry Pi computer for learning and creating, and we continue to be amazed by the ingenuity and technical skills shown by the people who make Raspberry Pi projects. We see everything from fun and quirky weekend projects to those built to genuinely improve

> We've been really pleased to see industrial users take advantage of the Raspberry Pi computer's low-cost, high-power package

the creators' lives, the lives of their relatives, and their communities.

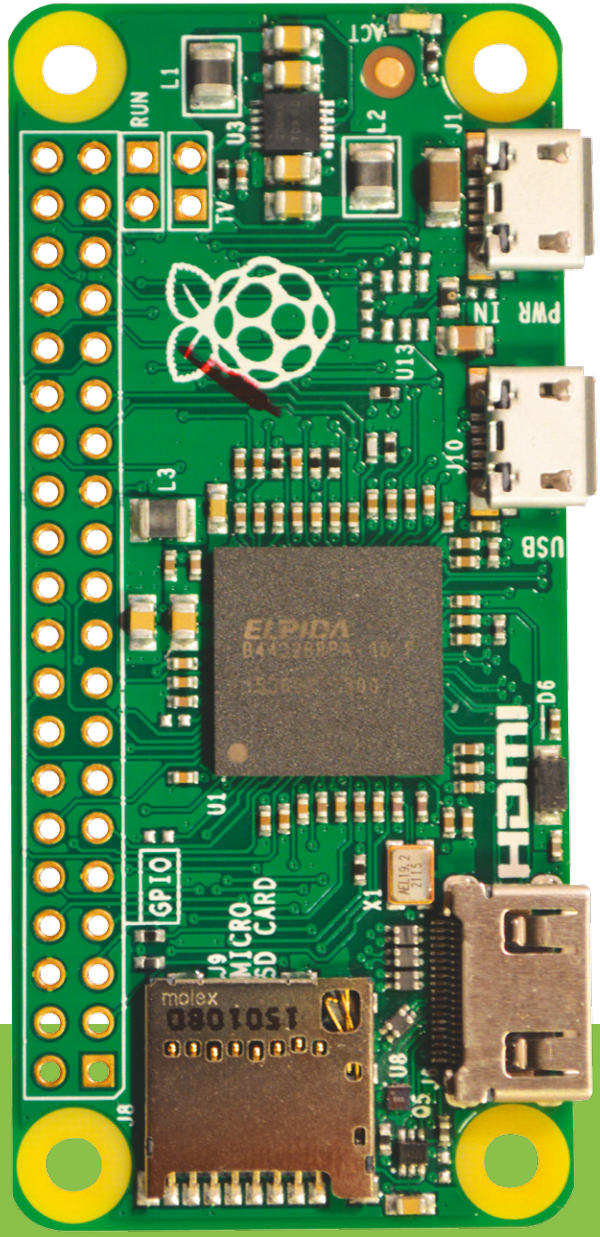
We've been really pleased to see industrial users take advantage of the Raspberry Pi computer's low-cost, high-power package. We launched our Compute Module back in 2014, providing the main components of the Pi system in a DDR2-SODIMM board resembling a stick of RAM. At the start of 2017, this was upgraded to match the power of the Raspberry Pi 3. Display manufacturer NEC has already taken advantage of this to integrate the Compute Module 3 into its large-format displays, designed for use in brightly lit public spaces such as schools, offices, shops, and railway stations.

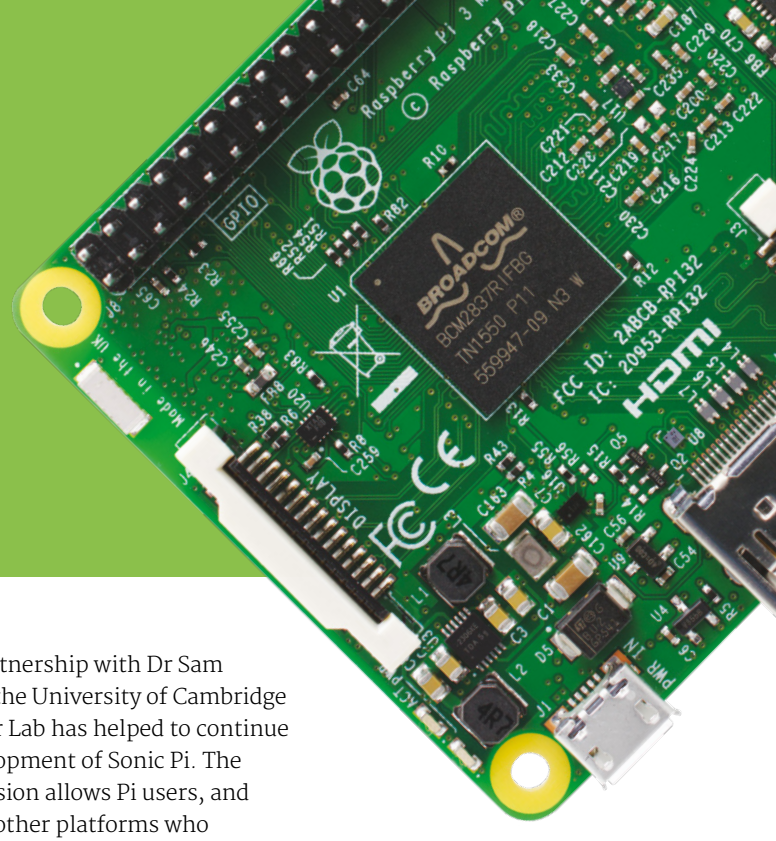
A UK story

As with all our products, the new Raspberry Pi models and software are designed in our UK HQ in Cambridge. The computers are also manufactured in the UK, and we continue to work with the impressive Sony factory in Pencoed, Wales. They currently make around 100,000 of our computers every week, including the Raspberry Pi 3 and Raspberry Pi Zero W. As well as manufacturing our computers to a high quality, they ensure that all the parts are sourced ethically and to the highest environmental standards.

Software

Access to hardware is important, but software is often the unsung hero of learning through making. We put a lot of work into ensuring Raspberry Pi computers benefit from a suite of software that allows people to create and learn. Every Pi computer can access Raspbian, our operating system that comes with educational software and tools. Raspbian experienced some big upgrades in 2016, the most visible being the brand new desktop environment, PIXEL.





PIXEL represents a complete visual overhaul of the Raspbian desktop environment, and provides a user experience that lives up to the power of the current-generation computers. In contrast with previous releases, it isn't just Raspberry Pi computers that benefit from the latest version of Raspbian. People with a PC or Mac can now download or use The MagPi's first cover DVD to run PIXEL on their machines, along with most of the educational software designed for use on the Raspberry Pi.

It's not just our software that provides opportunities for learning and fun on the Raspberry Pi computer. We've partnered with some of the world's biggest software companies to provide their tools as part of the Raspberry Pi version of Raspbian, and the PC and Mac versions where licences allow.

Scratch, MIT's block-based programming language, has become ubiquitous in computing classrooms across the world. On our computers, Scratch has been customised to allow users to access GPIO pins and control electronics in the physical world, so even the youngest users can access the potential of physical computing. The Python Software Foundation is a great friend of ours, and we provide Python tools pre-installed. Many libraries have been developed by the Raspberry Pi community to improve access to the features of our computers.

Wolfram provides a free version of Mathematica, its mathematics program, and access for Raspberry Pi users to the Wolfram Language. Microsoft allows our users to customise worlds of Minecraft blocks in a version of the game that interacts with Python code. Thanks to our partnership with Oracle, we can provide the Java development environments Greenfoot and BlueJ.

Our partnership with Dr Sam Aaron at the University of Cambridge Computer Lab has helped to continue the development of Sonic Pi. The latest version allows Pi users, and those on other platforms who download the free software, to code and create electronic music.

Digital making for everyone

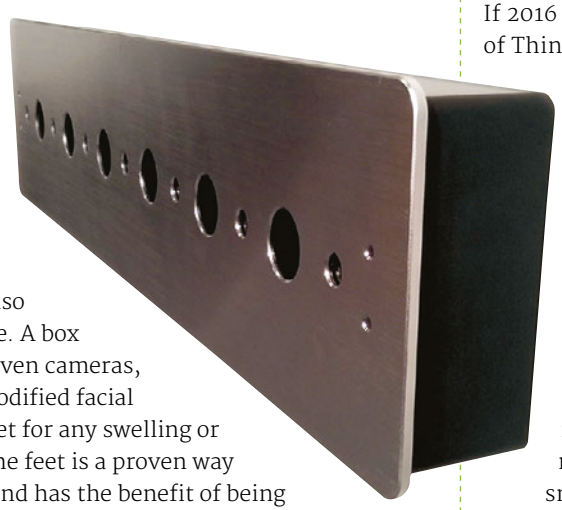
People all over the world are using Raspberry Pis to make, learn, and have fun. Simple projects often act as gateways to complex creations, solving problems in users' homes and communities. Creative computing gives people extraordinary agency. Once the door to that kind of potential is opened, they go on to learn and make things that continue to surprise and delight us. Children, young people and adults are getting their first taste of the power of technology, then learning and building their skills using Raspberry Pi computers.

> "Simple projects often act as gateways to complex creations, solving problems in users' homes and communities"

RASPBERRY PI POWERED PROJECTS

Heartfelt Technologies

Startup Heartfelt Technologies has created an early warning system for people at risk of heart failure. The system can detect changes before an emergency situation develops, potentially preventing heart failures and emergency trips to hospital. Heart failure is the most common form of hospitalisation for people over 65, so this project could also save the NHS billions at the same time. A box sits next to the patient's bed, using seven cameras, seven Raspberry Pi computers, and modified facial recognition software to check their feet for any swelling or changes each morning. Focusing on the feet is a proven way of detecting cardiovascular changes, and has the benefit of being relatively unobtrusive and of preserving patients' privacy. Medical professionals and the patient are notified of any changes that might cause concern. These can often be addressed with a pill well before a more dangerous and costly incident could occur. Heartfelt's device has been through NHS testing and is already starting to be used with patients.



Read more at **rpf.io/heartfelt**

Making and baking

If 2016 was the year of the Internet of Things, it was also the year of baking. Software engineer and YouTuber Estefannie brought these two trends together with her Smart Gingerbread House project, and like all good makers and bakers she shared her code and her recipes online. Now others can create their own smartphone-controlled, motorised gingerbread masterpiece, complete with smartphone-controlled front door and dancing gingerbread men. We love projects like this that are light-hearted or quirky, with the aim of having fun and learning something new.

Read more at **rpf.io/baking**

> "We love projects like this that are light-hearted or quirky, with the aim of having fun and learning something new"

Pi-powered homes

2016 was the year the Internet of Things started to go mainstream, with Amazon and Google both launching major connected home solutions. Before Amazon's voice-activated Echo arrived in the UK, hackers like Novaspirit got stuck into the provided API. They figured out how to get their Raspberry Pis to talk to the Alexa service, allowing them to speak their requests to their homebrew Echo. Combined with other home-based projects, hacks like this open up huge possibilities for a Raspberry Pi-powered smart home. With a handful of low-cost computers and some project time, you could control your lights and household appliances, or even create an on-demand romantic fire and music combo, as demonstrated by Redditor and Raspberry Pi user Hovee.

Read more at **rpf.io/echo** and **rpf.io/fireside**

Pocket FM in Syria

The Raspberry Pi computer was designed to allow people freedom of expression, and Media in Cooperation and Transition (MiCT) and the Syrnet group of radio stations have taken this to new frontiers. The Pocket FM portable radio transmitter is based on a Raspberry Pi computer, and can be powered from a car battery or solar panel. In a country where it can be both technically and politically challenging to build larger transmitters, Pocket FM is allowing the broadcast of a wide range of voices and ideas, reaching 1.5 million citizens in north and north-western Syria. In a war zone, radio can be one of the easiest ways to get information. If the power grid is down, broadcasters and listeners can switch to batteries. These bold people are doing something extraordinary. We hope for a swift end to the conflict.

Read more at **rpf.io/pocketfm**

> "The Raspberry Pi computer was designed to allow people freedom of expression"

ANNUAL REVIEW 2016

OUTREACH

> We make computing and digital making relevant and accessible through outreach and educational programmes

ASTRO PI

Astro Pi is a series of competitions that give young people the opportunity to design experiments and write programs that will run on the International Space Station (ISS). In 2015 we worked with the UK Space Agency (UKSA), the European Space Agency (ESA), and other partners to space-harden two Raspberry Pi computers and send them to the ISS. Now children all over Europe have the opportunity to have their code run in space.

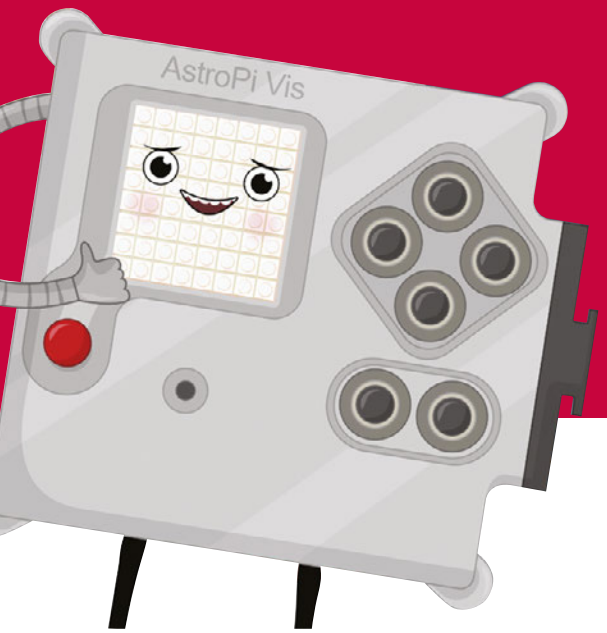
Winning code in space

Our first Astro Pi competition ran in 2015, so in 2016 we worked with UKSA, ESA, and British ESA astronaut Tim Peake to run the winning science experiments and games on the International Space Station. The data generated by the experiments was downloaded from the Raspberry Pi units and sent back to Earth by Tim Peake for analysis, and we encouraged other young people to analyse and learn from the data.

A musical competition

In 2016 we ran a second Astro Pi competition. The theme was inspired by Tim Peake, who faced challenges when updating his MP3 player on the ISS. We asked young people to program the Astro Pi computers to act as MP3 players, and to create original music using Sonic Pi for him to listen to. The winning eight teams had their code run in space in May 2016.

Read more at **astro-pi.org**



> This year we worked hard to make Astro Pi accessible to even more young people

Making Astro Pi more accessible

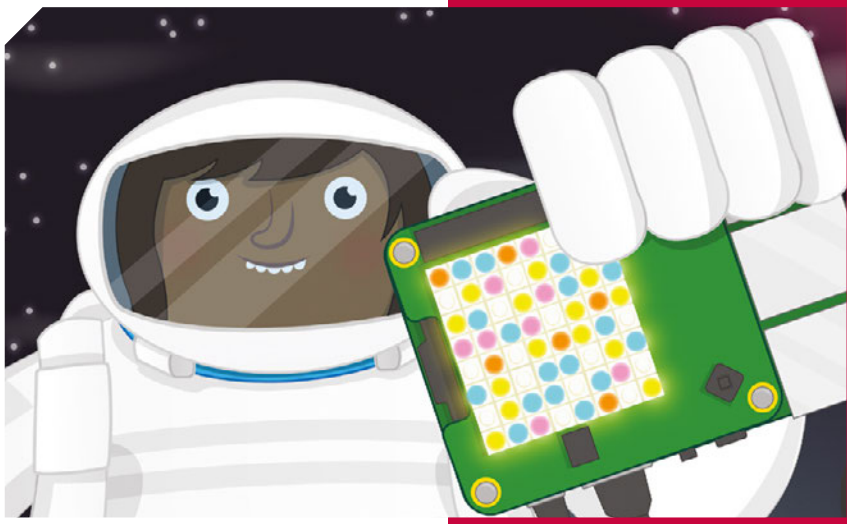
This year we worked hard to make Astro Pi accessible to even more young people. The Astro Pi computers were tested and qualified to connect to the Joint Station LAN on the ISS, allowing us to connect directly to them from Earth. This means we can upload young people's code and download their results in future without having to use as much valuable crew time.

Anyone with a Raspberry Pi computer and Sense HAT board has the same hardware that astronauts use on the ISS. We worked with our partners at Trinket, and community member Dave Jones, to release on-screen emulators of the Astro Pi units. This helped to make the competition accessible for young people who don't have access to the hardware, and allowed anyone to develop and test their code.

In total, 347 UK schools participated directly in the first two Astro Pi competitions, with many more benefiting from the educational resources, activities, and outreach that were part of the wider programme.

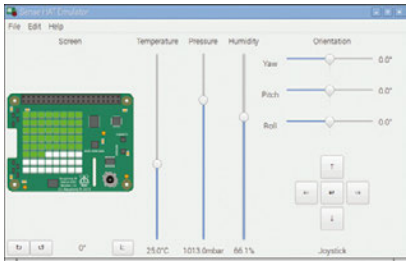
Space-Byrds from Thirsk School

British ESA astronaut Tim Peake



Astro Pi across Europe

In the second half of 2016, we launched Astro Pi in all states that are members of ESA, as part of the mission of French ESA astronaut Thomas Pesquet to the ISS. Once again, we have challenged school students to invent new scientific experiments using the sensors on the Astro Pi unit. The competition opened in October 2016. 250 teams from 15 countries are now developing programs that have the chance to run on the ISS, with the winners due to be announced in early March 2017.



Above Desktop Sense HAT emulator

> “250 teams from 15 countries are now developing programs that have the chance to run on the ISS”

Videos

Astro Pi has generated some fantastic video content, including some actually filmed in space. Take a look at the videos at the links below:

- Tim Peake with the Astro PI units, filmed on board the ISS: **rpf.io/timpeakevideo**
- A series of cartoons explaining the story of Astro Pi, narrated by Fran Scott: **rpf.io/astropicartoons**
- The winners of the first Astro Pi competition: **rpf.io/astropiwinners**

PIONEERS

#MakeYourIdeas

PIONEERS

Towards the end of 2016 we launched a brand new programme to inspire teenagers to get involved with computing and digital making. Pioneers is a series of challenges that encourage twelve- to 15-year-olds to form teams and make their ideas, sharing with and learning from each other.

Developing Pioneers

To develop Pioneers, we spent time talking to teenagers to find out their interests, what they want, and how they like to be talked to. We also consulted adult mentors and other organisations like CoderDojo, who already provide opportunities for teenagers to get involved in digital making. We ran surveys and focus groups, and our own pilot maker day at the brilliant Cambridge Makespace. All of this research was used to shape our plans for the programme.

The programme is designed around the three seasons that coincide with school terms in the UK. Each season is given a broad theme with an open-ended challenge, aimed at inspiring young people to get creative with technology. We have designed Pioneers so that it is open to any existing groups or meet-ups, like CoderDojos or school-based technology clubs. We also hope that it will encourage new clubs to get started.

We provide resources, inspiration, and money-can't-buy prizes for the most inspiring and interesting entries.

> “We want the teams to share what they’re making across social media, using the hashtag #MakeYourIdeas on Twitter, Instagram, and Facebook”

The only requirement is that the team has to actually make their idea, and that they submit a video documenting what they did.

Social media is an important part of teenagers’ lives, and it’s an important part of Pioneers too. We want the teams to share what they’re making across social media, using the hashtag #MakeYourIdeas on Twitter, Instagram, and Facebook. There has been lots of buzz already, with more than 250 teams registering their interest for the first challenge before its launch.

Looking forward

2017 is when Pioneers is officially launched, with the first challenge revealed in January. We are looking forward to seeing the projects the teams put together. Future themes will be unveiled as the year goes on.

Pioneers targets an audience underserved by activities that engage them in digital making, and we will be closely following the impact of the programme. We have set up pilot groups to provide us with regular feedback. We will engage with participants on social media to follow and share the Pioneers projects, and the learning that young people undertake. Pioneers is focused on the UK to start with, but developing the programme at this scale will give us the experience to support an international launch.

Read more at **rpf.io/pioneers**

The shape of Pioneers

- Teams of twelve- to 15-year-olds make their ideas
- Adult mentors guide and support
- Themed, open-ended, and creative challenges
- Projects shared on social media
- Kudos, respect, money-can’t-buy prizes
- Launched January 2017
- Generously sponsored by The Shell Centenary Scholarship Fund

CREATIVE TECHNOLOGISTS

April 2016 saw the culmination of a year-long programme, mentoring nine 16- to 21-year-olds to develop their skills as Creative Technologists. After months of field trips, mentoring sessions, and exploring ideas, the participants created an exhibition of their work, which was showcased at Raspberry Pi's offices in Cambridge.

Interactive installations

The Creative Technologists' projects covered a wide range of themes and technologies. Augmented reality pop-up books presented the reader with animations, mapped to the paper cut-outs. A rope for aerial acrobatics generated accompanying music based on how and where it was touched. A collaborative text-based adventure progressively illuminated a multicoloured Perspex trophy in response to tweets from players about the clues they found in the game. Visitors to the exhibition were treated to interactive, multimedia installations using a mix of computing, electronic, and physical elements.

Learning creatively

This programme was obviously fun, but the Creative Technologists also rated the programme very highly in terms of the impact it had on their professional development. Participants made progress in their skills in areas such as devising and planning creative projects, programming, and electronics. They also learned lots about collaborating remotely, exploring professional opportunities, and planning and

> "It has truly been a life-changing journey, and I feel especially privileged to have been a part of it"
>
> Creative Technologist

running an exhibition. Four of the participants submitted their work to the Arts Council England and achieved the Gold Arts Award, which is recognised in the UCAS system for university entrance. Many participants developed their career ambitions, aiming for jobs in creative technology, and two chose to build on their experience by taking up related studies at university.

The Raspberry Pi Creative Technologists have become important members of the Raspberry Pi community, acting as role models for younger people, speaking at events, and exhibiting their work at technology events such as MozFest.

> “Four of the participants submitted their work to the Arts Council England and achieved the Gold Arts Award”

Supporters

Thanks to our supporters for their help with this programme:

- FutureEverything
- Hellicar&Lewis
- Pimoroni
- Saladhouse
- V&A Digital Programmes
- Writers’ Centre Norwich

WEATHER STATION

> One of the goals of the programme is to enable schools with Weather Stations to share their data with other schools

Students at Bradford Grammar School, UK

In partnership with Oracle, we've been bringing the experience of meteorological monitoring to schools all over the world, while also helping thousands of young people to learn about computing and digital making. In 2015 we developed a Weather Station kit with sensors to monitor nine environmental processes. These measurements were to be logged to a cloud-based Oracle database.

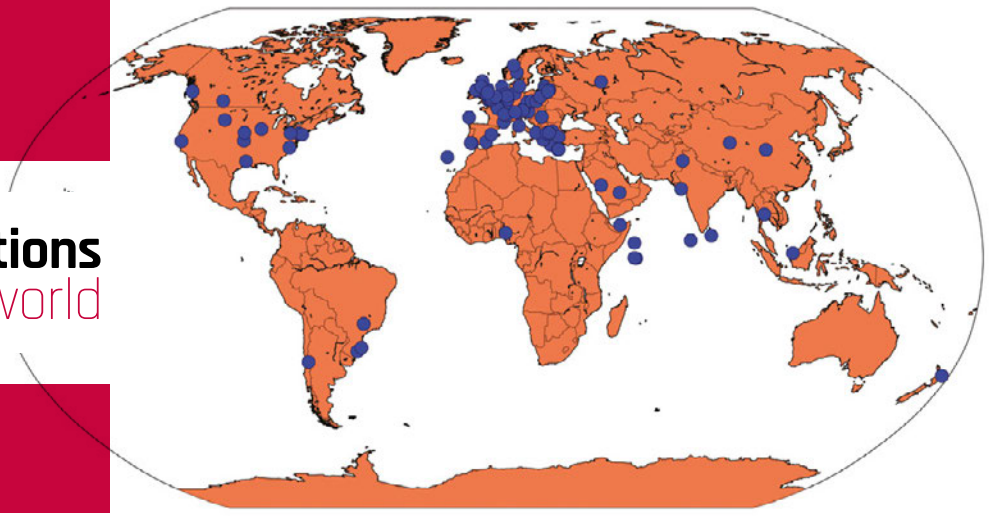
In 2016 we shipped the kits to 860 schools in 72 countries, and students from Chile to China have been building their own Raspberry Pi-based weather stations. 162 of these schools are part of the Oracle Academy programme, supported by Oracle to develop their students' computer science skills.

Sharing and analysing data

One of the goals of the programme is to enable schools with Weather Stations to share their data with other schools, including those without a Raspberry Pi Weather Station, so that young people can learn to analyse large sets of data. We've been working with Oracle and Explorer UK

Weather Station at Wallace High School, UK

Weather stations
all over the world



to build an online database, which is now being used by almost 300 schools to capture and share their data.

We have produced 13 educational resources to support learning about computing through exploring the weather. Four of these can be used without the dedicated Weather Station hardware, allowing many more schools to get involved in the project.

2017 forecast

Over the coming year, we will continue to support these schools to make the most of the opportunities offered by their Weather Stations.

We will continue to develop resources to help many more schools to participate in the programme, by analysing the data or through building their own Weather Stations.

Students and staff at Liceo 1 Javiera Carrera school, Chile

Eastlea Community School

Students from the computing club at Eastlea Community School in London, UK, set up their Weather Station and installed it in a small garden on the school grounds. They worked with their teacher, Mr Richards, to adapt the Weather Station to their local environment, adding a battery, a solar panel, and wireless connectivity for its database connection. The students worked out how much power they would need, how much the sun could provide in all weathers, and how to store this power using a battery: just the kind of problem-solving the Raspberry Pi computer was invented to encourage. The school Weather Station is now ready to be used in lessons with other students, and there are plans to add a camera to monitor wildlife and vegetation in the future.

CODE CLUB

> This year we reached a major milestone in the UK, with more than 5,000 active clubs by the end of 2016

Code Club is a network of volunteer- and teacher-led after-school coding clubs that take place in schools, libraries, and community venues across the world. Code Club is powered by an enormous community of volunteers and educators, who use our projects and educational resources to help children learn how to make things with computers.

In the UK, we directly support the network of Code Clubs, building the movement, connecting venues to volunteers, providing training, running competitions, and helping the community in any way we can. Through Code Club International, we are developing partnerships with not-for-profit organisations in countries across the world, to spread the model to their communities.

Code Club UK

This year we reached a major milestone in the UK, with more than 5,000 active clubs by the end of 2016. This means that more than 75,000 children aged nine to eleven take part in Code Club each week. That's a net growth of more than 2,200 clubs since the start of 2016.

We've done a lot of work this year to really get to grips with our data. We are confident about the

Code Club Hong Kong

numbers of active clubs; we know that 40 percent of the children attending Code Clubs are girls; and we know that Code Clubs happen in schools that serve communities with a wide range of socio-economic backgrounds. We have also seen rapid growth in clubs meeting in community venues, such as libraries. Ten percent of clubs now meet in non-school venues.

Reach is important, but what really matters is what happens in a Code Club, and whether children are learning meaningful skills. We will shortly be publishing the results of an independent randomised trial undertaken by the National Foundation for Educational Research (NFER), assessing the impact of Code Club. We want to build on these findings to ensure that Code Club creates the best possible impact for the largest number of young people.

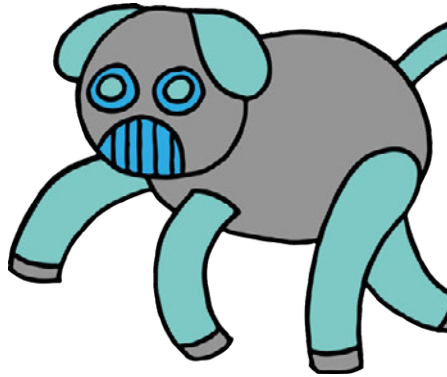
Supporting the community

Along with the growth of Code Clubs in the UK, we've increased our support for the community of volunteers, educators, and parents. Our regional teams of Code Club co-ordinators are fantastically active, organising meet-ups and attending events. We are also using Twitter, Google+ communities, and other social media to connect with Code Clubs and share best practice.

We have expanded our Star Clubs initiative, with many more outstanding clubs committing to share their expertise to help the Code Club community. They do so by offering opportunities for potential new volunteers to experience Code Club, hosting visits from VIPs, offering their space for training, and helping to build the community through online chats.

We also launched a new programme of Code Club Champions, which recognises some of our most outstanding volunteers. They represent us at events, support others on our forums, and help us to spread the word about Code Club.

Code Club has always been a global movement. There are now 9,000 clubs registered in ten countries. A large part of that growth depends on the network of partners who lead the growth of Code Club communities in their countries. We have thriving communities in Australia, New Zealand, Brazil, Ukraine, Canada, and France. This year we launched country-wide pilot programmes with three new partner organisations: Code Club Hong Kong, Code Club Bangladesh, and Programerko in Croatia. Australia was the first country after the UK to grow to more than 1,000 clubs, thanks to the great work of Code Club Australia.



> “The children’s enthusiasm has been brilliant and they have been proud of what they have achieved. Some have taken these skills and produced some fabulous work at home”
>
> Code Club Teacher

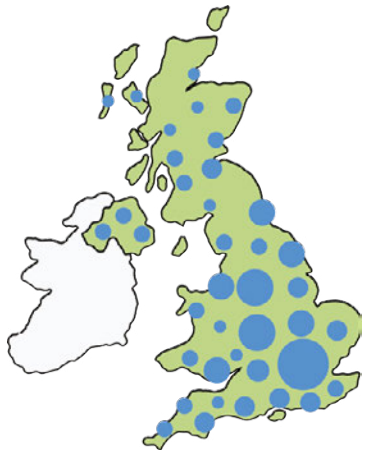
We launched an improved website for Code Club International, and translated our projects into eight new languages including Korean and Croatian.

Code Club in 2017

Code Club is now one of the largest networks of coding clubs in the world, and our ambition is to move closer to our goal of a Code Club in every community. We will continue to support the growth of Code Club in the UK, focusing particularly on more deprived communities, and internationally through our network of partners. We will also do much more to understand what is working in existing clubs, and to share best practice between clubs. We are also looking at how to track children’s progress, so that they and their club organisers understand what they have learned so far, and how they can build their skills even further.

Read more at **codeclub.org.uk** and **codeclubworld.org**

Code Clubs across the UK



Club supporters

Code Club receives support in the form of grants and donations from a range of trusts, foundations, businesses, and individuals, in order to reach so many children around the UK.

- Lloyds Banking Group matched its generous donation to Code Club in 2016 with a commitment to encourage IT employees at the firm to volunteer with Code Club, as part of the company’s Digital Champions scheme. By the end of the year, more than 400 employees had signed up.
- ARM’s continued support for Code Club allowed us to better understand the programme’s reach and impact.
- The Platten Family Fund at the Community Foundation Tyne & Wear and Northumberland helped Code Club to engage with more schools and new volunteers in the North East of England.

Jam makers workshop

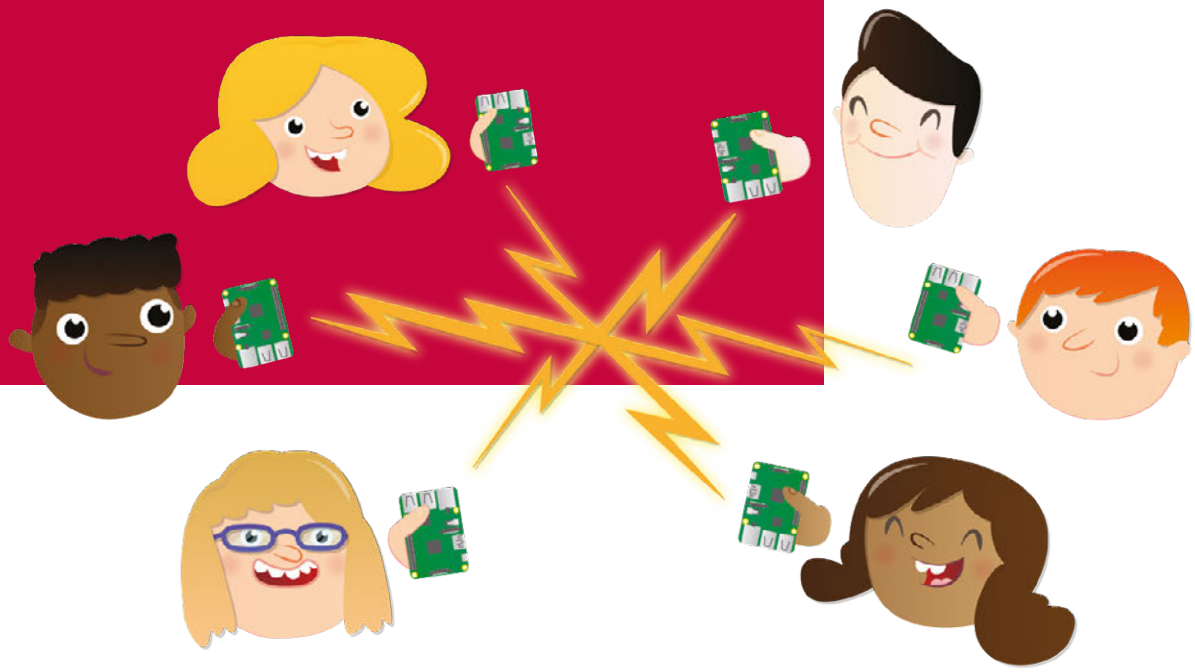
COMMUNITY

The Raspberry Pi Foundation is primarily a community organisation. We are part of a movement of makers, educators, parents, and young people, who share our mission to empower people through digital technologies. The community includes the volunteers and educators who run Code Clubs; people who run Raspberry Jams and other events; resellers and creators of add-ons who provide the tools that makers need; members of our forums who offer user support and the moderators who help organise them; bloggers and YouTubers who share projects and ideas to inspire others to get into making; makers who share their projects on social media; and many others. A lot of our work is focused on helping that community to grow and supporting them to do great things.

Raspberry Jams

Raspberry Jams are community-led events that provide an opportunity for people to get together and learn about computing and digital making. Jams come in different shapes and sizes, but will typically involve makers showcasing their projects, sharing their ideas, and learning from other makers. Jams are always welcoming to beginners. We hear lots of stories of people of all ages who've been

> “A lot of our work is focused on helping that community to grow”



introduced to the world of digital making at a Raspberry Jam.

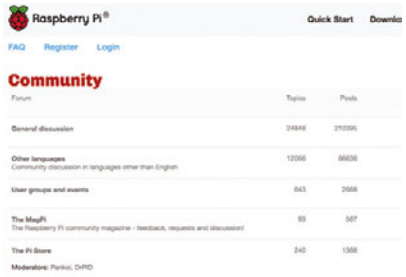
There were 320 Jams from 27 countries registered on our website in 2016, and many more that took place as part of hackathons and other events. 200 were in the UK, 51 in the USA, and ten in Taiwan.

The Raspberry Pi Foundation has always helped to promote Raspberry Jams. This year we have been working with the Raspberry Jam community to develop ideas for providing practical support, including a playbook for Raspberry Jams that was co-created with the community. We've also started to run our own Jams, including a new monthly meet-up at our Cambridge office, and pop-up Jams at the Bett education technology show and The Digital Garage in Glasgow.

The Raspberry Pi Forums

The forums at **raspberrypi.org** are the go-to place for anyone looking for help with their projects, to discuss new products and tools, and to get to know other enthusiasts. There are now more than 1 million posts and 191,000 members active on the forums. The forums are frequented by experienced community members, Raspberry Pi engineers and staff, and people who are new to making. They are moderated by community members, who work hard to support the positive atmosphere and well-informed discussions that forum members enjoy.

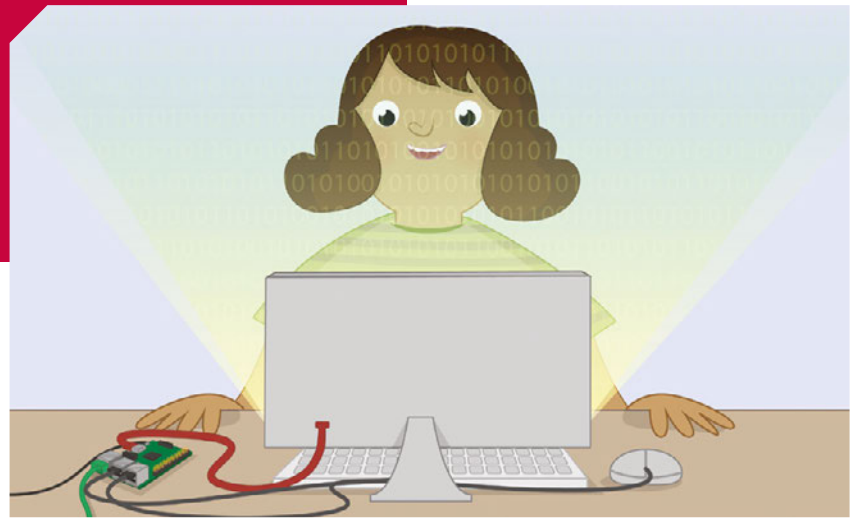
The forums provide a range of support areas. Beginners can spend time getting to know Raspberry Pi computers, while experts have the chance to discuss in-depth technical issues. There are areas for different categories of projects, including



Map of Jams

Raspberry Jam events have taken place all over the world in 2016.

> "There were 320 Jams from 27 countries registered on our website in 2016, and many more that took place as part of hackathons and other events"



> “Code Club has made regular use of Twitter chats: scheduled hour-long discussions based around a hashtag”

automation and robotics; and graphics, sound, and multimedia. The areas for specific pieces of hardware, such as the Raspberry Pi Camera Module, provide support for makers. Users of specific programming languages can seek out fellow coders for help, or for discussions of the details of the language.

Social media

Social media is an important tool for engaging with the Raspberry Pi community. We have large and growing communities on Twitter, Facebook, Instagram and YouTube, with members sharing projects, spreading the word about events, connecting community members, and encouraging new people to get involved with the movement.

The #picademy tag was created on Twitter to share experiences during our teacher training events. It has grown to become a tool for educators to continue to connect and share their ideas. Code Club has made regular use of Twitter chats: scheduled hour-long discussions based around a hashtag, designed to give volunteers a chance to meet each other, ask questions, and share ideas. Our new Pioneers

SOCIAL MEDIA STATS

As of Feb 2017

TWITTER
RASPBERRY_PI
324k
FOLLOWERS

YOUTUBE
RASPBERRY PI
14k
SUBSCRIBERS

45k
INSTAGRAM
RASPBERRY PI FOUNDATION
FOLLOWERS

FACEBOOK RASPBERRY PI
252k LIKES

GOOGLE+ RASPBERRY PI
1.06 MILLION
FOLLOWERS

programme uses the hashtag #MakeYourIdeas to encourage young people to share their in-progress projects for discussion and support.

Celebrating the contribution of community members

We are always trying to find ways to celebrate and thank the amazing community that supports our mission. Projects and contributions are showcased on our blog and in our community magazine, The MagPi. This year we were also able to say thank you in person to hundreds of our volunteers, makers, and educators. Community members who have made some of the biggest contributions were invited to special events at the Houses of Parliament, hosted by Matt Hancock MP; and at St James's Palace, hosted by our patron, Prince Andrew, Duke of York.

The future

This year, we will continue to support our community to do great things. We will be meeting with event organisers at our birthday party to discuss how we can best support them, and producing a playbook to help people to start new Raspberry Jams. We will be running regional meet-ups for community event organisers, and offering training in event planning. We will continue to create online materials, including website templates and marketing materials, to help organisers to spread the word about their events.

We are constantly looking to improve our support for the people who contribute to our amazing community.

> "Community members who have made some of the biggest contributions were invited to special events at the Houses of Parliament"

EVENTS AND OUTREACH

Our aim is to introduce more people to computing and digital making, and to grow the movement for computer science education. In support of this aim, we've been attending events, meeting people, and providing hands-on experience of digital making.

This year we engaged tens of thousands of people through a series of events, primarily in the UK and the USA. We make our presence at these events as interactive as possible. We provide workshops and practical demonstrations, allowing people to have a go at digital making and to write their first line of code. We also provide information about getting started with Raspberry Pi computers and getting involved in our educational programmes. Engineers and members of the Foundation are on hand to talk to people about their questions and ideas.

> "This year we engaged tens of thousands of people through a series of events, primarily in the UK and the USA"

Raspberry Pi events in 2016

Raspberry Pi Big Birthday Weekend

- Cambridge, UK (March)
- More than 1,500 people at Cambridge Computer Lab

Royal Institution Astro Pi Masterclasses

- Bedfordshire, Exeter, and Newcastle, UK (Feb–May)
- Expert-led classes on Astro Pi programming in partnership with local schools

10 Million Pis Celebration

- London, UK (September)
- A milestone in our sales, celebrated at the House of Commons
- Workshops run by Raspberry Pi Foundation staff, community members and Creative Technologists

Thanking the community

- London, UK (November)
- Celebrating the achievements of our community members at St James's Palace

Outreach events

Bett Show

- London, UK (January)
- More than 34,000 educators at the annual education technology event

The Big Bang Fair with the UK Space Agency

- Birmingham, UK (March)
- 70,000 seven- to 19-year-olds and their parents and teachers, celebrating STEM

The Gadget Show Live

- Birmingham, UK (March)
- 75,000 technology and gadget fans

SX Create

- Austin, USA (March)
- 72,000 creative visitors at the hardware hacking and maker arm of the SXSW conference

USA Science & Engineering Festival

- Washington DC, USA (April)
- 365,000 visitors to this festival to engage and inspire young people in STEM

Maker Faire Bay Area

- San Mateo, USA (May)
- 150,000 makers of all kinds sharing their builds, ideas, and inspiration

American Library Association Annual Conference

- Orlando, USA (June)
- 8,000 library professionals discussing the learning opportunities they provide to their communities

The Royal Cornwall Show

- Cornwall, UK (June)
- 125,000 people, 500 cattle, and 1,500 sheep celebrating rural life in the UK

ISTE

- Denver, USA (June)
- 16,000 educators and education technology professionals

Raspberry Pi community members at St James's Palace

Camp Bestival

- Dorset, UK (July)
- Family-focused festival, attended by 30,000 parents and children

Big Bang Fair North West

- Liverpool, UK (July)
- A celebration of STEM at the Liverpool Exhibition Centre

Scratch Conference

- Cambridge, USA (August)
- Biannual conference for the Scratch programming languages

PyCon UK

- Cardiff, UK (September)
- Talks and workshops from Foundation staff at this annual event for the Python programming language

Silver Spring Mini Maker Faire

- Silver Spring, USA (September)
- Supporting young makers at Mini Maker Faires in their local cities to share their creations and be inspired

XperiBIRD.be launch with Google.org

- Belgium (September)
- Launch of the Royal Belgian Institute of Natural Sciences initiative to develop a bird nesting observation network by distributing nest boxes with cameras to schools

Scottish Learning Festival Exhibition

- Glasgow, UK (September)
- 52,000 educators from across Scotland

Mozilla Festival

- London, UK (October)
- 1,600 champions of the open web

World Maker Faire New York

- Queens, USA (October)
- 90,000 makers from across the world sharing their projects and exploring new ideas

Google's Digital Garage

- Port Talbot, UK (November)
- A two-day workshop event to support the local community after the loss of jobs in the steel industry in the area

Barnes & Noble Mini Maker Faire

- All over the USA (November)

ANNUAL REVIEW 2016

LEARNING

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

PICADEMY

Picademy is a free, two-day course in computing and digital making for educators. Graduates become Raspberry Pi Certified Educators, with the skills and confidence to lead the movement for computing and digital making in education. Picademy is designed to be cross-curricular: 42 percent of teachers on our courses teach computing as their main subject, 14 percent are generalist primary school teachers, and others focus on other subjects such as science and design technology.

The course is packed with workshops on computing concepts, hardware and software tools, and a range of practical applications that educators can bring to the young people they work with. Picademy also aims to introduce educators to the process of learning through making. On the second day the educators work in teams to make their own digital projects, giving them the chance to directly experience our project-based learning approach.

Growing the community

This year the Picademy programme trained 514 teachers, which more than doubled the size of the community of Certified Educators. This brings the total community to almost 1,000 educators, who work with an estimated 70,000 children and young people every year.

Google generously sponsored the UK Picademy program in 2016. With its support, we were able to deliver Picademy sessions across the UK. Sixteen events took place at Google Garage venues including London, Manchester, Glasgow, Newcastle, and Liverpool.

We also launched Picademy in the USA, supporting President Obama's commitment that every student should have the opportunity to study computer science. We ran four events in the USA, which brought together enthusiastic educators and helped to build their skills and experience in maker-based computer science learning. We are extremely grateful to our hosts (the Computer History Museum in Mountain View, the Digital Harbor Foundation in Baltimore, and the Texas Advanced Computing Center in Austin) for their generous support.

Impact

The first survey of all Raspberry Pi Certified Educators was run in July, achieving a 60 percent response rate. The survey has helped us to understand the impact that our community of educators is having as a result of their training. They have also given us plenty of ideas for improvements to the Picademy programme, which will allow us to provide them with better support and training.

From the survey, we know that many of our educators (42 percent of responses) provide their enthusiastic students with extracurricular opportunities for learning computing. In addition, 32 percent use what they learned at Picademy as part of a unit of work they provide, and 36 percent have designed an entire topic or unit of work around Picademy content.

Picademy is aimed at supporting and creating leaders in digital making education. We now know that 83 percent of participants are passing on their learning to other professionals, influencing others to bring digital making projects into their classrooms. These professionals include colleagues in their own organisation (71 percent), other organisations (39 percent), and from other parts of the country (16 percent).

Locations of our Certified Educators across the world

Moving forward

Over the next year we will train more than 600 new Certified Educators in the UK and USA.

We will also be continuing to develop our work with our existing network, helping them to build their own skills and those of other educators. One of the greatest resources for our Certified Educators is the network of other leaders in digital making education. We plan to strengthen this network, with opportunities to learn face-to-face, to share expertise online, and to communicate in print in Hello World magazine.

We now know much more about how Certified Educators build what they learn at Picademy into their teaching. We are developing initiatives to help them to have even more impact, learning not just from us, but also from each other.

Read more at **rpf.io/picademy**

> “Picademy is aimed at supporting and creating leaders in digital making education”

SKYCADEMY

One of the most powerful ways to engage young people in digital making is through cross-curricular projects that combine science, computing, maths, and more. In Skycademy, we help young people to send Raspberry Pi computers to near space by attaching them to helium-filled high altitude balloons. The equipment takes photographs and measures atmospheric data on a journey of up to 40km into the atmosphere. This data is transmitted live back to the Earth, allowing the students to experience the near-space flight in real time. Capturing your own photograph of the curvature of the earth is both a powerful rebuttal of the flat-earth theory and a fantastic way to inspire young people to get creative with technology.

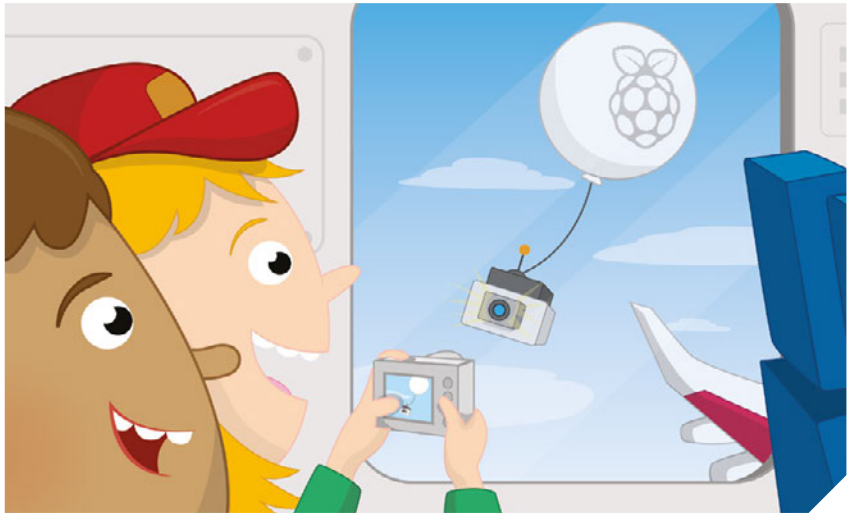
Educator training

This year we trained 30 educators, who worked in teams with the support of high-altitude balloon pioneer Dave Akerman. They learned about the process of launching a balloon, assembled their own flight computer and balloon setup, and carried out a launch.

The educators returned to their schools with the knowledge, skills, and all of the equipment they needed to run launches with the young people they work with. As the year progresses, we are supporting them to run launches with their students across the country, inspiring them with the possibilities of computing and digital making.

> “This year we trained 30 educators, who worked in teams with the support of high-altitude balloon pioneer Dave Akerman”

A student from Bourne Grammar school launches an HAB



HAB launch equipment

For any successful launch you need the right equipment, both in the air and on the ground. For our flights in the UK, we use:

In the air:

- Helium weather balloon and parachute
- Raspberry Pi (A+ or Zero)
- Raspberry Pi Camera Module
- Pi in the Sky board (GPS tracking and UHF radio)
- LoRa board (data communication over radio)

On the ground:

- Hardware or software radio (for receiving UHF)
- Raspberry Pi and LoRa board (for communicating with the flight computer)
- Tablet or computer (for decoding data)
- Chase vehicle with mobile broadband

> “As the year progresses, we are supporting them to run launches with their students across the country”

CODE CLUB
TEACHER TRAINING

Computing is still a new subject for many primary schools. Our Code Club teacher training helps to give primary school teachers the confidence they need to teach the computing curriculum.

Building computing confidence

Our programme recruits volunteers who understand and care about computer science, and trains them in a one-day workshop. Our trained volunteers then go into local schools and work with any teachers who have requested help with the computing curriculum.

This programme has been generously sponsored by Google. Code Club teacher training in 2016 has taken place in Google Garage venues, including Manchester, Birmingham, Glasgow, and Newcastle. This has allowed us to reach teachers in schools across the country.

Reaching teachers

Some amazing volunteers have worked with us this year, reaching 684 teachers in the UK. These teachers work with more than 15,000 pupils in total. Code Club teacher training also encourages schools to set up their own Code Clubs. In one instance a volunteer trainer delivered three sessions to teachers from 15 local schools in Newcastle. As a result, eight schools set up their own Code Clubs.

2017 training

This year we will extend our support for primary school teachers by offering online courses on the FutureLearn platform.

We will be working with our partners at BT, and our trained volunteers, to reach even more teachers through the BT Barefoot Programme. We are also developing more support for Raspberry Pi Certified Educators in their work with primary teachers in their local schools.

> “Some amazing volunteers have worked with us this year, reaching 684 teachers in the UK”

ONLINE TRAINING

Our face-to-face Picademy and Code Club teacher training sessions have been incredibly popular, with an average of three applicants to every space. We want to reach even more educators than we can meet in person, so we spent the latter part of 2016 developing new, free online training courses for educators.

Both courses take the 'learning through making' approach that runs through everything we do. Educators will work on practical activities and projects, share their achievements and their challenges with others, and build their understanding through discussion.

Just like our face-to-face courses, these courses offer a chance to learn, and to connect with other like-minded educators.

The courses are provided free on the FutureLearn platform. They incorporate the expertise of our education team, and our experience from the many Picademy and Code Club teacher training events we have run to date. We're excited about making our training available to even more people, and about expanding the impact to more young learners as a result.

You can find our courses, and sign up to join the learning, at **rpf.io/futurelearn**.

The courses

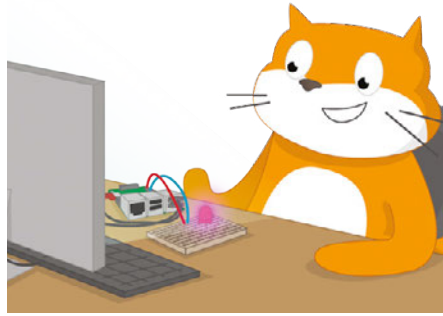
Teaching Programming in Primary School:

- Comprehensive introduction to programming for non-subject specialists in four weeks
- Key programming concepts using Scratch and unplugged activities
- Ideas for teaching pupils using these concepts
- Collaborative ethos: learning and discussing with other educators and Raspberry Pi Foundation experts

Teaching Physical Computing with Raspberry Pi and Python:

- Four week introduction to creating systems that respond to and control the physical world
- Develop knowledge of programming and simple electronics. Write programs using Python and Raspberry Pi
- Apply your knowledge and skills to challenges as you learn. Explore ideas to help your students to learn through making
- Connect with a network of other educators and Raspberry Pi Foundation experts

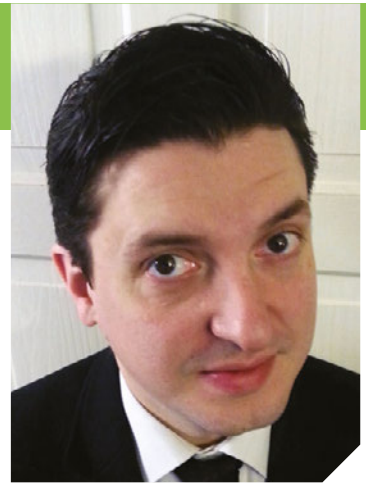
> "We spent the latter part of 2016 developing new, free online training courses for educators"



RASPBERRY PI CERTIFIED EDUCATORS

JON WITTS

DIRECTOR OF DIGITAL STRATEGY AT QUEEN MARGARET'S SCHOOL, YORK, UK



Jon is a firm believer in the importance of digital making as a creative outlet that young people can use to express themselves and to learn. He applied to Picademy to further his knowledge of physical computing and Raspberry Pi computers. He has gone on to make use of what he learned in many aspects of his work at a girls' secondary school in York. Their computer science curriculum is planned around Raspberry Pi computers, and taught to all eleven- to 14-year-olds. Jon also runs extracurricular clubs for all age groups.

The school has a high-altitude balloon club, with three successful launches to date. A future night launch and an attempt to break the altitude record are planned. Outside work, Jon also runs the Hull Raspberry Jam for nine- to twelve-year-olds, with Claire Garside. With Hull chosen to be UK City of Culture for 2017, Jon and Claire have big plans to develop the Raspberry Jam's opportunities for creative digital making.

AMANDA HAUGHS

ELEMENTARY MATH AND TECHNOLOGY INTEGRATION COACH IN CAMPBELL UNION SCHOOL DISTRICT, USA

Amanda is a teacher who works with other teachers to support their use of technology in English and maths. She had been using coding in her work to help engage students in relevant and meaningful learning, so when Picademy came to the USA she saw it as a chance to supercharge her skills in this area. Amanda was in a similar position to many teachers. She had tried Scratch and other programming languages, but wanted to find out how to use this knowledge to plan compelling and relevant projects.

Picademy provided these ideas, and gave her the confidence and experience to use them. Amanda met and connected with other enthusiastic educators, and expanded her personal learning network. She is now continuing to learn from this network, as well as sharing her good practice with the teachers she works with. She has shared her skills at the International Society for Technology in Education (ISTE) conference, at CUE Rockstar events, and at some of our own Picademy events.

THE MAGPI MAGAZINE

The MagPi is the official Raspberry Pi magazine, written by and for the community to inspire and educate readers of all ages to have fun with digital making. The magazine celebrates the achievements of the community, and gives its members a platform to share their skills, ideas, and experience with readers all over the world. It is filled with projects and guides from community makers, reviews of the latest products, and news on what's happening in the wider Raspberry Pi community.

> "The MagPi's monthly editions are now a fixture in newsagents and supermarkets, including WHSmith and Tesco across the UK"

The MagPi's monthly editions are now a fixture in newsagents and supermarkets, including WHSmith and Tesco across the UK, and Barnes & Noble in the USA. The proceeds from print sales contribute to funding our educational goals. Part of our mission is making sure that cost is not a barrier to learning about digital making, so we also make The MagPi available as a free PDF at **magpi.cc.**

The MagPi is downloaded and purchased more than 125,000 times every month. Downloads and sales in November 2016 exceeded a quarter of a million alone.

This year has seen a range of themes for the features in the magazine, from Christmas- and Halloween-focused projects for those keen on seasonal celebrations, to projects for the Raspberry Pi Zero in March. In April, those with an ambition to automate their home with Raspberry Pi computers enjoyed the 'power up your life' feature, and in November there was an in-depth look at the potential of robotics projects. The 50th issue, published in October, celebrated the 50 most popular Raspberry Pi projects, as voted for by readers.

Greatest projects

For issue 50 of The MagPi, we ran a vote to find the 50 greatest Raspberry Pi projects so far. Here are the top five...

5. Aquarium
Michael Gronau's fish tank polls a weather station on the Cayman Islands and adjusts the lighting and temperature in his tropical tanks to match.

4. Internet of Lego
Cory Guynn's internet-controlled Lego town is complete with a train scheduled for London commuters using the Transport for London API.

3. BrewPi
Elco Jacobs developed this early project to control the temperature of beer brewing equipment. It is now a commercially available product.

2. SeeMore
Staff at Virginia Tech combined computer science and art to create this sculpture of 256 parallel Raspberry Pi computers that move in sync as they compute.

1. Magic Mirror
Michael Teeuw created this much-replicated project, bringing information and updates to mirrors across the world. It's a delightful project that allows each maker to customise it to their information needs and their own interior decor.

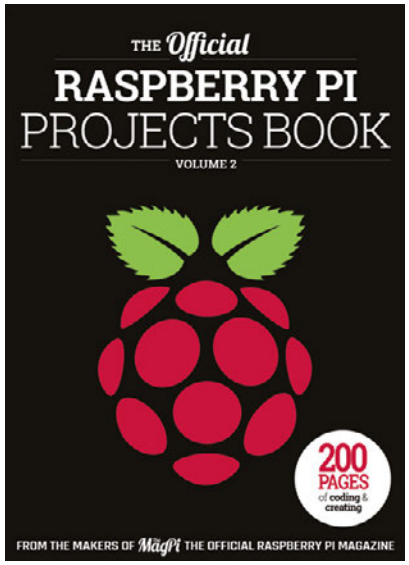
Read more at **magpi.cc/Issue-50**

BOOKS

Our publishing arm shares the goal we have for computer hardware: to turn something otherwise expensive and inaccessible into something affordable and fun. This year we have expanded The MagPi Essentials series with six new titles.

Each of these books aims to bring together the essential elements of a topic, taking the reader from a novice to near-expert in the subject. An Essentials book takes a theme that you might find in The MagPi magazine and allows readers to go deeper, taking a structured approach to mastering all the essential elements.

Just like The MagPi, our books are available both in print and online. PDF copies are available for free download from **magpi.cc**. Like The MagPi, they reach huge numbers of people, with more than 1.25 million sales and downloads to date.



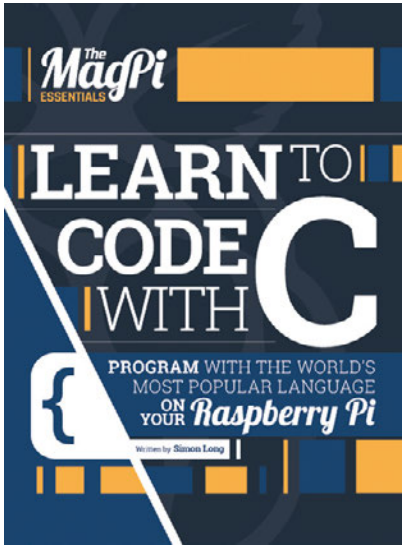
The Official Raspberry Pi Projects Book 2

£12.99

Released November 2016, *The Official Raspberry Pi Projects Book Volume 2* is the ultimate compendium of inspiring projects, essentials guides, and step-by-step projects.

magpi.cc/PiProjects2

> “Each of these books aims to bring together the essential elements of a topic, taking the reader from novice level to near-expert level”



Learn to Code with C

£3.99

The latest in our affordable Essentials series of books designed to help you master Raspberry Pi-related and general computing and coding skills. *Learn to Code with C* is one of our most popular titles to date.

magpi.cc/learn-c-book

New books for 2016

- Experiment with the Sense HAT Jan 2016
- Code Music with Sonic Pi Feb 2016
- Learn to Code with Scratch June 2016
- Hacking and Making in Minecraft July 2016
- Simple Electronics with GPIO Zero Aug 2016
- Learn to Code with C Oct 2016
- Official Raspberry Pi Projects Book vol 2 Nov 2016

Buy or download free at
magpi.cc/Back-issues

HELLO WORLD

Hello World is the new magazine for computing and digital making educators. Inspiring and supporting educators is a key part of our mission, enabling them to create opportunities for young people to learn computing and digital making. Our experience with The MagPi has shown the power of a magazine to support and build a community. In 2017 we are working with Computing At School (CAS) to bring this approach directly to educators.

Free education inspiration

Hello World is a magazine, in print and online, written by educators, for educators. It features a mix of news, features, teaching resources, and reviews. Issues appear three times a year to coincide with school terms, and feature 100 pages of content. Best of all, it's free forever online as a PDF. Hard copies are also available for personal subscription and there are free hard copies for practising educators in the UK.

The magazine was launched at Bett 2017 in January, and has already reached thousands of educators. Hello World will grow to support our community of educators, and in turn to support this community to grow. As a result, we aim to reach many thousands more educators and help them share their ideas, inspire each other, and develop the opportunities available to young people to get involved in computing and digital making.

Read more at **helloworld.cc**

RESOURCES AND CURRICULUM

One of the main ways that we support learners is through providing free, high-quality educational resources that provide inspiration and help them learn about computing and digital making. All of our resources are created by experienced educators and tested to ensure that they help learners to develop skills, knowledge, and confidence.

Our learning resources support people to learn skills using both Raspberry Pi computers and other cross-platform tools such as Scratch, Sonic Pi, and Python. All our resources can be used at home, in clubs, or in the classroom. Many are designed to support school computing lessons, and some are linked to other subjects such as science, art, music, and storytelling. Learning how computing can be used to solve problems in a range of subjects and areas is an important part of our approach. Raspberry Pi Foundation resources are available free online at **raspberrypi.org/resources**, and Code Club projects are available free to registered clubs at **codeclub.org.uk/projects**.

Projects in 2016

Last year we created and published 40 new learning resources on **raspberrypi.org** and an additional 29 learning resources for Code Clubs. The resources range from beginner to intermediate, and cover a wide range of hardware, software and computing concepts.

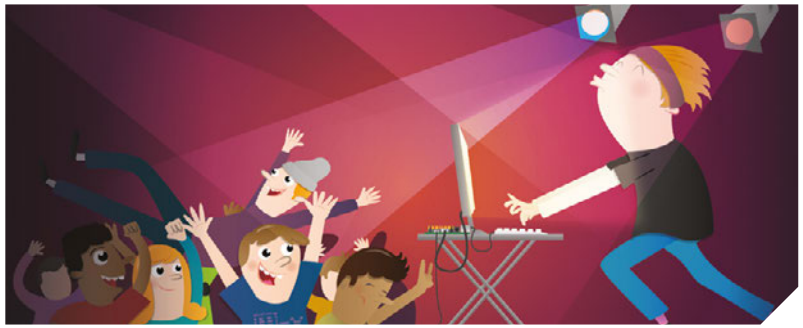
Some new projects were linked to themes, such as the Olympic Games. Others support people to get involved with programmes such as Astro Pi and the Raspberry Pi Weather Station. We revamped the Code Club Python curriculum, based on feedback and experience from users, to make it even more engaging. We developed resources for school students who received the BBC Micro:Bit device, which we also gave away to Code Clubs across the UK.

In January 2017, we launched the first version of the Raspberry

Sonic Pi

Sonic Pi is a live-coding music synthesizer, allowing anyone to create music through programming. The Raspberry Pi Foundation has supported Dr Sam Aaron at the University of Cambridge to develop the software and reach new audiences. A number of our resources make use of Sonic Pi as a fun way to get started with programming, including a full scheme of work for teachers.

sonic-pi.net



Pi Foundation's Digital Making Curriculum, which attempts to set out how we think about the skills and knowledge needed to become a digital maker. The curriculum was developed with the input of experts from a wide range of fields. We are continuing to gather feedback as we start to use it for our resources and projects.

This curriculum brings together all of our projects into a map of everything we want to help people to learn about computing and digital making. It will help people to understand their progress so far in learning, and what they could learn next. It will help educators to plan sequences of projects, with the aim of building the skills of their students. It will also help us to create even more inspiring and educational resources, teaching new skills and supporting learners on their journey to becoming highly skilled digital makers.

> "The curriculum will help educators to plan sequences of projects, with the aim of building the skills of their students"

Projects in numbers

Raspberry Pi learning resources have had 6.1 million unique views in 2016, with the average project being viewed by 64,180 makers. Code Club projects have had almost 900,000 unique views. Millions of views of our projects represent a huge amount of making.

Resources in 2017

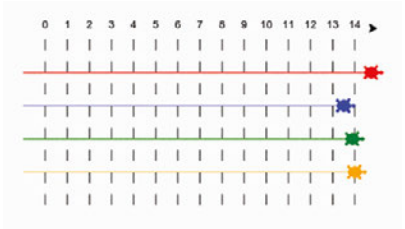
In 2017 we will continue to create fun projects and resources that appeal to people with a wide range of interests and skill levels. We have plans to expand the range of our Scratch projects; to produce more projects around particular themes or events; and to target projects at people taking part in our programmes, such as Pioneers. Our new resources will be framed around the Raspberry Pi Foundation's Digital Making Curriculum. We will be working really hard to develop access to our online projects, and to transform how people navigate through them on their own journey of learning.

Projects

Code Club Projects

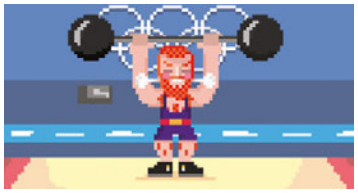
Ada's Poetry Generator
Celebrate Ada Lovelace's contribution to computing by building a Scratch program to generate poetry. Learn to use variables, lists and randomisation, and try Ada's vision of applying poetic imagination to computing.
rpf.io/adapoetry

Turtle Race!
Create a racing turtle game using the text-based programming language Python. Learn about loops and writing to the screen using the online Python development tool Trinket.
rpf.io/turtlerace



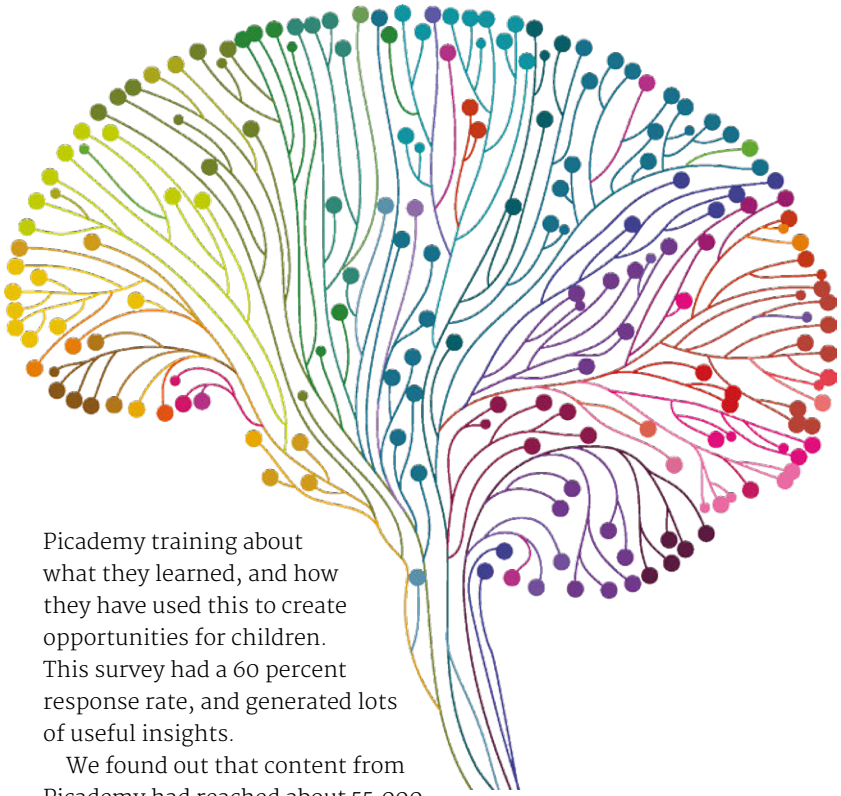
Raspberry Pi Projects

Minecraft selfies
Minecraft fans can now get even more immersed in their virtual world! Learn how to take photos with the Raspberry Pi camera, and use Python to translate them into a block-based version of yourself in Minecraft.
rpf.io/mcselfies



The Scratch Olympics Weightlifter
Experience the magic of classic button-bashing sports games by creating your own. Learn how to use conditional selection, Boolean operators, and conditional loops along the way.
rpf.io/weightlifter

RESEARCH



We are committed to understanding the impact of the work we do, and learning from ourselves and from others. In 2016 we started investing in our own research to help us to understand the relatively new area of digital making, and to ensure that we are having a positive impact through our work.

Learning from others

Digital making might be a new concept, but there are lots of people doing research in this area. We have been making sure we get to know them all, so we can learn from their insights and share ours. We've hosted the CAS Research group at our Cambridge offices, and presented a session at the researchED National Conference about what we are learning through our work.

Theory of Change

This year we have used an approach called 'Theory of Change', used in many social-purpose organisations, to clearly define our goals and how we work to achieve them. We work on a wide range of different programmes, and our staff and Trustees all contributed to create a map of how these activities have an impact in the world. This will help us all to better understand how each of our projects and programmes are contributing towards our goal, of helping more people to have better lives and make a positive impact on society. We will also identify metrics that we can use to regularly monitor our progress. We will be sharing our Theory of Change online in 2017.

Evaluation

We have done a lot of work this year to find out more about the people who participate in our programmes, and the effect those activities have on them. The largest piece of work in this area was our Certified Educators survey. We asked around 700 people who had been through our Picademy training about what they learned, and how they have used this to create opportunities for children. This survey had a 60 percent response rate, and generated lots of useful insights.

We found out that content from Picademy had reached about 55,000 children and young people at that time, with 42 percent of educators running extracurricular clubs, and 36 percent designing entire units of work around it. We also found out that 12 percent of participants have found it challenging to implement

> "We found out that content from Picademy had reached about 55,000 children and young people"

> “It is really important for us, as a charity, to share both our successes and the areas where we could do better”

what they learned. These challenges included a lack of equipment and time to practise their skills, and a need for more support. In response, we created new resources to help teachers to access equipment, and to win over senior colleagues. In 2017 we will continue to develop this support, with online training for practising and developing skills. We are conducting similar work for all of our programmes, and the results will be published on our website. In 2017 we will continue to incorporate the lessons from this work into the design of our programmes.

External evaluation

Wherever possible, we will work with independent institutions to help us understand what is working in our programmes. In 2015 and 2016 we worked with the National Foundation for Educational Research (NFER), which ran a random controlled trial of a group of Code Clubs. We are very grateful to Nesta and the Cabinet Office for providing the funding to support this work, as part of their commitment to evidence-based social programmes. This trial showed us clearly how Code Clubs have an impact on children’s learning and confidence in programming. It showed us we are doing well in providing high-quality resources, and in how we set up clubs. It also showed that the areas we need to prioritise for improvement are making sure we are assessing exactly what children learn in Code Clubs, and how we develop their computational thinking.

We also worked with the Behavioural Insights Team (BIT) to develop new ways of recruiting volunteers for Code Club, as well as making our processes for setting up a Code Club as easy and accessible as possible.

It is really important for us, as a charity, to share both our successes and the areas where we could do better. We will be publishing this work on our website in 2017 to keep moving forward the discussion about effective computing and digital making education.

ANNUAL REVIEW 2016

GOVERNANCE & PARTNERSHIPS

> The Board of Trustees is responsible for ensuring we use our resources effectively to reach our charitable goals

GOVERNANCE AND PARTNERSHIPS

The Raspberry Pi Foundation is a UK registered charity (1129409), formed as a company limited by guarantee. The Foundation is governed by a Board of Trustees, who are responsible for ensuring we use our resources effectively to reach our charitable goals. Trustees are volunteers who give their time freely to support the work of the Foundation.

Supporting our Board of Trustees is a wider group of Members, who are individuals with significant expertise and knowledge that supports our mission. Membership is a voluntary position. Members contribute to the Foundation's strategic direction, hold the Foundation to account, and advocate for our mission. New Trustees are elected by the Membership.

Tilly Blyth was elected to the Board of Trustees at the Annual General Meeting in November 2016.

Patron

His Royal Highness the Duke of York

Trustees

- **David Cleevely**, Chairman, The Raspberry Pi Foundation and co-founder, Cambridge Angels
- **David Braben**, CEO, Frontier Developments
- **Chris Mairs**, Chief Scientist, Metaswitch Networks
- **Jack Lang**, Fellow and Entrepreneur in Residence, Judge Business School
- **Louis Glass**, Partner, Olswang LLP
- **Pete Lomas**, Director of Engineering, Norcott Technologies
- **Sherry Coutu**, Entrepreneur, Investor and Advisor to universities and charities
- **Tilly Blyth**, Head of Collections and Principal Curator, Science Museum, London

Members

- **Alan Mycroft**, Professor of Computing, University of Cambridge (Founding Member)
- **Andy Rice**, Senior Lecturer, University of Cambridge Computer Science Lab
- **Annika Small**, Trustee, Design Council, Wayra, and the Access Foundation
- **Christine Swan**, Director of ICT and Enterprise, Stourport High School and Sixth Form Centre
- **David Willetts**, Executive Chairman, the Resolution Foundation and Visiting Professor, King's College London
- **Eben Upton**, CEO, Raspberry Pi Trading Ltd (Founding Member)
- **Ian Livingstone**, Non-executive chairman, Sumo Ltd
- **Lord Jim Knight**, Chief Education Advisor, TES and a member of the House of Lords
- **Joe Scarboro**, Founder, Touchpaper and co-founder, Unicorn Hunt
- **Jon Drori, Chair**, Ravensbourne College
- **Limor Fried**, CEO, Adafruit Industries
- **Martha Lane Fox**, CEO, doteveryone and a member of the House of Lords
- **Matthew Postgate**, Chief Technology Officer, BBC
- **Miles Berry**, Principal Lecturer in Computing Education, University of Roehampton
- **Richard Sharp**, Chief Technology Officer, Yieldify and Director of Studies for Computer Science, Robinson College, Cambridge
- **Rosemary Francis**, Creator and CEO, Ellexus Ltd
- **Rosemary Leith**, Founding Director, World Wide Web Foundation and Fellow, Berkman Center, Harvard University
- **Sarah Wood**, Co-founder and CEO, Unruly
- **Scott McGregor**, Former President and CEO, Broadcom Corporation and former President, Broadcom Foundation
- **Simon Peyton-Jones**, Principal Researcher, Microsoft UK and Chair, Computing At School (CAS)
- **Sway Grantham**, Primary school teacher specialising in computing
- **Tim Peake**, British Astronaut, European Space Agency (ESA)

OUR SUPPORTERS

The work of The Raspberry Pi Foundation is only possible because we are part of a fantastic and growing community that shares our mission. That community includes a wide range of individuals and organisations that support our work by donating their expertise, providing funding and support in kind, and much, much more.

Special thanks to the following individuals and organisations who supported us in 2015–2016:

£250,000 and above

- ARM
- The Cabinet Office
- Google
- Nesta
- Olswang
- The Shell Centenary Scholarship Fund

£150,000 - £249,999

- Oracle

£50,000 - £149,999

- Canary Wharf Ltd
- European Space Agency
- Mythic Beasts
- Samsung
- UK Space Agency

£10,000 - £49,999

- Adobe
- Bloomberg
- Broadcom Foundation
- The Digital Xtra Fund
- EDGE Conference
- Humble Bundle
- Lloyds Banking Group
- Nominet Trust
- ProsperWorks
- Salesforce.org
- Tech North
- The Platten Family Fund at the Community Foundation, Tyne & Wear and Northumberland
- The Worshipful Company of Information Technologists
- University of Cambridge

We also want to acknowledge the following companies, whose software and services help us to do our work, and who have generously donated or discounted them during 2015 and 2016:

Appcanary, BrowserStack, Bytemark, Bytes, CircleCI, Code Climate, Contentful, DNS Made Easy, dotmailer, GitHub, Google, Gravity Forms, Freshdesk, Heroku, Intercom, Laravel Forge, MailChimp, Mailtrap, New Relic, Papertrail, LastPass, Postcode Anywhere, phpList, pi-top, Proofpoint, Segment, Sentry, Slack, Typeform, Typekit, vzaar, WhosOff, Zapier, Zoom

Each year, we also receive hundreds of smaller donations from individuals and organisations. Every donation helps us to further our educational mission.

Support our work today

If you or your organisation would like to make a donation towards our work, or discuss the possibility of partnership, email **partners@raspberrypi.org** for more information.

ANNUAL REVIEW 2016

Raspberry Pi Foundation
UK registered charity 1129409