



# The growth of Research Software Engineering and its vital role in research



SOCIETY OF RESEARCH  
SOFTWARE ENGINEERING



@ResearchSoftEng  
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Martin O'Reilly  
Trustee | Society of Research Software Engineering  
Director of Research Engineering | Alan Turing Institute

<https://doi.org/10.5281/zenodo.1139999>



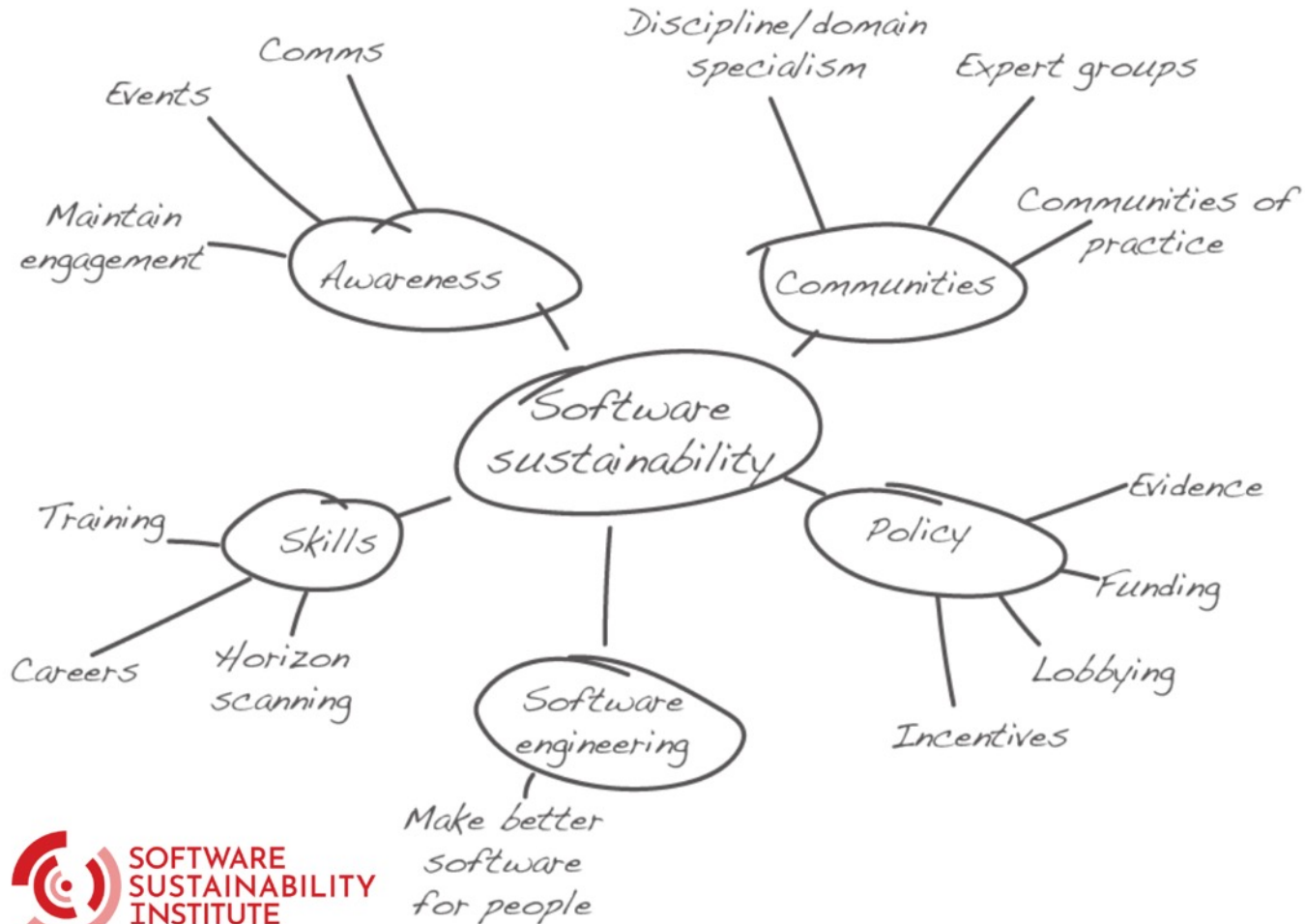
Since 2010

QUALITY SERVICE

## Online Sustainability Evaluation

Find out if your software is sustainable and get tailored advice on how to improve it

The Software Sustainability Institute cultivates better, more sustainable, research software to enable world-class research. We help people build better software, and we work with researchers, developers, funders and infrastructure providers to identify key issues and best practice in scientific software.



# Importance of research software



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**Research software** is software that you use to generate, process or analyse results that you intend to appear in a publication.

It can be anything from a few lines of code written by yourself, to a professionally developed software package.

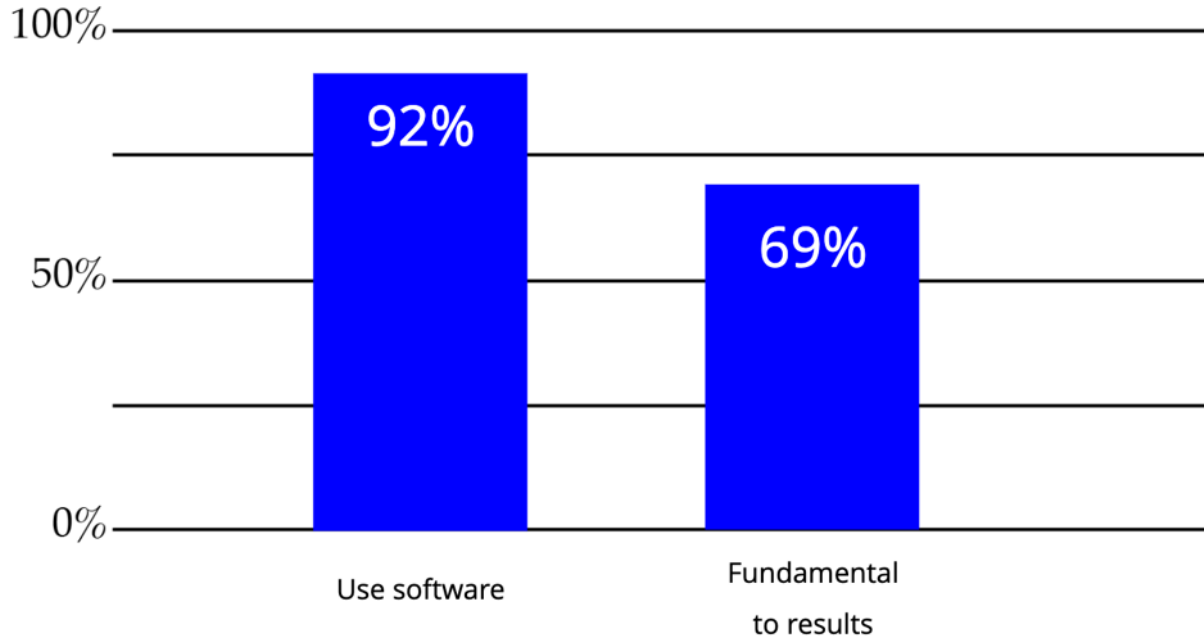
“

The **Research Software Engineer** is a new role in research.

*It combines an intimate understanding of research with professional software engineering expertise*

# Use and importance of software

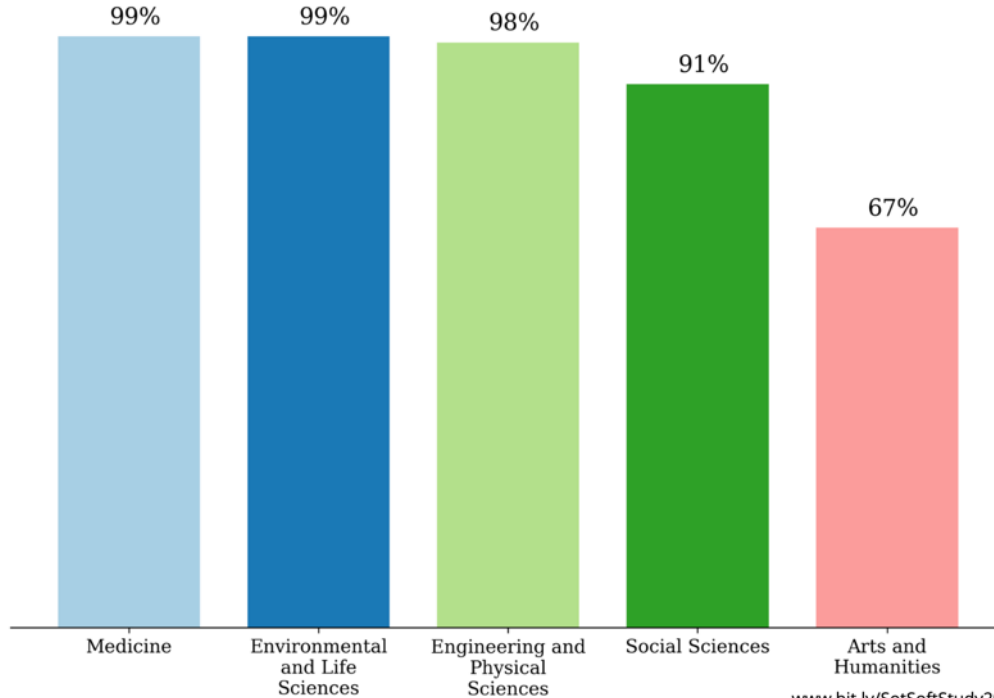
n=417



# Use and importance of software

Percentage of respondents using software.

n=594



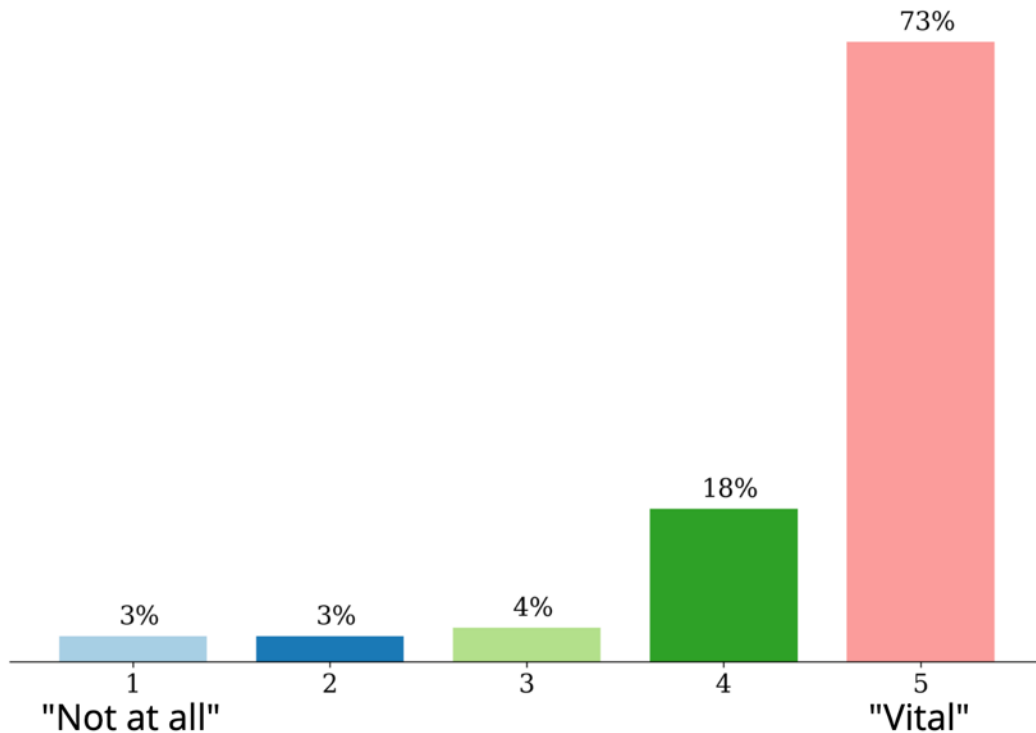
[www.bit.ly/SotSoftStudy2019](http://www.bit.ly/SotSoftStudy2019)



# Use and importance of software

How important is research software to your work?

n=594



# Growth of RSE in the UK

...

# Grassroots movement to professional Society

RSE name  
and first  
RSE Group



**2012**

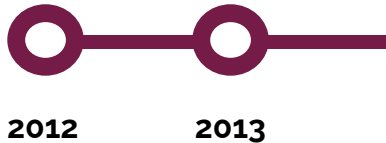
2012: birth of a name



<https://www.software.ac.uk/blog/2016-08-17-not-so-brief-history-research-software-engineers>

# Grassroots movement to professional Society

RSE name First RSE  
and first Workshop  
RSE Group



The screenshot shows a website header for the Software Sustainability Institute with navigation links for Blog, News, Events, Contact, and Subscribe, along with social media icons for RSS, Twitter, LinkedIn, and WordPress. Below the header is a search bar and a main article titled "A workshop for research software engineers" by Simon Hettrick, Deputy Director. The article text discusses the first workshop held on 11 September 2013 and mentions a second workshop in mid-2014. It defines research software engineers and notes the need for recognition. An image of a piece of paper with the text "You would do well in the field of computer technology." is included. The article concludes with information about the free workshop on 11 September 2013, held at the Oxford eResearch Centre, and provides a link to register on the Eventbrite site.

# Grassroots movement to professional Society

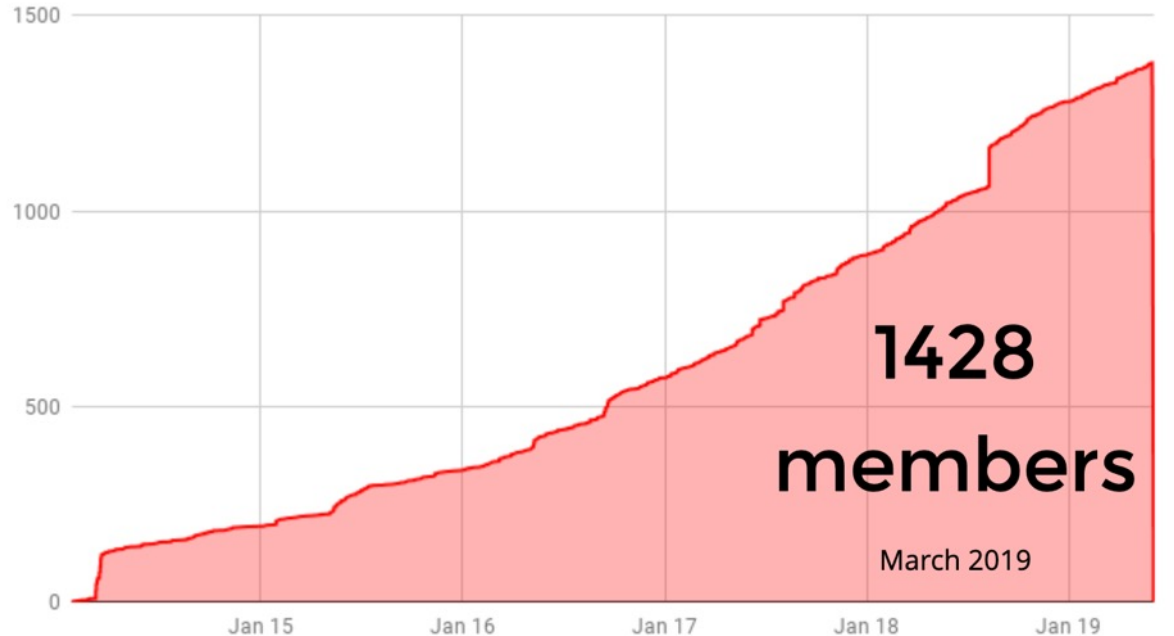
RSE name and first RSE Group      First RSE Workshop      UK RSE association founded



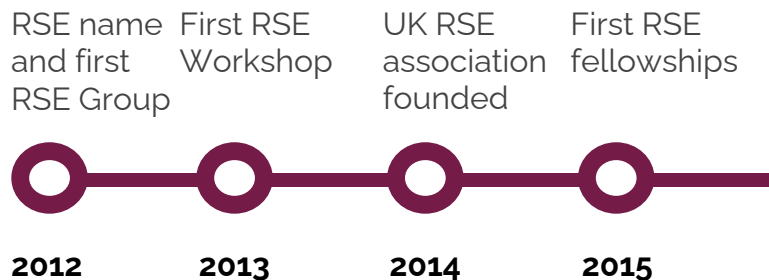
2012

2013

2014



# Grassroots movement to professional Society



## Research Software Engineer (RSE) Fellowships

↑ Issue date:	13 May 2015
📅 Opening date:	13 May 2015
🕒 Closing date:	21 July 2015 at 16:00
📌 Status:	Closed
🏷️ Tag:	Invitation for proposals
📄 Related theme:	<input type="text" value="Research Infrastructure"/>

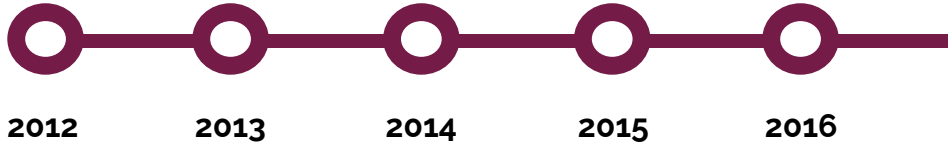
This call will support Research Software Engineer (RSE) Fellowships for a period of up to five years. The RSE Fellowship describes exceptional individuals with combined expertise in programming and a solid knowledge of the research environment. The Research Software Engineer works with researchers to gain an understanding of the problems they face, and then develops, maintains and extends software to provide the answers.

To support the role of RSEs and establish a cohort in the academic environment, up to £3m is available for this pilot call. Candidates are invited to provide an 'Intent to Submit' document in the first instance to register interest. Full proposals will be subject to a rigorous peer review and sift process before a final selection by interview.



# Grassroots movement to professional Society

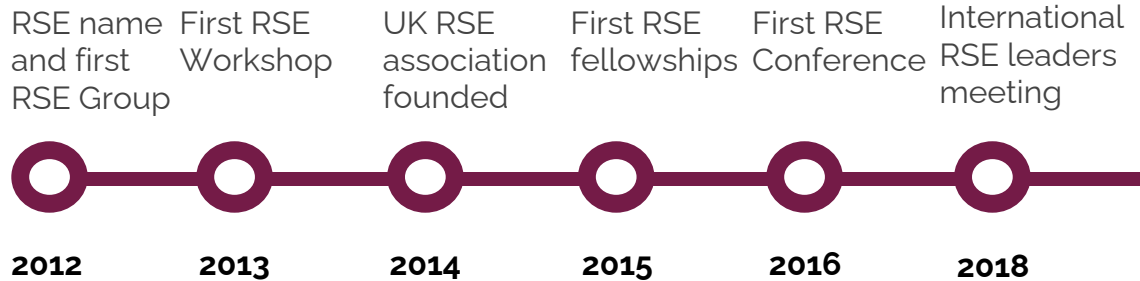
RSE name and first RSE Group      First RSE Workshop      UK RSE association founded      First RSE fellowships      First RSE Conference



## 2016: the RSE Conference



# Grassroots movement to professional Society



## International RSE Leaders Workshop

April 23, 2018



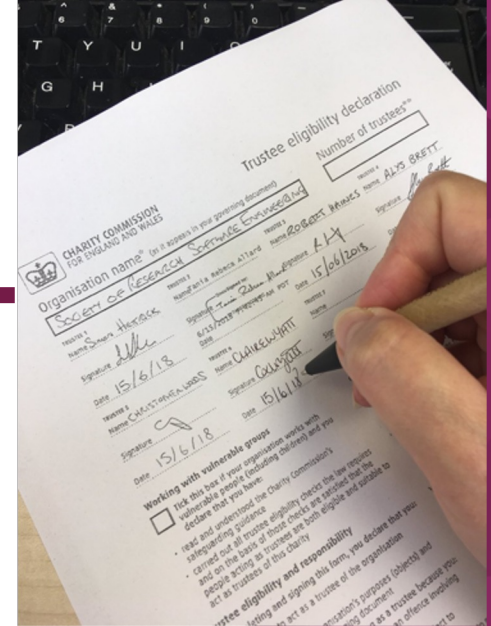
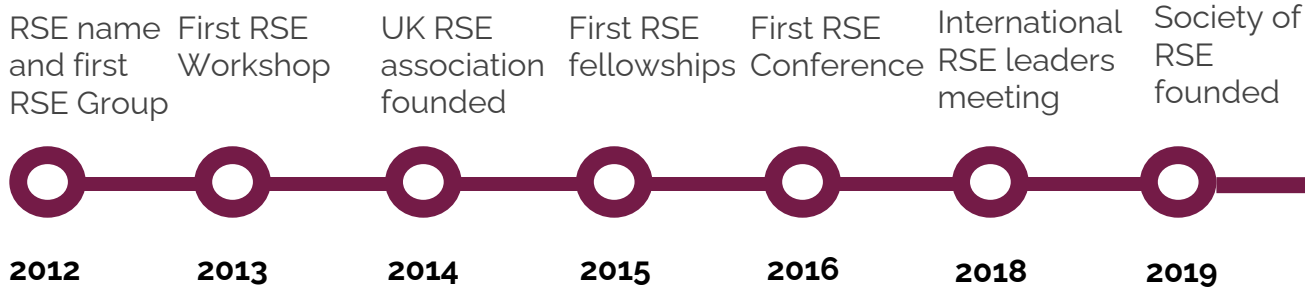
By Alys Brett, UK Atomic Energy Authority / UK RSE

In January 2018, leaders of Research Software Engineering groups, networks and initiatives from around the world gathered in London for the first ever International RSE Leaders workshop, organised by UK RSE. The event generated huge enthusiasm and progress towards the goal of improving access to software expertise in research by pooling knowledge, coordinating efforts and establishing collaboration.

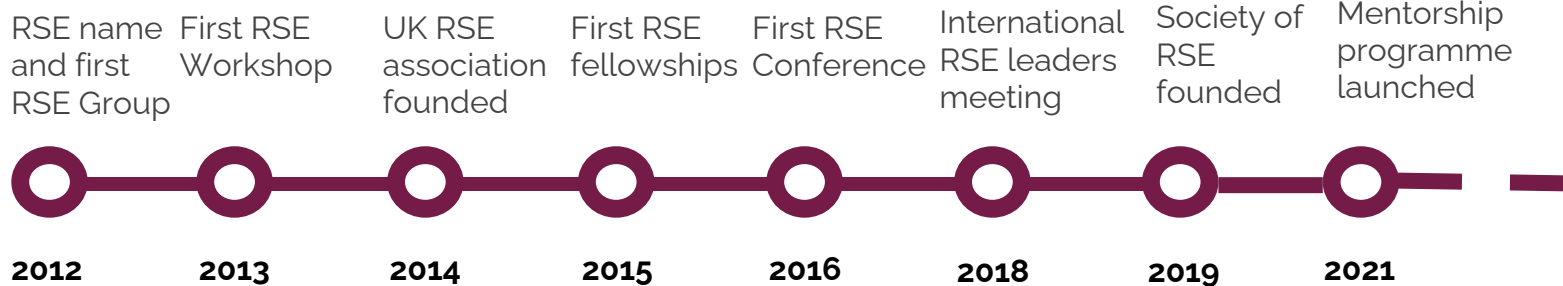
International momentum



# Grassroots movement to professional Society



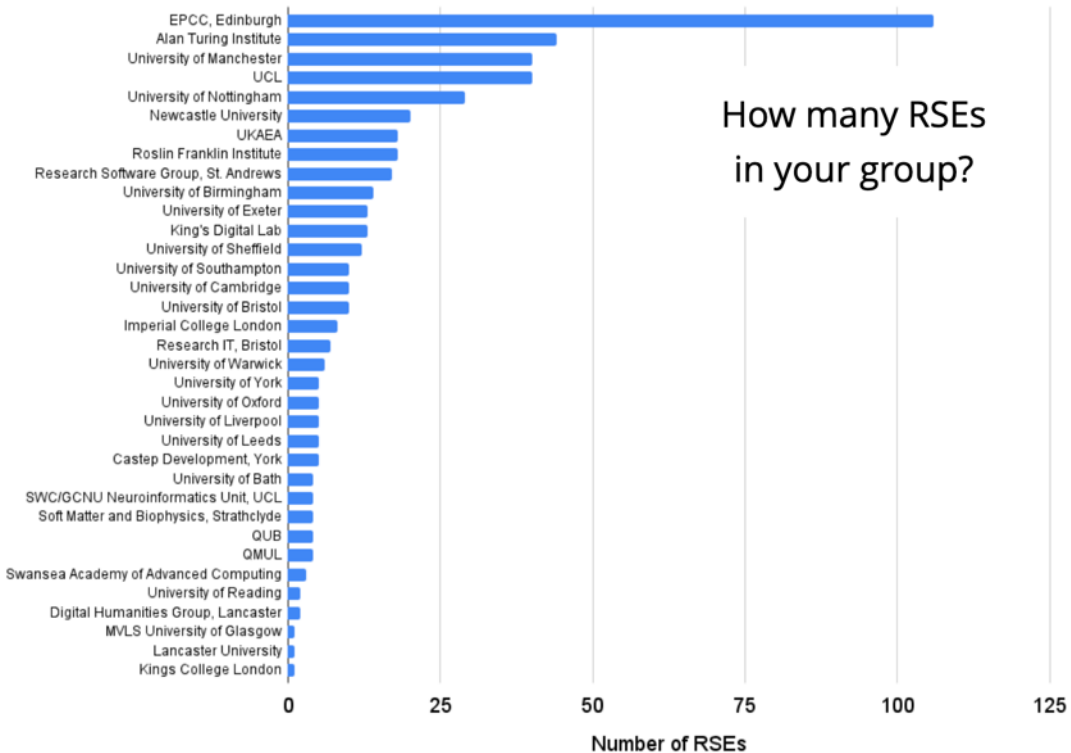
# Grassroots movement to professional Society



# RSE today

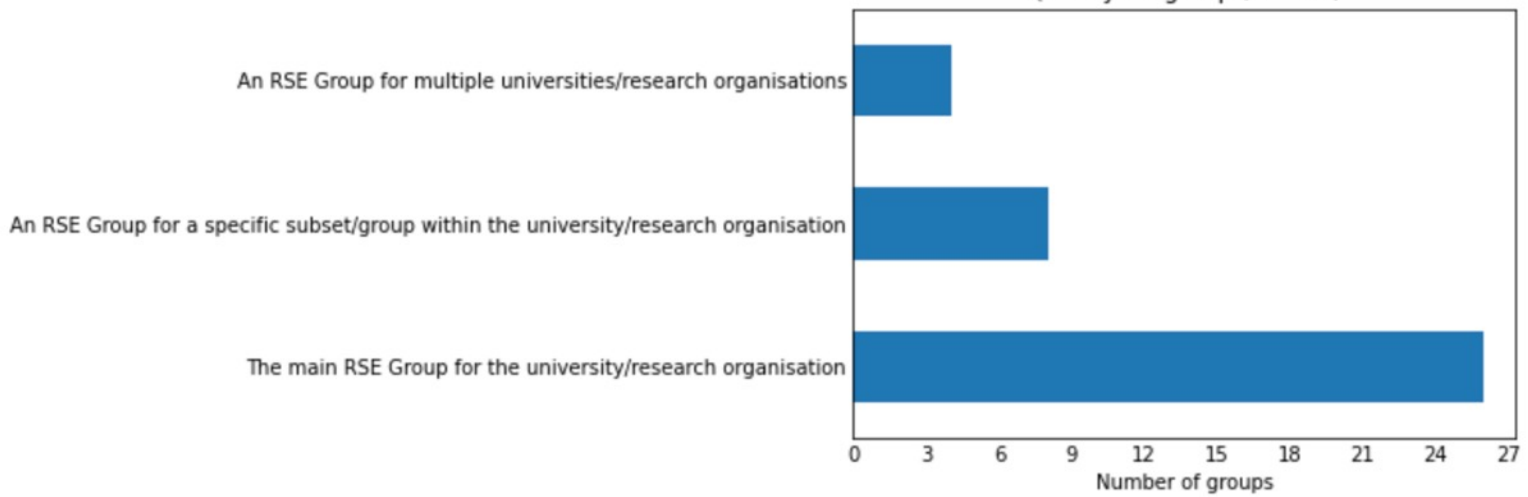


# UK RSE Groups

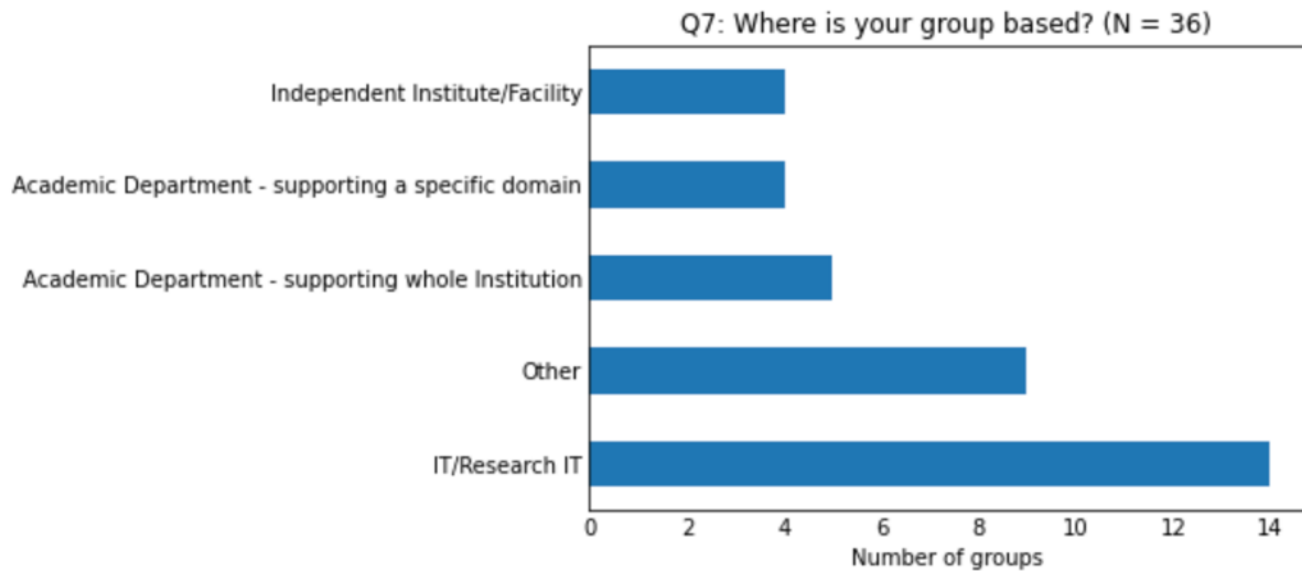


# UK RSE Groups

Q4: Is your group (N = 36)

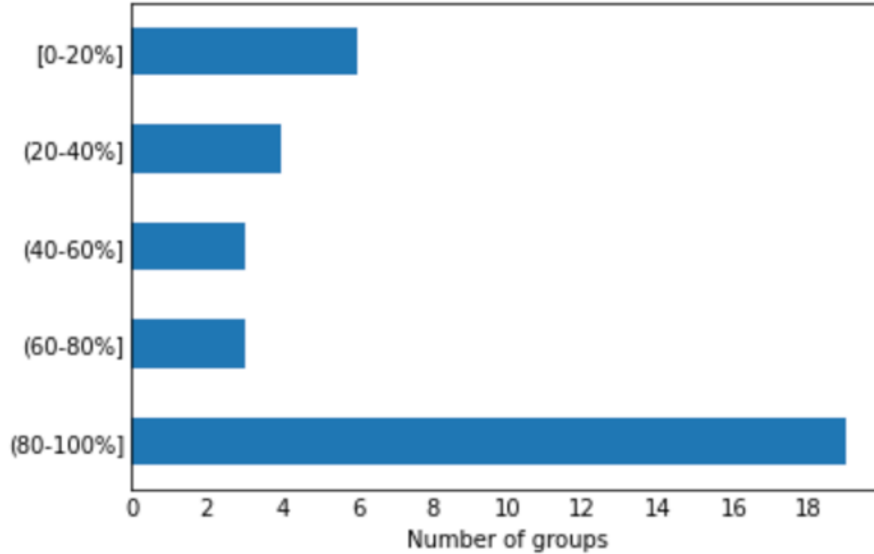


# UK RSE Groups

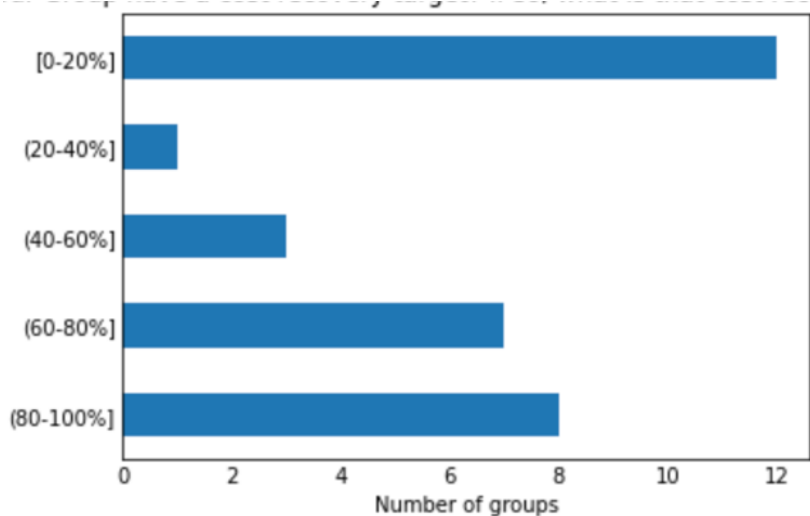


# UK RSE Groups

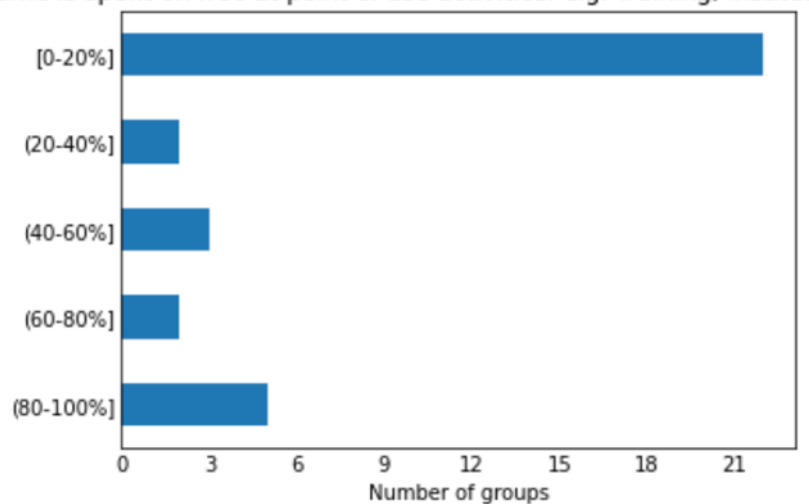
Q17: Roughly what percentage of your roles are open-ended/permanent? (N = 35)



# UK RSE Groups



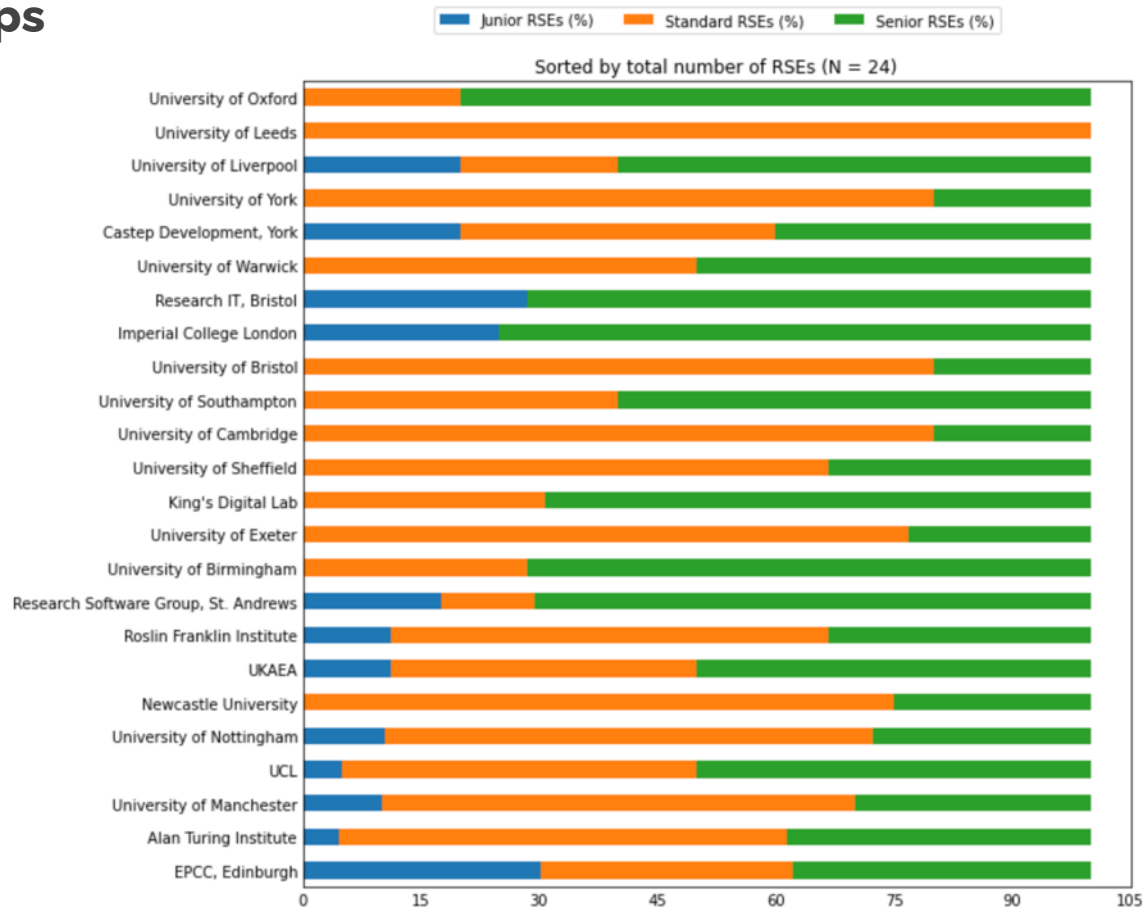
Target for fraction of group costs that must be charged to projects



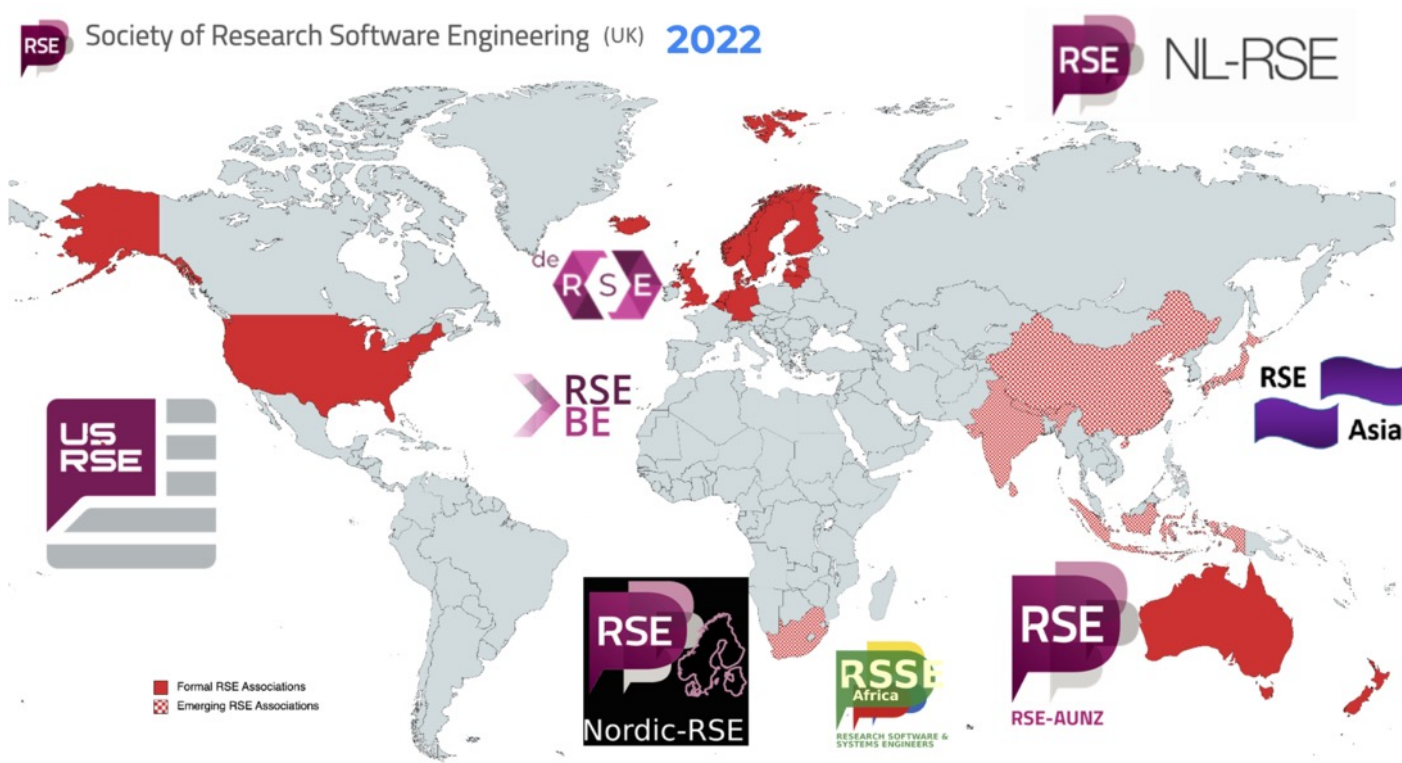
Fraction of time that is free to researchers



# UK RSE Groups



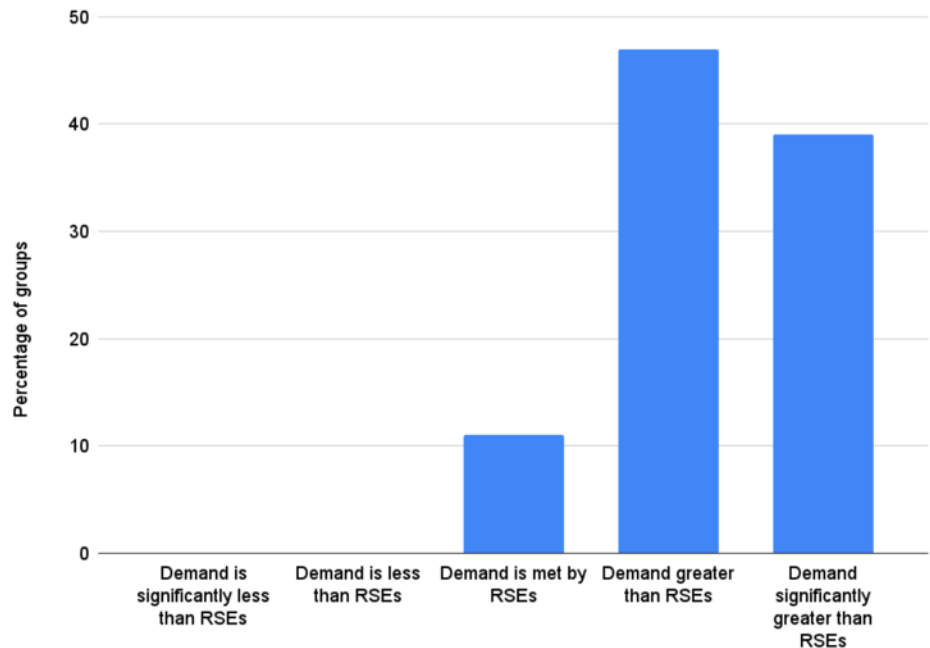
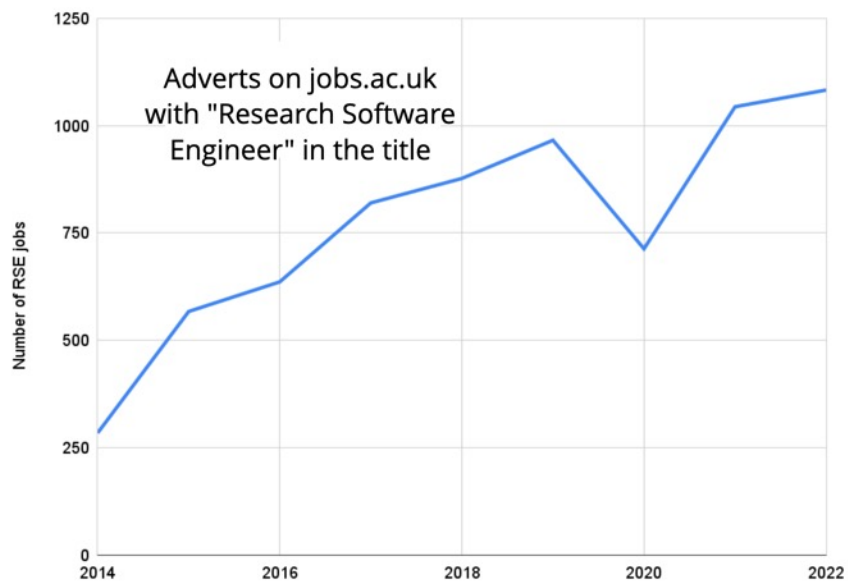
# International RSE associations



~10,000 RSEs worldwide

Created with mapchart.net

# Demand for RSEs



[https://github.com/SimonHettrick/parsing\\_rse\\_job\\_adverts](https://github.com/SimonHettrick/parsing_rse_job_adverts)

[https://github.com/software saved/RSE-Group-Leaders-Survey-2023\\_Python](https://github.com/software saved/RSE-Group-Leaders-Survey-2023_Python)

# Society of Research Software Engineering



2019



**The RSE Landscape**  
What is your RSE type and how do you want to develop it?

# Society of Research Software Engineering

- ▶ Open to all
  - ▶ Who identify as research software engineers or related roles
    - ▶ E.g. data scientists, infrastructure engineers, HPC specialists etc.
  - ▶ Who are researchers, scientists who code
  - ▶ Who may have RSE as role title, or may not
  - ▶ Who work in academia or private sector etc
- ▶ Professional organisation for individual members
  - ▶ Registered Charity
  - ▶ 700+ members

# Government recognition



*Research software engineers who port and maintain these codes and optimise system performance are a crucial part of operational infrastructure*

<https://www.gov.uk/government/publications/future-of-compute-review/the-future-of-compute-report-of-the-review-of-independent-panel-of-experts>

The screenshot shows the top of a UK Government website page. At the top left is the 'GOV.UK' logo. To its right are 'Menu' and search icons. Below the logo is a breadcrumb trail: 'Home > Business and industry > Science and Innovation > Independent Review of the Future of Compute'. The main header area is blue and contains the text 'Independent report' followed by the title 'Independent Review of The Future of Compute: Final report and recommendations' in large white font. Below the title, it says 'Updated 6 March 2023'. On the left side, there is a 'Contents' section with a list of links: 'Introduction from the expert panel', 'Report outline', 'List of recommendations', 'Proposed timeframe', 'Glossary of terms', '1. The significance of compute for the UK', '2. The international landscape of compute', '3. The demand for compute in the UK', '4. Meeting the UK's compute needs', '5. Creating a vibrant compute ecosystem', '6. Recommendations', and 'Acknowledgements'. Below the list is a 'Print this page' button. On the right side, there is a portrait of a man with glasses and a blue sweater, identified as 'The Rt Hon Jeremy Hunt MP, Chancellor of the Exchequer'. Below the portrait is another identification: 'The Rt Hon Michelle Donelan MP, Secretary of State for Science, Innovation and Technology'.



## Government recognition



*Universities should embrace Research Software Engineering as an intellectually and academically creative collaborative discipline, especially in health, with realistic salaries and recognition*



# Funding opportunities

Funding opportunity

## UKRI Digital Research Technical Professional Skills NetworkPlus

### Strategic Technical Platforms – Full proposals

### Software for research communities

Opportunity status: Closed

Funders: [Engineering and Physical Sciences Research Council \(EPSRC\)](#)

Funding type: Grant

Total fund: £4,500,000

Publication date: 29 June 2021

Opening date: 29 June 2021

Closing date: 14 October 2021 4:00pm UK time

Apply for funding to adapt or maintain existing software used by researchers.

You must be a UK resident based at an organisation eligible for UKRI funding. We particularly encourage applications from research software engineers and early career researchers.

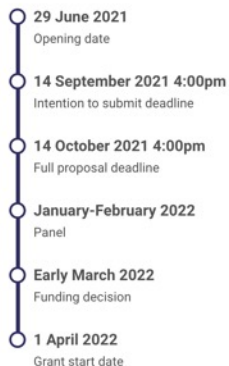
Your project must be within the remit of EPSRC.

You can use the funding for:

- development and re-engineering of existing software
- maintenance activities
- activities that widen participation in development and maintenance.

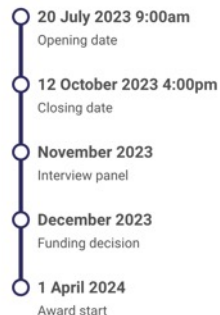
We will provide funding for three years. EPSRC will fund 80% of your project's full economic cost.

#### Timeline



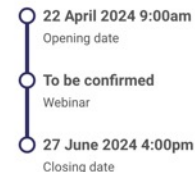
Print this guidance or save as PDF

#### Timeline



Print this guidance or save as PDF

#### Timeline



Print this guidance or save as PDF

Guidance on good research



# Remaining challenges

...

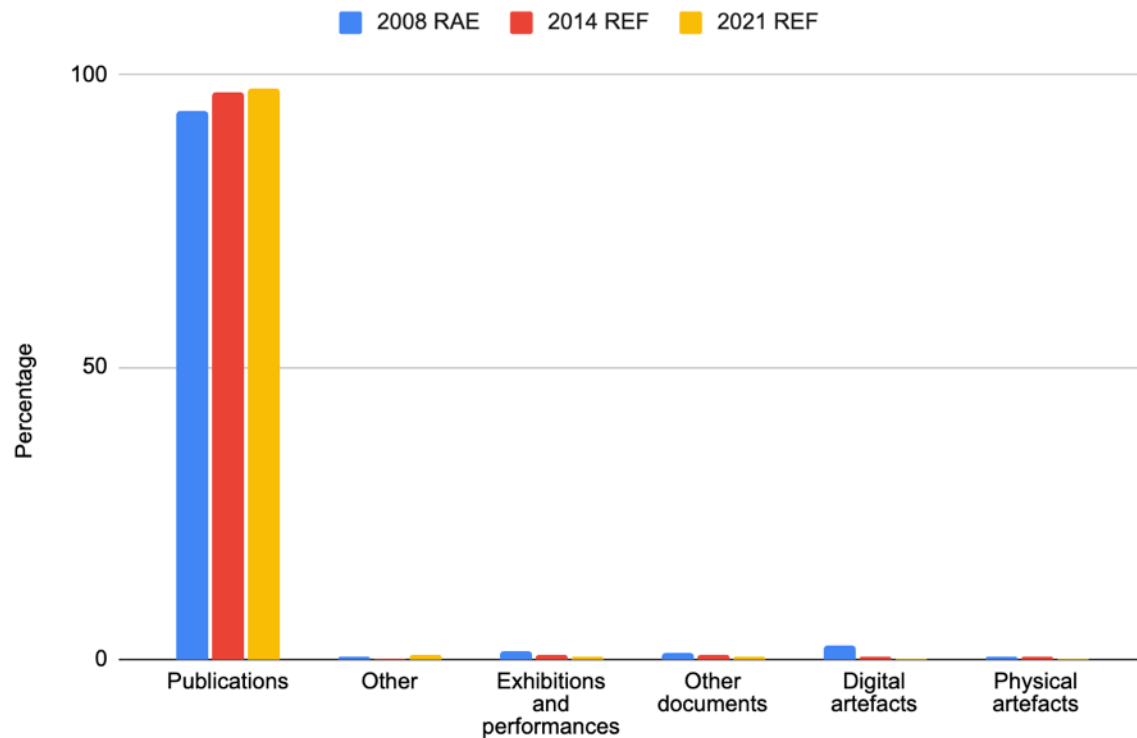
## Academic recognition

“

*If we don't **recognise** the  
work that is vital to  
research,  
we limit our ability to  
conduct research*

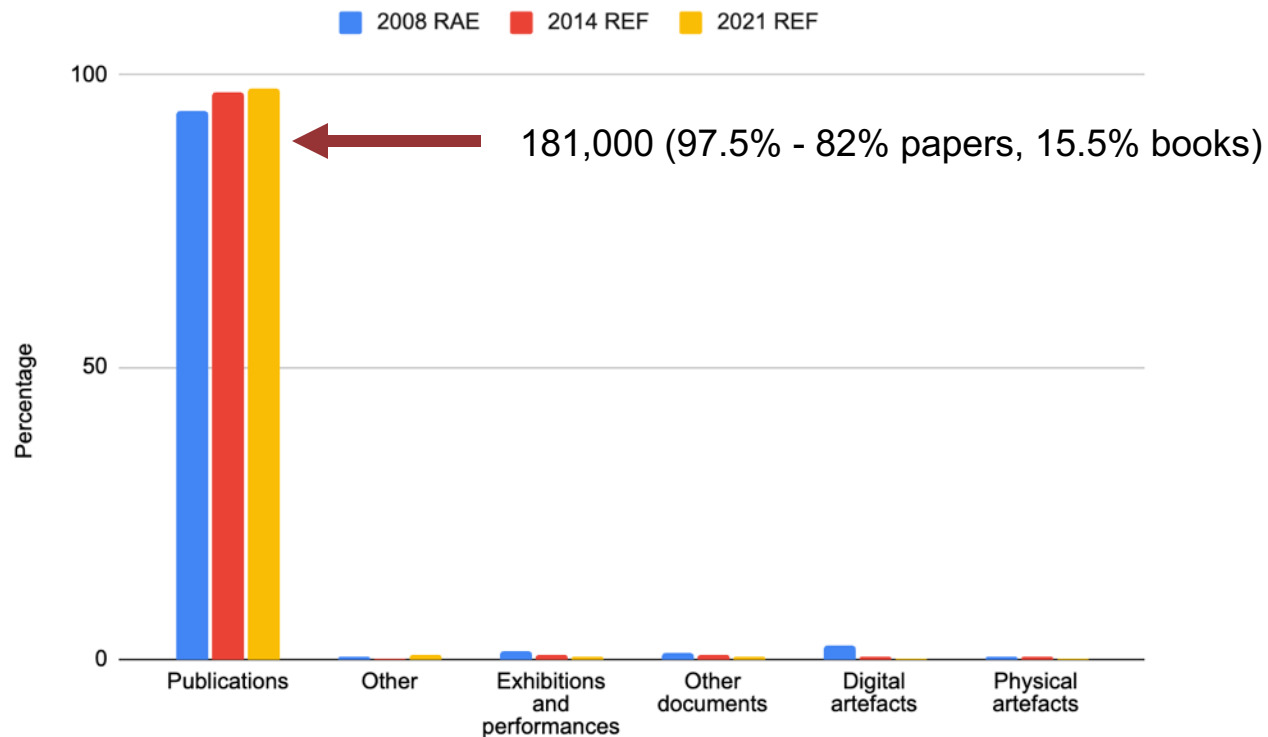
# Academic recognition

Research outputs as percentage submitted to RAE and REF



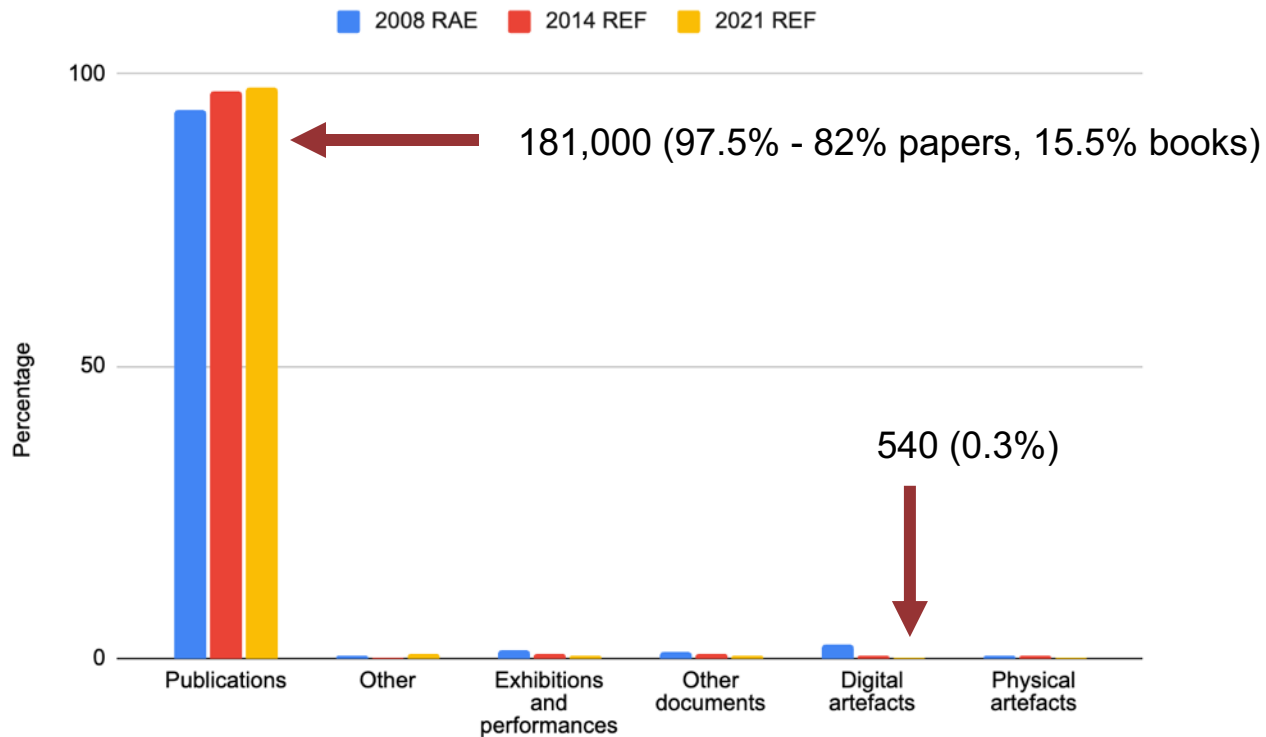
# Academic recognition

Research outputs as percentage submitted to RAE and REF



# Academic recognition

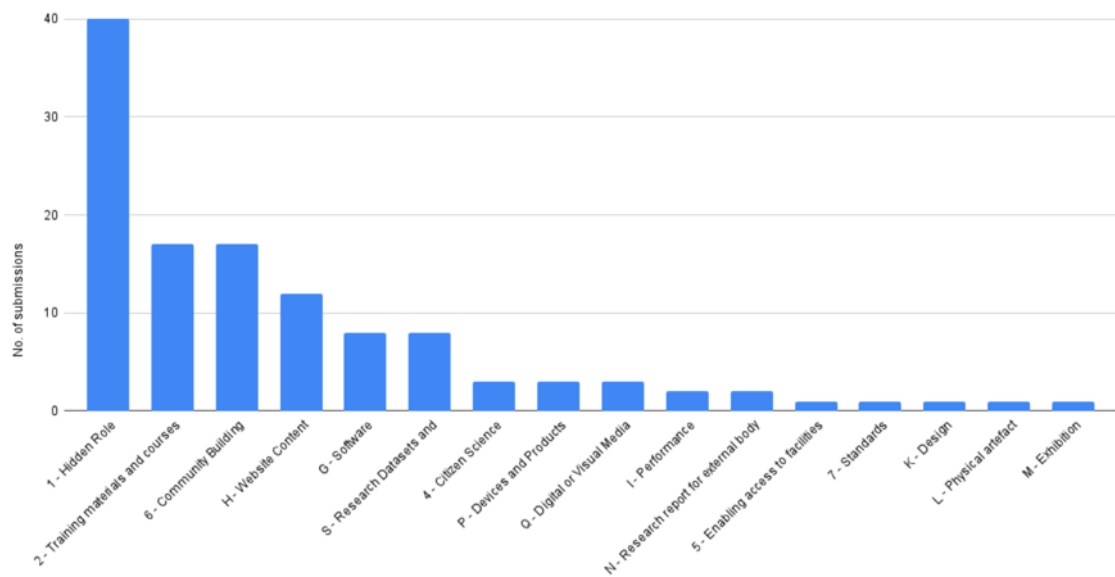
Research outputs as percentage submitted to RAE and REF





[www.hidden-ref.org](http://www.hidden-ref.org)

Hidden REF submissions



[www.hidden-ref.org](http://www.hidden-ref.org)









**The hidden REF**

@HiddenRef · [Follow](#)



What's the most exciting change in the [#REF2028](#)?

"This will allow the submission of outputs by any staff member, including non-academic staff"

Excellent news for campaigns like ours that are pushing for recognition of everyone involved in research.

[repository.jisc.ac.uk/9148/1/researc...](https://repository.jisc.ac.uk/9148/1/researc...)

9:43 AM · Jun 15, 2023



118

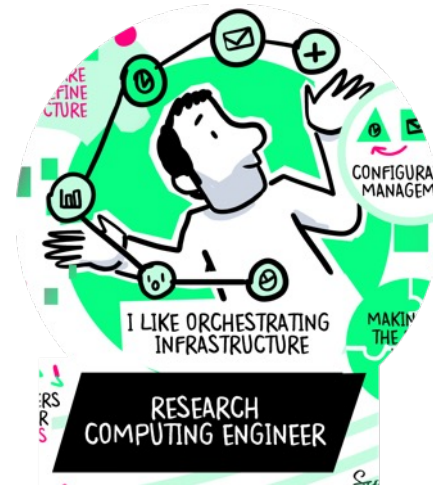


Reply



Copy link

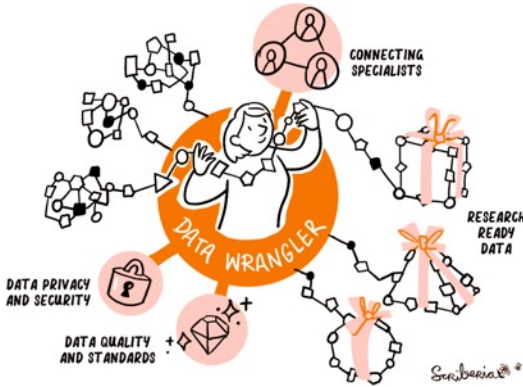
# Role diversity



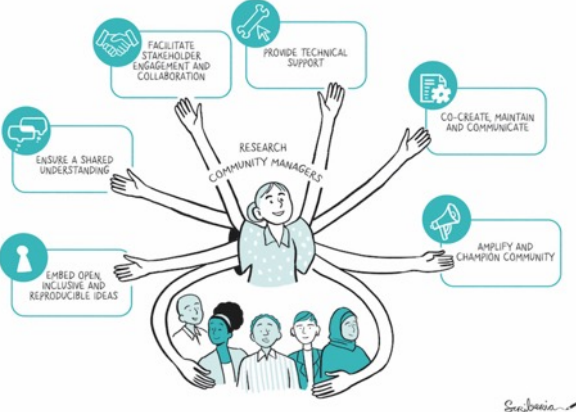
# Role diversity



# Role diversity



Data wranglers



Research Community Managers

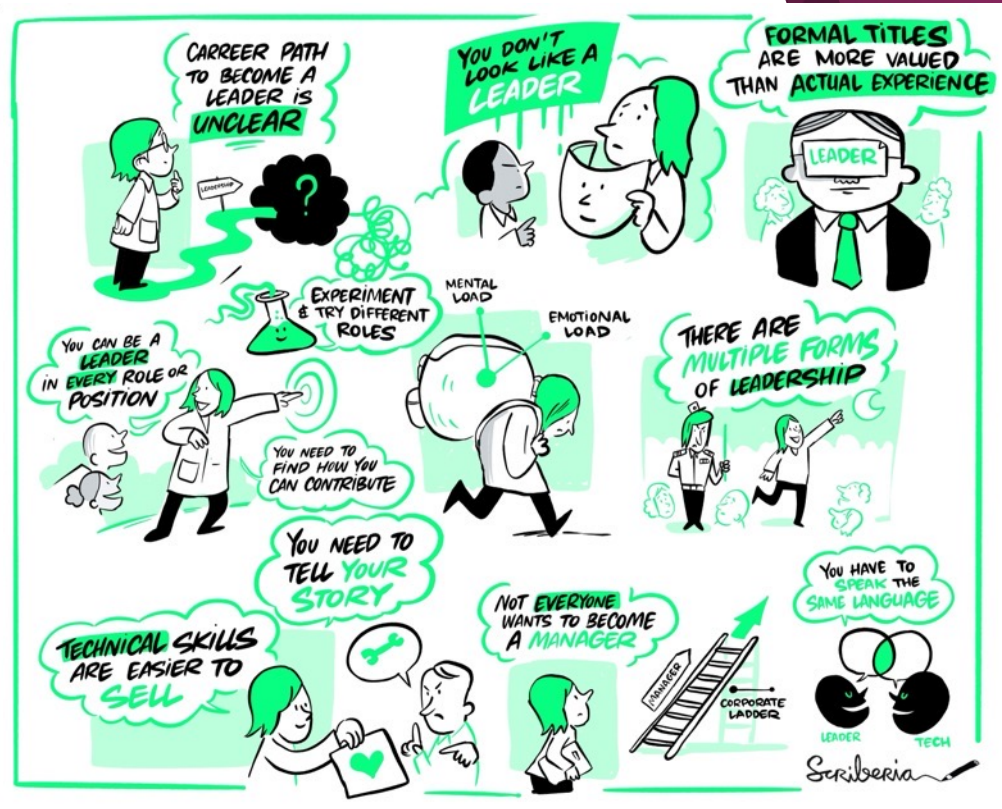
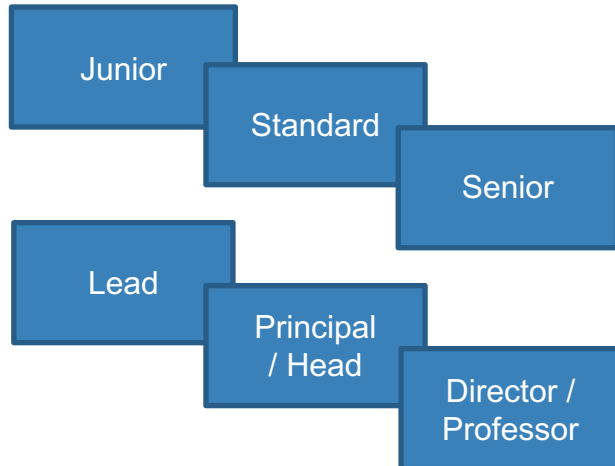


Research Application Managers



# Career pathways

- Wider range of seniority levels
- Promotion pathways
- Competency framework
- Entry pathways to profession
- Pathways for embedded RSEs



# Read more

[society-rse.org](https://society-rse.org)

Society of RSE Trustee Report  
[bit.ly/socrse-report-2023](https://bit.ly/socrse-report-2023)

RSE State of the Nation Report  
[doi.org/10.5281/zenodo.495360](https://doi.org/10.5281/zenodo.495360)

A not-so-brief history of Research  
Software Engineers  
[bit.ly/NotSoBriefRSE](https://bit.ly/NotSoBriefRSE)

HiddenREF  
[hidden-ref.org](https://hidden-ref.org)

# Contact



[info@society-rse.org](mailto:info@society-rse.org)  
 [@ResearchSoftEng](https://twitter.com/ResearchSoftEng)



[moreilly@turing.ac.uk](mailto:moreilly@turing.ac.uk)  
 [@martinoreilly](https://twitter.com/martinoreilly)

A promotional poster for RSE CON 24. It has a black background with a yellow circle on the right. The text 'RSE CON 24' is at the top left, with 'Research Software Engineering Conference' below it. The yellow circle contains the text 'Save the date!' followed by '03-05 Sept 2024' and 'Newcastle, UK'.

**RSE CON 24**  
Research  
Software  
Engineering  
Conference

**Save the date!**  
03-05 Sept 2024  
Newcastle, UK