## **Raspberry Pi Foundation Annual Review 2018**







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### **OUR MISSION**

ur mission is to put the power of computing and digital making into the hands of people all over the world. We do this so that more people can harness this power for work, to solve problems that matter to them, and to express themselves creatively.

#### Our strategy:

- We provide low-cost, highperformance single-board computers and free software through Raspberry Pi Trading Ltd, so that computing and digital making are accessible to all
- We help young people acquire computing and digital making skills through compelling learning resources, a thriving

network of volunteer-led clubs, exciting competitions and events, and partnerships with youth organisations

- We provide training and support to educators, volunteers, and parents who want to help young people learn these skills
- We build and support communities of young people, parents, volunteers, businesses, and educators that share our mission

Since launching our first product in February 2012, we have sold more than 22 million Raspberry Pi computers and have helped to establish a global community of digital makers and educators.

We help young people acquire computing and digital making skills





### **INTRODUCTION** FROM THE CHAIRMAN

#### DAVID CLEEVELY

018 was a remarkable year for the Foundation. Millions of people used the educational projects on our website. We engaged with hundreds of thousands of young people through Code Clubs and CoderDojos every week. We supported tens of thousands of educators through our training. I am immensely proud of the team's role in winning the bid to deliver the National Centre for Computing Education in England, and this will greatly help us as we continue to deliver on our mission to help people all over the world create with computers.

Raspberry Pi Trading Limited has had a fantastic year, with more than 22 million Raspberry Pi computers sold by the end of 2018, including the new Pi 3 Model B+ and Pi 3 Model A+ launched this year. People are using Raspberry Pi computers in education, in industry, and in their homes, and I continue to be surprised by the inventive things people accomplish with our products. All of these sales fund the educational work of the Foundation and let us create opportunities for even more people to gain computing skills.

While the Foundation continues to be funded in part by our Trading subsidiary, we also now receive substantial support from many partners, donors, and sponsors. We will keep on forging new partnerships around the world, our growth rooted in our identity as the organisation that can help young people develop the digital skills they need for the future.

I am privileged to work with exceptional Trustees, Members, and Directors as Chairman of the Boards of the Raspberry Pi Foundation and Raspberry Pi Trading Limited. These groups ensure that both organisations are well governed, and the people in them are great advocates for our mission.

In 2018 David Braben and Louis Glass stepped down as Trustees of the Foundation, and I'd like to thank them for their incredibly valuable contributions to our work over many years. David was one of the Founding Members, and has



been supporting and shaping the Foundation since the early days. At the Annual General Meeting, the Members elected Caroline Brown to the Board of Trustees. Caroline brings a wealth of experience from a wide range of company Boards, and her contribution to governance will be invaluable.

My thanks to everyone who has contributed to Raspberry Pi in 2018. 2019 is already looking to be another exciting year, and I look forward to working with you all over the next twelve months.

### **INTRODUCTION** FROM FOUNDATION CEO

#### PHILIP COLLIGAN

elcome to our Annual Review for 2018. It has been another fantastic year for the Raspberry Pi Foundation and our mission to help more young people learn how to create with digital technology.

We have continued to grow our reach and impact worldwide, with millions of people using our free educational content, and hundreds of thousands of young people involved in our programmes every week, including Code Club and CoderDojo.

In 2018 we took on responsibility for Coolest Projects, the world's leading technology fair for young people. At events in Dublin, London, and Southern California, thousands of young people showcase amazing projects that they have built using digital technologies.

We also launched new partnerships with national youth organisations in the UK to bring digital skills into their programmes. Our work with the Scouts is helping young people to learn how digital tools can help them shape their experiences of the outdoors and of teamwork. The National Citizen Service is the UK's fastest-growing youth movement for 15- to 17-yearolds, and we're working with the organisers to help young people learn how to use digital skills and tools to solve social problems. We're looking forward to developing similar partnerships outside the UK.

At the end of the year, we received the amazing news that we had been selected by the UK government to run the National Centre for Computing Education and associated programmes. Backed by £82m of government investment and substantial industry support, this is the largest initiative of its kind in the world and a once-in-a-generation opportunity to provide a worldleading computing education for every young person in every school in England. We are working as part of a consortium with STEM Learning



and the British Computing Society, and with a wide group of other partners, including the University of Cambridge. It is an immense privilege and a huge responsibility to be part of this initiative, and we are determined to have a big impact.

None of these achievements would be possible without the support from the community of makers, educators, young people, volunteers, parents, businesses, and policymakers we work with. I also want to pay a special tribute to the generous donors and sponsors that provide the resources that enable us to do such amazing work. Thank you.

### **INTRODUCTION** FROM TRADING CEO

#### EBEN UPTON

2018 has certainly been another busy year for Raspberry Pi Trading. We started the year with a bang, launching Raspberry Pi 3 Model B+ on Pi Day (14 March). The most technically sophisticated product we've ever designed, this added dual-band wireless networking and much faster Ethernet to the popular Raspberry Pi 3 Model B, along with a modest CPU speed increase and improved thermal behaviour.

The 3B+ also introduced one entirely new feature: Power-over-Ethernet (PoE) support. In August, we launched the PoE HAT accessory, which contains the electronics needed to power your Raspberry Pi via an Ethernet cable. Unfortunately, a design defect relating to USB crept through our pre-launch testing, and for the first time we made the decision to take a product off sale while we addressed it. Some heroic engineering from James Adams got us back on track, but it was a chastening experience. October saw the release of the TV HAT, which turns a Raspberry Pi into a DVB-T2 digital terrestrial set-top box. Our official mouse and keyboard get an honourable mention, despite slipping into the start of 2019.

The last product of 2018 was a poignant one for us. Raspberry Pi 3 Model A+ is a cut-down version of the 3B+, with half the memory and a single USB port, and is the final 'classic' Raspberry Pi product, based on the Broadcom BCM270x line of chips. Wherever we go next will by necessity be less of an evolution and more of a revolution, but with seven years of product launches we can certainly feel we got our money's worth out of the 40 nanometre process!

Alongside all this hardware work, the rest of the organisation has been keeping busy too. We've seen a steady stream of enhancements to our software stack, with regular releases of our Raspbian-based operating system focusing on usability and



significant improvements to media playback and web browsing. Our publishing team launched a new bi-weekly games magazine named Wireframe, an official Beginner's Guide, and the first Code Club Book of Scratch; we also welcomed Custom PC and Digital SLR Photography into the Raspberry Pi Press family.

At seven years in, with more than 22 million units sold to date, we're the UK's most successful computer company, and the third-most popular general-purpose computing platform in history. We think you're going to love what we have planned for 2019 and beyond. Watch this space.



**2082 DOJOS** 

**REACHING OVER** 

7- TO 17-YEAR-OLDS IN 114 COUNTRIES

21000

COMMUNITY

**MEMBERS** 

ATTENDED





AROUND THE WORLD **REACHING 250000+** 9- TO 13-YEAR-OLDS

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IN THE 2017/18 ASTRO PI CHALLENGE



## Putting the power of computing and digital making

8 Annual Review 2018

RASPBERRY





## into the hands of people all over the world.











### **THE RASPBERRY PI** COMPUTER

Our affordable, powerful computer gives people across the globe the opportunity to learn about and create software and physical computing projects

he Raspberry Pi is a low-cost, high-performance, credit cardsized computer that people use in industry, to learn, and to make stuff that matters to them. This affordable hardware is powered by opensource software that we build and maintain, and we partner with other organisations to provide free access to powerful educational software tools.

#### **Activities:**

There are now more than 22 million Raspberry Pi computers being used by people worldwide to learn about technology by exploring programming and physical computing, to address problems and challenges they care about, or to create commercial products. This year we launched two new Raspberry Pi computers, increasing the computing power available for projects using both our credit card-sized \$35 computer and the smaller form factor \$25 model. In addition, we launched two new official accessories: a HAT to power a Raspberry Pi 3B+ over Ethernet, and another HAT to receive digital TV streams. Our operating system Raspbian was also updated, with an improved desktop experience, easier setup and localisation, and a better way to manage our recommended software.

#### **Achievements:**

- Launched the Raspberry Pi 3 Model B+, which has a 200MHz increase in peak CPU clock speed over the Pi 3 Model B, three times the wired and wireless network throughput, and the ability to sustain high performance for much longer periods
- Launched the Raspberry Pi 3 Model A+, bringing these improvements in clock speed, networking, and thermal performance to our smaller form factor



- Launched the Raspberry Pi PoE HAT, an add-on board to power a Raspberry Pi 3 Model B+ via an Ethernet cable
- Launched the Raspberry Pi TV HAT, an add-on board that lets users receive digital DVB-T2 TV streams on their Raspberry Pis to view them or stream them over a network to other devices

#### 22<sup>+</sup> MILLION

Raspberry Pi computers sold by the end of 2018

#### **5 MILLION**

of our most recent Raspberry Pi models (3B and 3B+) sold in 2018

### **RASPBERRY PI** POWERED PROJECTS



#### **Knitting the universe**

Some makers use the Raspberry Pi as a tool for their artistic creativity. Sarah Spencer's medium for creativity is knitting: she works with a 1980s domestic knitting machine, complete with pattern scanner and floppy drive port. This technology is literally stuck in the 1980s, as you can't buy such things any more. However, a floppy drive emulator, a Raspberry Pi, and lots of programming skill have allowed Sarah to innovate with the machine in the 21st century. By sending patterns from the Pi to the knitting machine through the floppy drive port, she makes personalised knitted items that she sells online. The pinnacle of her creative work so far is an immense, beautiful tapestry called Stargazing – created in seven panels and taking 21 times the memory of the knitting machine – that accurately depicts constellations and the Milky Way.

#### Read more at rpf.io/knitting

#### **Protecting coral reefs**

German charity Save Nemo works to protect coral reefs with the help of the Raspberry Pi. Their Nemo-Pi project won a Google Impact Challenge award for its potential environmental benefits Nemo-Pi installs on anchor buoys for diving boats and uses sensors to monitor water conditions. With a Pi for brains, it records visibility, temperature, current, and oxygen and nitrogen levels, letting divers check on shore whether conditions are suitable for a dive. The device is solar-powered and has GPS tracker to provide location data. Save Nemo is currently testing Nemo-Pi off the coast of Thailand and Indonesia and plans to install a network of the monitoring devices in shallow reefs across South East Asia. Providing diving organisations with this information will help lower the impact they have on reefs, and the data will also be of use to other groups campaigning for reef conservation.

Read more at rpf.io/nemo



The Nemo-Pi project uses sensors to monitor water conditions



#### Turning text to speech with Oton Glass

Raspberry Pi computers are used by people all over the world to create projects that help others. Keisuke Shimakage of the Media Creation Research Department at the Institute of Advanced Media Arts and Sciences, Japan, was inspired by his father's dyslexia to create a set of glasses that capture text with a blink and convert it into speech. His project, Oton Glass, uses a Raspberry Pi 3 with two cameras to track eye movement and capture text in the wearer's field of view. The Raspberry Pi computer then runs optical character recognition and text-to-speech software to convert the captured text, and it can even read in one language and speak in another. The Oton Glass team is working towards public distribution for this innovative product, which has already been runner-up for the James Dyson Award.

#### Read more at rpf.io/oton



#### The floating, motiontracking eye in a jar

Some Raspberry Pi projects are built to change the world; others are just downright strange. Lukas Stratman used a Raspberry Pi Zero W, a camera, some magnets, and a table tennis ball to create an eerie floating eye in a jar that tracks movement around the room. Magnets in the table tennis ball react to moving magnets attached to a Raspberry Pi-controlled servo motor below the jar. Motion-tracking software on the computer allows the eye to follow anyone in the room, no doubt seriously creeping them out.

#### Read more at rpf.io/eyejar







## OUTREACH





## **CODE CLUB**

Code Club works with a global community of volunteers, educators, and partners to run free coding clubs where young people aged 9 to 13 create and share their ideas using code

#### **Activities:**

ode Clubs are led by educators and volunteers who support young people to learn programming skills while creating their own games, animations, and websites. The young people use our free project guides to build their confidence in making things with technology, and in the process they also develop soft skills such as resilience and the ability to collaborate.

We provide free training, support, and guidance to educators and volunteers who help children learn programming in free coding clubs based in schools, libraries, and community centres all over the world. We also offer free step-by-step project guides for the young people who attend Code Club, which they use to create games, quizzes, animations, and even interactive chatbots with Scratch,

HTML/CSS, and Python. Club leaders encourage their learners to see our project guides as starting points for creative exploration.

code club

Find out more at: codeclubworld.org

WHAT IS CODING?

Children who go to Code Club explain what coding means in our video at rpf.io/whatiscoding



#### Achievements:

Grew the global network of Code Clubs by 41%, to more than 14,000 clubs worldwide, including 7700 clubs in the UK; there are now Code Clubs in 160 countries

More than **250,000** young people learning programming in over **14,000** active clubs worldwide

**17,000** volunteers and educators running Code Clubs worldwide

24% of UK primary schools and 25% of UK secondary schools have registered to run Code Clubs

**38%** of club members are girls

**92%** of volunteers say the children who attend have improved their programming skills through Code Club; **88%** say the children who attend are more confident in their computer skills because of Code Club

I really enjoy coding, because you get to do fun things and people are normally very impressed when you do coding

Code Club member



- Grew the number of Code Clubs in the USA by 77%, adding more than 350 new clubs
- Grew the number of Code Clubs in India by 33% through our targeted national programme
- Our Local Partners in Croatia, Canada, and Ukraine doubled the number of clubs in their countries
- Added more than 350 new Code Clubs to our network in the United States
- Launched the Growth Leaders scheme, in which we support established non-profits around the world to grow Code Club in their communities; so far, there are 14 Growth Leader organisations that have set up 179 clubs
- Published the first-ever Code Club book, Code Club Book of Scratch
- Launched a brand-new Code Club website with lots of help and positive feedback from our volunteer community

## CODERDOJO

CoderDojo is a global community of free, open, and local programming clubs for young people



ojos are fun programming clubs where volunteers give young people aged 7 to 17 the opportunity to learn how to create with technology. For young people, Dojos are an informal, social environment where they create with code, learn new skills, and collaborate to create practical solutions to problems in their local areas and beyond.

More than **55,000** young people taking part in **2082** Dojos worldwide

114 countries across the globe have Dojos

**12,000** people volunteering for CoderDojo

**33%** of Dojo participants are girls

#### Activities:

The worldwide community of CoderDojos has continued to grow this year, with volunteers in 114 countries now running free, open programming clubs for young people in their communities. At Dojos, young people learn how to make games, apps, websites, and hardware projects. Creativity is central to CoderDojo, and young people are encouraged to explore their interests and create practical solutions to problems that matter to them. As well as learning about computing and programming, young people at Dojos develop skills in communication, teamwork, leadership, and critical thinking.

Find out how to start a Dojo at: coderdojo.com





CoderDojo provided a space where I was around others who shared similar interests, and where we could collectively solve each other's problems. Since it had meant so much to me over all the years, I decided to take it over myself

Richard, 17, CoderDojo champion

#### **Achievements:**

- Increased the number of Dojos worldwide by 45%, to 2082 clubs reaching more than 55,000 young people
- Increased the proportion of girls regularly involved in Dojos from 29% in 2017 to 33% in 2018; increased the proportion of women mentors in line with this
- Reached more than 1000 volunteers through our free online training course about running a CoderDojo, hosted on the FutureLearn platform
- Reached more than 250 youth workers across Ireland with full-day training workshops about how to introduce programming to young people
- Moved our CoderDojo learning resources to the Raspberry Pi projects site to make more educational projects in more languages available to the community

### **COOLEST** PROJECTS

The world's leading technology fair for young people

t Coolest Projects events, young makers share their projects with fellow creators and the public, and they explore each other's work. Outstanding entries can win awards in different categories. All Coolest Projects events are free to enter and free to attend for young people, giving more people the opportunity to become inspired to create with technology.

#### **Activities:**

Coolest Projects began in 2012 as the work of CoderDojo volunteers Noel King and Ben Chapman. Their first event was held in Dublin,

#### **PROJECTS VIDEOS**

Coolest Projects International – rpf.io/cpintvideo Coolest Projects UK – rpf.io/cpukvideo Coolest Projects USA – rpf.io/cpusavideo and this city remains the location of the annual Coolest Projects International. And since 2012, Coolest Projects has inspired volunteers all over the world to organise regional Coolest Projects events in their communities, engaging thousands more young people in technology.

2018 was the first year in which the Raspberry Pi Foundation managed the Coolest Projects events and brand, having been passed the baton by co-founders Noel King and Ben Chapman and the Coolest Projects board. We've just completed our first season managing Coolest Projects, including the first-ever UK event in London in April, and the first-ever US event at Discovery Cube Orange County in September.

COOLEST 2019

Coolest Projects community and partner events run in Belgium, Bulgaria, and Italy. In 2019 we want expand our reach to bring Coolest Projects to new regions in collaboration with our community and partner organisations.

To any kids who are looking to enter a project in Coolest Projects, I would definitely encourage them to go in with an open mind. I had no expectations going in and loved being immersed in the environment, which exuded innovation and ingenuity

Kavi, Coolest Projects USA participant

#### **Achievements:**

- 7 Coolest Projects events held in 2018 in Europe and North America, with the flagship Coolest Projects International in Dublin, Ireland, in May
- More than 300 volunteers worked to organise and run these spectacular events

More than **1700** participants at all seven events combined

923 projects showcased by young tech creators

#### More than

**00** visitors at the events

**16** countries represented by the participants



# THE EUROPEAN 🐼 🐲 🐖 ASTRO PI CHALLENGE

This programme offers young people the amazing opportunity to conduct scientific investigations in space by writing computer programs that run on Raspberry Pis aboard the International Space Station

stro Pi is an ESA Education project run in collaboration with the Raspberry Pi Foundation. ESA astronauts Alexander Gerst and Paolo Nespoli are the Challenge's ambassadors for 2018/2019, supporting Astro Pi on the International Space Station.

**6813** young people took part in Astro Pi in the 2017/2018 programme

**1402** participants in **329** teams for Mission Space Lab

**5411** participants in **2506** teams for Mission Zero

**38%** of 2017/2018 participants are girls (across both missions)

#### **Activities:**

The Astro Pi Challenge provides an opportunity for young people to engage with computing in a spectacular context, and it raises awareness of the link between computing and space-related and scientific careers. Astro Pi is made up of two missions for different age groups and skill levels.

Mission Space Lab is the more advanced mission, aimed at young people up to 19 years of age. We challenge them to design scientific experiments and write programs to perform them, and the best experiments are run on the Raspberry Pis aboard the ISS.

Mission Zero is a simpler mission, aimed at young people up to 14 years of age. It involves writing a simple Python program to take a temperature reading and display a greeting to the ISS astronauts. All valid entries for the mission are automatically accepted and run on the station.

To see a six-year-old girl working with a Python interface with a twelve-year-old girl, and getting really excited, and not being fazed/fussed by textbased programming, just kind of looking for a solution to a problem, just debugging or something... you know, it's just magic, isn't it? It's a big opportunity for informal learning

Mission Zero mentor



WHAT IS ASTRO PI? ESA astronaut Alexander Gerst explains the two missions in a video from the International Space Station: rpf.io/whatisastropi

#### **Achievements:**

- 5411 participants in Mission Zero, our newly introduced non-competitive route for younger coders
- The Astro Pi programme is open to 24 countries

   all ESA Members and Associate Members!

## SCOUTS



The Digital Maker Staged Activity Badge gives Scouts in the UK the opportunity to build their computing and digital making skills

e have partnered with the Scout Association to create and deliver the new Digital Maker Staged Activity Badge, which introduces digital making to the wide variety of young people and adult volunteers who are involved in the Scouting movement. While earning this badge, Scouts learn digital skills in activities we've designed to relate to more traditional Scouting activities.

**465,000** young people in the UK Scouting movement

**10,000** badges earned so far

**16** resources created for Scouts taking the Digital Maker Badge

#### Activities:

Together with the Scout Association, we have created a new badge and a series of activities that Scouts can use to learn digital making skills and apply them to contexts that are relevant to them. We've set badge requirements, and we provide resources to support Scouts, Beavers, Cubs, and Explorer Scouts in fulfilling these requirements to earn their badges. Our activities include writing a simple program using compass directions, creating electronic camp-fire music, and building a step tracker. Scouts complete an activity for one of the five badge stages - either in their regular Scouting sessions or in their own time - and then share what they've created with their fellow Scouts

#### **COMPASS CODING**

Find out how we are introducing Scouts to computing and digital making in this video: rpf.io/compasscodingvideo



#### **Achievements:**

- Released the new Digital Maker Staged Activity Badge, with a new badge design that was the first one featuring the new Scouts logo
- Produced activity resources that support the first three stages of the badge
- Promoted the badge at three official Scout Association events for young people involved in the movement

The excellent resources provided by Raspberry Pi ensured that the Beavers remained focused and completely engaged throughout the session. The content was aimed at just the right level, encouraging interesting discussions between the Beavers and ensuring that we could complete Digital Maker Stage 1

Christine, Scout leader at 1st Heathcote Beavers

### NATIONAL CITIZEN SERVICE

We worked with the NCS Trust to deliver a digital making workshop pilot framed around social action to 15 to 17-year-olds in Surrey and Bournemouth

he National Citizen Service is a vouth movement in the UK that aims to challenge, change, engage, and empower 15- to 17-yearolds, and to give them confidence and skills for their futures. It incorporates experiences in adventure, skills, and social action. This year, we worked with the NCS Trust to develop a two-day programme in which young people learned digital making skills and applied them to take social action. We delivered this pilot programme to 259 young people with The Challenge in Surrey, and to 499 with BCHA in Bournemouth

#### **Activities:**

Our two-day digital making programme for NCS started with a call to social action. The participating young people were introduced to various community groups, such as aged care facilities or children's centres; they were encouraged to think about what problems people using these services face that the young people might be able to address with digital technology. The participants then worked with our facilitators to develop some programming and physical computing skills, and to apply these skills to implement their ideas for a solution. They worked collaboratively to build a digital product that would address the problem they had identified, and to present the product to their peers. We are developing our programme based on feedback from this pilot, and we will roll it out to thousands of NCS participants in 2019.

It gives you a sense of achievement, of going, 'Oh wow! I can actually code, and I don't have to be amazingly good at computers to be able to do this

NCS digital making workshop participant



#### Achievements:

- Ran the first digital making programme pilot in NCS
- Evaluated the pilot with NCS to develop it into a full-scale programme for 2019
- All young people in our evaluation group said they learned something, and we reached many young people who had no experience of digital making before participating in the programme

#### 758 young people took part in our pilot

180 digital projects created

More than **90,000** young people take part in NCS every year



### WEATHER STATION

The Weather Station programme allows young people worldwide to build hardware and program software to conduct meteorological experiments

ur Raspberry Pi Oracle Weather Station kits have been assembled by schools all over the world: students have built the hardware, they've created the software, and they now collect local meteorological data that they share on our global Oracle database. Participants learn about building scientific equipment, and about collecting and analysing data – both their own and a worldwide dataset.



#### **Activities:**

The Weather Station programme enables young people to study and investigate their local climate and environment. This programme has been running for over two years, so the young people involved have the chance to work with years' worth of global data records that include seasonal variations Students who have built Weather Stations with our kits get a very tangible connection with this unique dataset. People who are not programme participants can also interact with the dataset through our free online projects - for example, 'A window on the weather', which teaches learners how to create visualisations of the data using Scratch.

Find out more at: rpf.io/weatherstation







#### **Achievements:**

Launched our 'Build your own weather station' guide to support even more groups and individuals to get involved in the programme; the guide is available online and was also an in-depth feature article in The MagPi magazine

**936** schools with Raspberry Pi Oracle Weather Station kits

**39** countries with active Weather Stations

**329** schools registered on the Oracle database to upload and share their weather data

**7** learning resources based on weather, some requiring the Weather Station and some needing no special equipment

### OUTREACH PARTNERSHIP



#### The Shell Centenary Scholarship Fund

Funding period: **2016–2018** Total funding: **£1,000,000** Grant in 2018: **£400,000** 

The Shell Centenary Scholarship Fund (TSCSF) partnered with us for three years to support the development of young people's STEM skills through high-quality learning opportunities and experience-based initiatives. In 2018, TSCSF funded Code Club to grow across the world, with a particular focus on increasing access for disadvantaged groups. The Fund also supported our Coolest Projects events If you'd like to partner with us in support of our activities for young people, please email **partners@raspberrypi.org** 

in the UK and Ireland, allowing more young people to showcase their digital making achievements.

In the UK, we prioritised growth of the Code Club network in disadvantaged and underserved communities. We also extended the age range of Code Club attendees to 13 years to give more young people the chance to get involved, or remain engaged, in digital making activities as teenagers.

We chose to partner with Raspberry Pi based on its track record and proven success engaging young children in coding via the Code Club programme. There is significant demand from secondary schools for this and Code Club is reaching many disadvantaged young people

Pradeep Pursnani, Director of The Shell Centenary Scholarship Fund





## COMMUNITY



### **RASPBERRY** JAMS

Raspberry Jams are community-led events where people come together to engage in learning and digital making with Raspberry Pi computers

t Raspberry Jams, people of all ages create with Raspberry Pi, share ideas, work together, support one another, and have fun learning new things. Members of the Raspberry Pi community volunteer their time and expertise to run these events all over the world. Many Jams run regularly and build strong local communities.

#### **Raspberry Pi Bia** Birthday Weekend

We celebrate the birthday of Raspberry Pi with Jams taking place all over the world on the same weekend. Find our more and get involved at rpf.io/bday

#### Activities:

People of all ages and levels of experience meet at Raspberry Jams to create with technology and to support and inspire each other. As Jams are created by volunteers to suit their local communities, they take many different shapes: some Jams run workshops and inspiring talks; others are informal meetings where people share projects they have made. Their focus is always on bringing together

people who are enthusiastic about Raspberry Pi so they can help each other. Young people and adults often work together on projects; creators bring project prototypes they need support with; beginners can learn from other digital makers, and the more experienced attendees expand their skills. Some Jams have been running for many years now, and there are always new Jams popping up around the world.

I started coding when I was seven. The first time I ever coded was at Pi Towers Raspberry Jam, where I learned on Scratch how to make a rocket to go to the moon. And after that, I got interested in Scratch and got an account, and then I made some of my own projects. [...] And today I run my own workshop here in London

A boy who is part of a London Raspberry Jam

#### **START A JAM!**

Anyone can set up a Jam: you just need the enthusiasm to put together an event for people who share your interests. Find out more at **rpf.io/jam** 

Raspberry

ASPBERR

**54** countries in 2018

More than

Jams in 2018 (50 attendees per Jam on average)

Volunteers in countries have hosted Raspberry Jam events

#### Achievements:

- The 2018 Raspberry Jam Big Birthday Weekend spanned the entire globe, with more than 130 Jams taking place in 30+ countries on six continents
- 178 new Jams in 18 new countries: Sudan, Lebanon, China, UAE, Denmark, Cambodia, Kenya, Malta, Bulgaria, Peru, Hungary, Argentina, Cuba, Nepal, Romania, Zambia, Dominican Republic, Armenia

### **EVENTS**

We showcase the work of the Foundation at major events around the world to introduce computing and digital making to people, engage them with fun activities, and help them discover our programmes and learning resources

aker Faires, trade shows, and other large public events are fantastic opportunities to reach people who are new to digital making. Our team participates in these events across the UK and North America to demonstrate the power of learning digital making through practical programming and physical computing activities. Our activities give people a chance to get a first taste of digital making, and our team is on hand to provide tailored information about how to explore the topic further through our programmes and resources.

In 2018 we successfully ran the first Coolest Projects UK, where young people present the amazing projects they have made. We also ran the first edition of our festival of digital making, Raspberry Fields.









**13,826** people engaged through our presence at major events in 2018









Raspberry Fields Footage from our first festival of digital making: rpf.io/raspberryfieldsvideo



### **COMMUNITY** PARTNERSHIP

Very year we are joined at Coolest Projects in the UK, US, and Ireland by companies and organisations who support our work. Sponsorship options start at £5000 for community organisations and go up to £30,000 at the headline sponsorship level.

Some funders donate to our work throughout the year, while others sponsor an event. Coolest Projects is a highlight for young people who want to share the creations they've made in their Code Clubs and Dojos. Sponsorship supports the running of these events and adds to their

If you'd like to speak to us about sponsorship opportunities, please email **partners@raspberrypi.org**  excitement by allowing us to provide interactive experiences for young people and their families. Sponsors also provide prizes, donate items to participants' swag bags, and fund travel bursaries allowing young people from around the world to attend.

In 2018 our sponsors included Riot Games, Blizzard Entertainment, Broadcom Foundation, The Shell Centenary Scholarship Fund, Workday Foundation, Mastercard, Microsoft Ireland, Travelport Digital, Dublin City Council, Liberty Global, Liberty IT, Accenture, Allied Irish Banks, Zalando Ireland, Facebook, CarTrawler, Canakit, Openet, IBM, Dublin City University, Zendesk, Folens, PayPal, OWASP, Barnardos, Twitter, LogMeIn, Wriggle Learning, Distilled SCH.

Last year, we came to Coolest Projects for the first time, and it was just such an amazing experience. The participants are our innovators, and they're going to be the future of our technology, so it's great to be here and get involved and celebrate those young people that are presenting projects

Riot Games representative

### **ONLINE** COMMUNITIES

any people in the Raspberry Pi community share their projects on social media and help each other make and learn. We have thriving communities on all major social platforms. The forums at **raspberrypi.org** are the place for anyone who wants to find help with their project, get to know other enthusiasts, or discuss new products and tools. Community members work hard to moderate the forums and support well-informed discussions and a positive atmosphere. Across social media, we support newcomers and more experienced digital makers to engage with the community and learn from one another.



**Instagram** – @raspberrypifoundation: **122,000 followers** (from fewer than 10,000 in 2017)



**YouTube** – Raspberry Pi: **46,000 subscribers and 1.5m views in 2018** 



Twitter – @Raspberry\_Pi: 397,000 followers and over 1.6m tweets about Raspberry Pi in 2018



Facebook – @raspberrypi: 330,000 likes



**Raspberry Pi** – rpf.io/forums: **254,000 active members** 



## LEARNING



### **CONTENT &** CURRICULUM



We provide engaging, rigorous, and free educational resources that millions of people use to learn computing and digital making skills

earning through making is at the heart of all our online resources. In our Digital Making Curriculum, we've set out all the skills we think are important for becoming a capable digital maker; each of the projects helps learners build one or several of these skills. Educators use our Curriculum to inspire the young people they work with and to help them learn.

**3.5** million unique users used our projects to learn in 2018

**2200** projects on our site, covering Scratch, HTML/CSS, Python, Raspberry Pi, and other topics, and supporting Code Club and CoderDojo

29 new projects in 2018

**563** translations of **36** projects on our site

#### Activities:

Our project guides and educational resources are all free, and they cater for all levels of expertise and a variety of interests. Using our project guides, learners can make everything from a simple Scratch chatbot to an encrypting Enigma machine using eight Raspberry Pis! We've designed our projects website around pathways that help people to challenge themselves and expand their knowledge and skill sets while making projects they enjoy.

We want creating with technology to be for everyone, so our projects allow people to learn within a range of contexts, whether they are curious about science experiments, wearables, home automation, hightech pranks, or visual arts. If you are interested in art and design, for example, then you can find projects to create algorithmic modern art, to make your own paint program in Scratch, or to build 3D scenes using Blender; or if you love space, we offer resources that help you create digital projects using data from the International Space Station, or build a hardware indicator of how many astronauts are currently in space, or explore how gravity is simulated in video games.

Making our resources accessible to everyone in the world is centrally important to us, and we work with amazing volunteer translators to provide our projects in a variety of languages. We now have projects in 26 languages on our site and we are continuing to develop this essential aspect of our content creation work.

#### Find a project to make at: rpf.io/learn

Explore our Digital Making Curriculum at: rpf.io/curriculum



#### **Achievements:**

- Developed and piloted digital making resources for workshops with older teenagers as part of the National Citizen Service
- Developed digital making activities for Scouts and Scout leaders, supporting them to engage with the Scouts Digital Maker Staged Activity Badge
- Started trialling a system for informal accreditation in Code Clubs
- Developed and tested features within the projects website to assist learners in completing projects
- Developed and released four new online training courses on the FutureLearn platform
- Upgraded all projects in the Code Club Scratch Modules 1-3 and the CoderDojo Scratch Sushi Cards to Scratch 3 versions

### **EDUCATOR** SUPPORT

We help computing and digital making educators in the UK and North America develop their skills through face-to-face training and through our magazine Hello World

Picademy is our free face-toface training workshop in which we support educators to build the skills and confidence to create computing and digital making opportunities for young people. Computing and digital making educators across the world can access our free magazine Hello World for news, ideas, resources, and best practices that benefit them in their work with learners.

#### **Activities:**

We run Picademy events in the UK and North America, and the graduates become Raspberry Pi Certified Educators (RCEs) and join our worldwide RCE community. Picademy is a two-day workshop during which educators learn from our experienced team and spend time collaborating and applying their skills to their own creative projects. We've designed the training so it is suitable for participants from all backgrounds: it's accessible for beginners while also providing opportunities for participants with more technical skills to stretch themselves. Our RCE community consists of a diverse range of educators, including school teachers catering for all ages, librarians, museum educators, university lecturers, youth workers, and coding club volunteers. We encourage RCEs to create opportunities for their learners to explore open-ended projects and learn through making.



I left Picademy invigorated and inspired to keep tinkering and learning so I can introduce awesome projects to my students and colleagues right away

Amanda Valledor, Boston, MA, Raspberry Pi Certified Educator

#### Take a selfie



#### # Selfie

from picamera import PiCamera
from time import sleep

camera = PiCamera()

camera.start\_preview(alpha=192)
sleep(3)
camera.capture("/home/pi/image.jpg")
camera.stop\_preview()

More than **2000** Raspberry Pi Certified Educators across the world

**499** educators trained in 2018

Certified Educators have reached over **150,000** young people in total

**30,000** subscribers to Hello World Magazine

**58%** of Hello World subscribers feel more able to teach others computer skills since they started reading the magazine

**100%** of Picademy North America graduates say they would recommend the program to a colleague

I teach Computing but I am not a Computer Science teacher by trade, so I find this magazine a really useful tool. Good-quality articles, teaching ideas, and support. Thank you

Hello World subscriber



#### **Achievements:**

- Ran 12 Picademy events in eight locations in the UK and North America:
  - Atlanta, Georgia (USA)
- Jersey City, New Jersey (USA)
- Seattle, Washington (USA)
- Denver, Colorado (USA)
- Cambridge (UK)
- Dublin (ROI)
- Belfast (UK)
- ◆ Leicester (UK)
- Grew the RCE community in North America by 68% from 478 to 791, with a 37% increase in the number of applications to the programme (1401 applicants in total)
- Doubled the number of subscribers to Hello World from 15,000 to 30,000

### **ONLINE** TRAINING

Our online training help tens of thousands of educators and volunteers to build their skills and confidence to teach computing and digital making

ur free online training takes the form of short, structured courses that guide participants through activities designed to build and deepen their understanding of a particular area of computing education.

#### **Activities:**

We build our courses around video and written content, with accessible explanations of concepts and practical activities that participants can use with the young people they teach. The courses are social spaces where educators and volunteers can discuss their experiences. These discussions allow participants to share common challenges and solutions, and to connect with educators who are working with similar age groups or in similar settings.

Participants take the concepts and activities from our courses back to the young people they work with, and the course content encourages them to take a 'learning through making' approach in their teaching. School teachers build what they take away from our courses into their lessons. Educators in other settings, such as museums and youth organisations, use what they have learned to set up extracurricular activities: Code Clubs, CoderDojos, or Raspberry Jams. We also provide specific courses for people who are looking for support with setting up Code Clubs or CoderDojos.

Find out more about our educator training at: rpf.io/train



I've learned how easy and fun it can be to teach programming to children.And also how fun it is to create projects where we can interact with the environment, such as lighting LEDs or using buttons

Participant in our online training



**27,000** learners participating in our online training courses in 2018

free course available

74% of learners say they have improved their programming skills

**69%** of learners say they have become more confident in their computing skills I've learned how to transform my ideas into code, and I've learned fundamental concepts which I hadn't grasped before – especially what variables are. I want to include more learning activities that involve coding in my teaching

Participant in our online training

#### **Courses available:**

- Teaching Physical Computing with Raspberry Pi and Python
- How Computers Work: Demystifying Computation
- Programming 101: An Introduction to Python for Educators
- Programming 102: Think Like a Computer Scientist
- Representing Data with Images and Sound: Bringing Data to Life
- Object-oriented Programming in Python: Create Your Own Adventure Game
- Teaching Programming in Primary Schools
- Scratch to Python: Moving from Block- to Textbased Programming
- Prepare to Run a Code Club
- Build a Makerspace for Young People
- Start a CoderDojo Club

### RESEARCH

Our research helps us to understand how people learn about computing and digital making, and how we can make the most difference to them

t the Raspberry Pi Foundation we are strongly focused on measuring the impact we are having and on making sure that we understand how people best learn skills for computing and digital making.

#### **Activities:**

Our research team collaborates with staff across the Foundation to make sure we are basing our educational programmes on sound evidence, using data to understand our impact, and trialling new approaches to learning. We get feedback from volunteers and participants, and we work with academics and educators to better understand how people learn. We publish and freely share our work so that others can benefit from our findings.

#### Download our research reports at rpf.io/research





Finding insights into computing and digital making



#### **Research publications:**

We publish our research on the Foundation website, including:

- How Children Make **Digital Projects**
- Who Comes to Code Club?
- Embedding Picademy Learning in Schools
- Raspberry Pi Computers in Schools
- Results of our annual surveys

**66** Research helps us understand how people participate and learn in computing and digital making and the impact our work has



#### **Achievements:**

- Interviewed children from across the world at Coolest Projects International, and shared the stories of their projects
- Visited Code Clubs across England to understand how different groups of children get involved in this programme
- Visited CoderDojos across Ireland to build our understanding of how people are using resources and organising their Dojos
- Coordinated our annual surveys so that we are collecting comparable data across our programmes
- Trialled new approaches to tracking progress through projects with Code Clubs
- Collaborated with the Behavioural Insights Team to trial different communications across our programmes

### **RASPBERRY PI** PRESS

Raspberry Pi Press supports and builds the community through resources and publications that showcase projects, share ideas, and help people learn from each other



aspberry Pi Press is dedicated to entertaining and educating the Raspberry Pi community as well as the wider computing and making communities by sharing relevant information,

resources, projects, and news. Raspberry Pi Press currently publishes six magazine titles. catering for a wide range of people who like to make and create using digital technologies.

people read 300.00 Raspberry Pi Press magazines each month

views of 600.00 magazine websites every month

subscribers to our new magazine Wireframe in two months

Entertaining and educating the Raspberry Pi and the wider computing and making communities with information, resources, projects, and news relevant to them

#### **Our magazines**

The MagPi magpi.cc

Hello World helloworld.cc

HackSpace magazine hsmag.cc

Wireframe wfmag.cc

**Custom PC** custompc.co.uk

**Digital SLR Photography** digitalslrphoto.com

#### **Our magazines** on YouTube

The MagPi - news and reviews from our community magazine: rpf.io/magpiyoutube

HackSpace magazine

— meet our magazine for makers: **rpf.io**/ hackspaceyoutube

Wireframe — meet the new magazine that lifts the lid on video games: rpf.io/ wireframeyoutube



#### **Achievements:**

 Launched Wireframe, a fortnightly magazine that lifts the lid on video games



 Acquired two magazine titles at the start of 2019, bringing Custom PC and Digital SLR Photography into our publishing business



Launched the Official Raspberry Pi Beginner's Guide to take people from setting up their Raspberry Pi to taking their first steps into writing code, digital making, and computing



 Published the Code Club Book of Scratch, the first-ever Code Club book. Build games, animations, and interactive stories with Scratch



### NATIONAL CENTRE FOR COMPUTING EDUCATION

The National Centre for Computing Education supports the teaching of computing in schools and colleges across all Key Stages in England, giving teachers the subject knowledge and skills to establish computing as a core part of the curriculum

n 2018 the Raspberry Pi Foundation, STEM Learning, and the British Computer Society formed a consortium which successfully bid for a government contract to establish the National Centre for Computing Education (NCCE). Through the NCCE, we will provide high-quality support to teachers in England, including face-to-face professional development, online training, regional support, and free resources. Generous bursaries for schools will help teachers to engage with these opportunities.

#### **Activities:**

The NCCE was established in late 2018 and has already begun providing support for teachers and students. The Raspberry Pi Foundation is leading the digital side of the NCCE, providing online resources and training, as well as developing and running the website. In partnership with the University of Cambridge, we are also building a platform to host online learning resources for A-level teachers and their students.

Teachers can now sign up for an account on the NCCE website and browse the opportunities available

to them, including face-to-face and online professional development activities. They can also access a diagnostic tool that helps them to prioritise the subject areas they want to focus on and to select the appropriate training from among the options we offer. Teachers can earn certificates recognising their achievement in completing a certain number of training modules, including face-to-face and online training.

Find out more about the NCCE at: teachcomputing.org

We support the teaching of computing in schools and colleges across all Key Stages, giving teachers the subject knowledge and skills to establish computing as a core part of the curriculum



## LEARNING PARTNERSHIP Google

#### Funding period: **2018-2021**

aspberry Pi and Google.org began working together in 2013 to engage young people with computer science education. Since 2017, the focus of our collaboration has been on training teachers. In 2018 we began a threeyear partnership to significantly increase the subject and pedagogy knowledge, as well as the confidence, of Key Stage 3 and Key Stage 4 Computing teachers in England.

This partnership has led to us launching seven new online courses in 2018, including How Computers Work: Demystifying Computation, Programming 101: An Introduction to Python for Educators, and Scratch to Python: Moving from Block- to Textbased Programming.

3000 teachers in England have registered and become active learners

#### Project funding: £1,000,000

on these courses in 2018, along with thousands more from outside the UK. 75% of active learners said that taking part in their course improved their programming skills, and 69% said that taking part improved their confidence in their computing skills. Our goal is to have 20 curriculumrelevant courses available, and to have reached at least 6000 teachers, by the end of 2021.

Google staff members also support our work by voluntarily donating their time to help run Code Clubs and Dojos, and to translate our online projects.

Ronan Harris, Google MD UK and Ireland, said: "Despite good progress in recent years, there is still much more to do to ensure young people across the UK have access to computer science education. "Whatever school they attend or what field they plan to go into, every student should have the opportunity to understand the principles and practices of computing. This will broaden their career opportunities and is critical to developing a globally competitive workforce for the 21st century."

If you'd like to support us with a grant or donation, please email **partners@raspberrypi.org** 

The main thing I have learnt is the use of a creative approach to using physical computing – the idea of asking learners 'what do you want to do with this button?' rather than showing them how to just use a button

Teacher participating in 'Teaching Physical Computing with Raspberry Pi and Python'



## **GOVERNANCE & PARTNERSHIPS**

### GOVERNANCE

The Raspberry Pi Foundation is a UK-registered charity (1129409), formed as a company limited by guarantee

he Raspberry Pi Foundation is a UK-registered charity (1129409), formed as a company limited by guarantee.

The Foundation is governed by our Board of Trustees, who are responsible for making sure we use our resources well to achieve our charitable goals. Trustees give their time freely as volunteers to support our work.

A wider group of Members supports the work of the Trustees. Members are individuals with expertise in areas related to our mission, and they volunteer their time as well. Members advocate for our mission, contribute to our strategy, and hold the Foundation to account. The Membership also elects new Trustees.

David Braben, one of our Founding Members, and Louis Glass stepped down as Trustees at our Annual General Meeting in November 2018. Both David and Louis have made significant contributions to the success of the Foundation over many years, and we would like to thank them for their work. Caroline Brown was elected to the Board of Trustees at the same meeting.

#### Patron

His Royal Highness the Duke of York

#### Trustees

- David Cleevely Co-founder, Cambridge Angels
- Chris Mairs Venture Partner, Entrepreneur First
- **Caroline Brown** Independent Director and Chair
- Jon Drori Chair, Ravensbourne University
- Pete Lomas Director of Engineering, Norcott Technologies
- Sherry Coutu Serial Entrepreneur, Investor, Advisor
- Tilly Blyth Head of Collections and Principal Curator, Science Museum

#### Members

- Alan Mycroft Professor of Computing, University of Cambridge (Founding Member)
- Andy Rice Senior Lecturer, University of Cambridge Computer Science Lab

- Annika Small Co-founder, CAST; Trustee, The John Ellerman Foundation and Access Foundation
- Bill Liao Co-founder, CoderDojo; General Partner, SOS Ventures
- Christine Swan PGCE Secondary Computer Science tutor and visiting lecturer, Birmingham City University
- Clare Sutcliffe Co-founder, Code Club
- David Willetts Executive Chairman, Resolution Foundation; Visiting Professor, King's College London; Chair, Sanger Institute; member of the House of Lords
- **Eben Upton** CEO, Raspberry Pi Trading Ltd (Founding Member)
- Ian Livingstone Non-executive Chairman, Sumo UK
- Jack Lang By-fellow and Director of Studies in Management, Emmanuel College, Cambridge (Founding Member)
- James Whelton Co-founder, CoderDojo
- Jim Knight Chief Education and External Officer, TES; member of the House of Lords

- Joe Scarboro COO, The Bot Platform
- Limor Fried Founder and Engineer, Adafruit Industries
- Martha Lane Fox Founder and Executive Chair, doteveryone; member of the House of Lords
- Matthew Postgate Chief Technology and Products Officer, BBC
- Miles Berry Principal Lecturer for Computing Education, University of Roehampton
- Rosemary Francis Managing Director and CEO, Ellexus
- Rosemary Leith Founding Director, World Wide Web Foundation
- Sarah Wood Chair and Co-founder, Unruly
- Scott McGregor former President and CEO, Broadcom Corporation
- Simon Peyton Jones Principal Researcher, Microsoft UK; Chair, Computing At School
- **Tim Peake** British astronaut, European Space Agency

### **OUR PARTNERS**

he work of the Raspberry Pi Foundation is only possible because we are part of a fantastic and growing community that shares our mission. This community includes a wide range of individuals and organisations who support our work by providing funding, by

#### £1 million and above

- Google
- The Shell Centenary Scholarship Fund

#### £500,000 - £999,999

Riot Games

#### £250,000 - £499,999

- Expo 2020 Dubai
- Kevin Abosch/GIFTO (Forever Rose)
- Microsoft

#### £100,000 - £249,999

- Arm
- Atlassian Foundation
- BNY Mellon
- European Space Agency
- Oracle Giving
- Workday Foundation

donating their valuable time and expertise, by offering discounts, or by lending in-kind support.

We would like to thank the following individuals and organisations for their support of the Raspberry Pi Foundation, Code Club, and the CoderDojo Foundation:

#### £50,000 - £99,999

- Blizzard Entertainment
- Broadcom Foundation
- BT
- Dogpatch Labs
- Mythic Beasts Ltd

#### £30,000 - £49,999

- A&L Goodbody
- Canary Wharf Ltd
- Liberty Global
- LogMeIn
- Norcott Technologies

Individuals also donate to us, for example in the form of one-off donations, monthly payroll giving, employer-matched charitable giving schemes, and money raised through workplace fundraisers, conferences, and other events.

#### In-kind/software support

3CX, 15Five, Amazon Web Services, Bullet, BrowserStack, Bytemark, Bytes, CircleCI, Code Climate, Contentful, Copper, DNS Made Easy, Dropbox, dotmailer, edgescan, Geekbot, GitHub, Gravity Forms, Freshworks, Heroku, Intercom, Laravel Forge, LearnUpon, MailChimp, Mailtrap, Papertrail, phpList, pi-top, Pivotal, PCA Predict, Proofpoint, RealVNC, RocketSpace, Sentry, Slack, Typeform, Typekit, Webroot, WhosOff, Wolfram Research, Zapier, Zendesk, Zoom

#### Support our work today

If you or your organisation would like to make a donation towards our work, you can do so via JustGiving or PayPal. If you would like to discuss a potential partnership, please email **partners@raspberrypi.org** for more information.





### raspberrypi.org

Raspberry Pi Foundation UK registered charity 1129409