

# National Centre of Computing Education

Our vision is for every child in every school in England to have a world-leading computing education.



<http://teachcomputing.org>

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# After the Reboot ...



The **recommendations** describe what is still needed – recommendations relate to

1. Computing for all & improving gender balance
2. Support for teachers & increasing supply
3. Improvement of computing education through research

<https://royalsociety.org/topics-policy/projects/computing-education>

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# Current statistics for computing education

Almost a **1/4** of students are not able to choose GCSE Computer Science as it is not available in their school.

Only **11%** Key Stage 4 students take GCSE Computer Science, **20%** of these are female.

There are not enough computing teachers: only **53%** secondary schools currently offer GCSE Computer Science.

Most GCSE CS is taught by a non-specialist: **75%** existing teachers do not have an academic background in Computer Science.

**87%** of A Level Computer Science providers operate below the Department for Education's minimum viable A Level class size.

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# Government commitment

- Department for Education committed £100m in UK (£84m for England) to improve computing education
- 4 year programme (2018-2022)
- Serious support needed for computing teachers in ALL key stages

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## Budget 2017: £100m National Centre for Computing to train 8,000 new teachers

Freddie Whittaker

Mon 20th Nov 2017, 10.26



The government will train 8,000 extra computer science teachers at a new £100 million National Centre for Computing, Philip Hammond is expected to announce this week.



# Our Consortium

## STEM Learning:

- Lead partner for reporting and communications
- Recruitment, training, and support of 40 school-based hubs
- Materials for CPD for GCSE CS teachers

## Raspberry Pi Foundation:

- Content development - the Resource Bank
- Online training courses
- Research
- A-level programme

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## BCS, The Chartered Institute for IT:

- Academic standards for subject knowledge
- Certification of teachers
- Community of practice
- Industry engagement



# The National Centre for Computing Education

We will:

- Build on the strong foundations established by Computing At School
- Establish a system of certification, leading to chartered status
- Develop a Network of Computing Hubs, underpinned by the vibrant grassroots communities of practice
- Provide face-to-face and online training grounded in the best research and delivered in a variety of flexible ways
- Curate a comprehensive bank of educational resources
- Make CPD available at no cost to teachers in priority schools and cap charges at a low rate for others
- Make all online resources and courses free for all teachers
- Provide bursaries to schools in areas of disadvantage to enable them to release teachers to take part in professional development
- Work with industry and non-profit partners to integrate a wide range of proven curriculum enhancements
- Work with teachers to realise the vision

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# Working to support teachers to ...

- Impact positively on their pupils future
- Improve their computing skills and subject knowledge
- Deliver engaging and inspiring computing lessons
- Save time with lesson planning
- Network with other computing practitioners
- Gain certification in to recognised their investment in their career
- Progress to be confident subject experts within their schools

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# Professional development courses

## Types of courses

- GCSE computer science
- KS3 computing
- Primary computing
- Pedagogy

Nationwide or Online

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## Online examples

- **Outstanding teaching of key stage 1 computing**
- **Representing Data with Images and Sound: Bringing Data to Life**

## F2F examples

- **Networks and cyber-security in GCSE computer science**
- **Outstanding teaching of key stage 1 computing**



# Regional school-led “Computing Hubs”

- Opening from late 2019
- Each hub will be an “alliance” led by one school but including other partners – schools, industry, HEIs, FE, etc.
- F2F PD will be delivered locally in the regions
- Focus on priority schools
- Diversity in post-14 take up of computer science & increased gender balance
- Linked to CAS Communities of Practice (~250 and growing)

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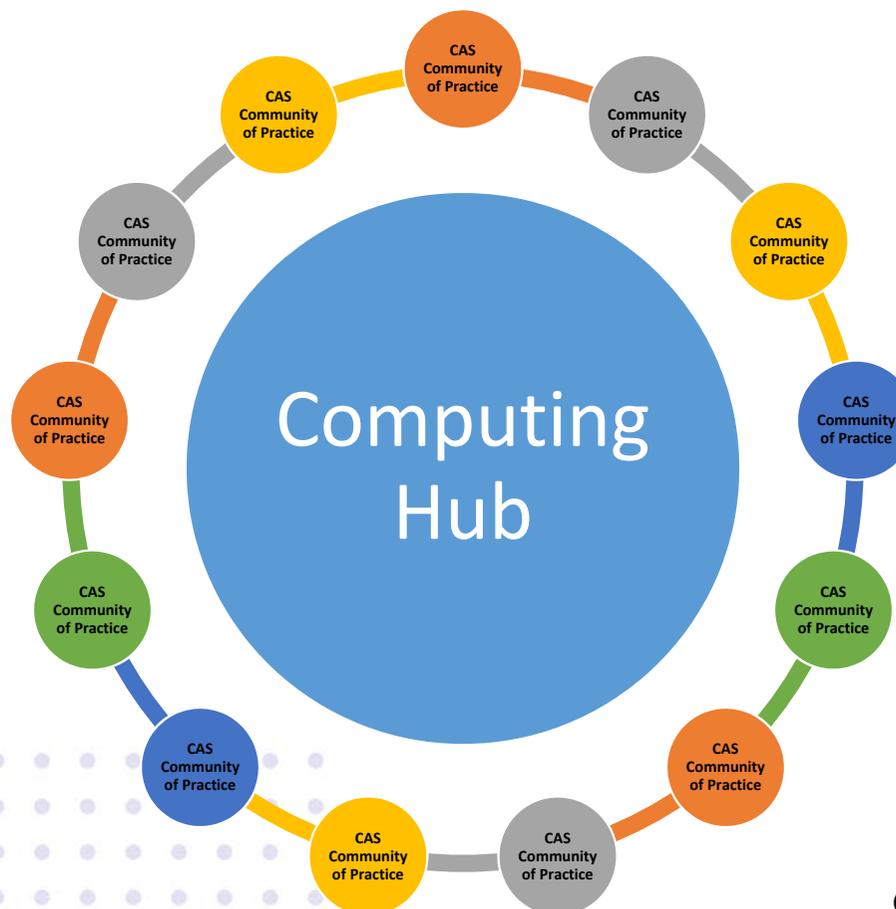
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# CAS Community of Practice

## 40 Computing Hubs

- An “alliance” led by one school but including other partners – schools, industry, HEIs, FE.
- Formal offer of F2F Certified CPD
- Focus on priority schools



## CAS Communities

- Create interest in Computing Hub CPD
- Support gap tasks
- Beyond formal CPD
- Share and reflect
- Test and trial

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# Resource repository

- We are developing a fully comprehensive resource bank to cover all computing lessons from KS1 to KS4
- Available from June 2019, and complete by July 2020
- All of our resources will be free, and available 24/7, 365 days a year
- Will be easily searchable and available to download
- Free, open and OGL

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## 10 core areas of Computing

Algorithmic thinking  
Creating media  
Computer networks  
Computer systems  
Data & information  
Design & development  
Effective use of tools  
Impact of technology  
Programming  
Safety and security



# The resource repository will include:

- **Teacher Manual** -- 1 per key stage: A guide to teaching computing at a particular Key Stage, including pedagogy and practice.
- **Schemes of Work (SoW)** -- 6 per year group : An overview of a connected series of lessons, detailing context, background and student progression.
- **Lesson Plans** -- 6 (approx.) per SoW: Step-by-step plans, outlining the delivery of a single lesson to students of varied abilities.
- **Homework & Assessment** -- 2 (approx.) per SoW: Follow up work to be done either to extend or assess students' learning.
- **Activities** -- multiple per lesson plan: Elements of a lesson that form a discrete “chunk” of learning. These may be online or offline, and take many varied forms.
- Includes curated, quality-assured third-party resources (including textbooks), as well as CPD opportunities offered by the NCCE.

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# Timeline

| When    | Major Milestones   |
|---------|--|
| Q4 2018 | Creation of computing taxonomy<br>Define quality assurance criteria<br>Review of existing resources against QA criteria and taxonomy                 |
| 2019    | 25% of curriculum-linked resources across KS available in NCCE Resource Repository (Jun 2019)<br>Review panel in place (February 2019)               |
| 2020    | Complete coverage of KS1-4 in NCCE Resource Repository (July 2020)<br>Resource kits (physical computing) given to schools via Hubs (2019/2020 (tbd)) |
| 2021    | Review and update resource repository  |
| 2022    | Review and update resource repository  |

- The resource bank needs to be in place and contain a comprehensive set of resources by July 2020, including 5 teacher manuals, 78 Schemes of work, 490 lesson plans and 150+ homework activities.

- All content to be of high quality, guided by an appointed “Subject Expert Panel”.

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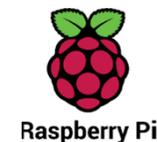


# Physical Computing Kit

- Each Computing Hub will be equipped with a core set of physical computing kits
- The kits will comprise of five class sets of equipment and resources. These will be used in CPD sessions and also available for loan to schools.
- The proposed equipment will include Raspberry Pi Computers, Sense HATs, and other addons; micro:bits, other microcontrollers like Crumbles; and other physical computing equipment. Curriculum linked lesson plans and other resources will also be provided.
- The core set may be added to over time and supplemented by donations.

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# Computer Science Accelerator Programme

- Become a certified teacher of GCSE computer science
- Highly personalised, modular programme, to improve subject knowledge
- Bursary supported for eligible teachers
- Diagnostic test to help identify gaps in knowledge
- Programme of at least 40 hours of study
- Short summative test after 40hrs
- Schools are paid bursaries up to £1750

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Getting started  
on the Computer  
Science Accelerator  
Programme is easy



1  
create an account  
on [teachcomputing.org](https://teachcomputing.org)



2

browse courses and use  
our diagnostic tool to  
decide what to study first



3  
participate in 40 hours  
of CPD, either online or  
local to you



4  
complete your  
learning programme  
with a short test

5

once you've  
passed, receive  
your certificate  
of recognition



# Certification

Following on from the existing BCS Certificate in Computer Science Teaching, the NCCE will provide a new free certification framework which recognises teacher knowledge and skills:

- NCCE Certificate in secondary computing teaching
- NCCE Certificate in primary computing teaching
- NCCE GCSE CS Subject Knowledge

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# A level computer science programme

- Isaac Computer Science programme
- Separate platform, hosted by the University of Cambridge
- Nationwide events for students and teachers
- Coverage of full A Level specification online
- Cost-priced workbooks
- State of the art autograded exam-like questions
- Available November 2019 (beta version May 2019)

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# Research & Pedagogy

- Highlighted as a gap by the Royal Society's *After the Reboot* report
- There are aspects of computing that have not been taught before in the classroom and we need evidence as to what works
- The Centre will make research and evidence accessible to teachers
- Evidence-based pedagogy will be embedded in resources and professional development courses

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# Summary

- Next five years .... focus on teacher professional development
- National Centre for Computing Education will provide PD for existing teachers to ensure high-quality computing education in England
- Communities of teachers will be able to work together to provide peer support, through CAS Communities
- We need more new computing teachers entering the profession
- We need to encourage diversity in those choosing computing options post-14

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# How you can help the work of the NCCE

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Raspberry Pi



# Host Discovery Events

- Part of A Level programme
- Capacity approx. 350 students
- Whole day incl. catering
- Role model - young developers to talk about what they do
- Cutting edge stuff - demo real things
- Engaging speakers

## Can you support our 1<sup>st</sup> event?

- Where? University of Cambridge
- When? Monday 1<sup>st</sup> July
- Audience? 300 Y9, 10 & 12 students

## Can you host/support other events?

- Contact [fergus.kirkpatrick@raspberrypi.org](mailto:fergus.kirkpatrick@raspberrypi.org)

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# Communications

- We need your help to raise awareness of the NCCE amongst schools.
- We can provide templates and social media assets that you can use.
- Can you share information about the NCCE with your contacts in schools? contact: [supporters@teachcomputing.org](mailto:supporters@teachcomputing.org)

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# Industry funding for bursaries

- Our target of £1.6m will cover the cost of access to CPD for teachers from priority areas
- We have already raised £300,000 towards the target
- Our funding partners include:
  - Rolls-Royce
  - Arm
  - BT
- Do you know someone who can help? contact: [julia@bcs.uk](mailto:julia@bcs.uk)

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# Resources

- Significant list of third party resources already identified
- Call out for additional resources to be included in the Resource Bank
- OGL only for inclusion pre 2020
- All content to be of high quality, guided by an appointed “Subject Expert Panel”.
- If you want to share content, please contact:  
[supporters@teachcomputing.org](mailto:supporters@teachcomputing.org)

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# Support CAS Community of Practice

- Host community meeting
  - 1, 2 or 3 meetings a year
  - Up to 20 teachers
  - Usually midweek 4pm – 6pm
  - Term time
  - Tea and cake
  - Share real world examples
- Join CAS and connect with local Community Leaders in your are, find out more [computingschool.org.uk](http://computingschool.org.uk)
  - Lead or support a local community, contact: [compatsch@bcs.uk](mailto:compatsch@bcs.uk)

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# Become a CAS University Partner

- A named person who can guide and help with:
- Outreach Programmes available and how these can be accessed, e.g. showcase events for sixth formers, GCSE students
- STEM activities involving Computing
- Anything around widening participation
- Donate venue/low cost venues for hosting events/conferences
- Links with ITT department to promote CAS and to get ITT trainees to learn about CAS/Teacher networking
- Guest speakers on specialist topics for schools or for CAS events
- Specialist CPD which is different to but could complement the NCCE courses
- Engagement in the CAS Working Groups – Research, Assessment, Diversity
- Any other ways you can feed into CAS

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