

# Increasing Equity through Open Research

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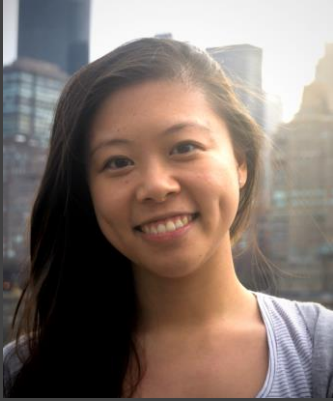
by *The Turing Way* Community

Jennifer Ding, Emma Karoune, Anne Lee Steele

Pronouns: she/her



# Introduction to speakers



**Dr Jennifer Ding**  
Research Application  
Manager,  
The Alan Turing Institute



**Dr Emma Karoune**  
Senior Community Manager  
DECOVID & The Turing-  
RSS Health Data Lab, The  
Alan Turing Institute



**Anne Lee Steele**  
Community Manager  
*The Turing Way*,  
The Alan Turing Institute

# What do we know about tackling health equity?

In the Marmot review in 2010

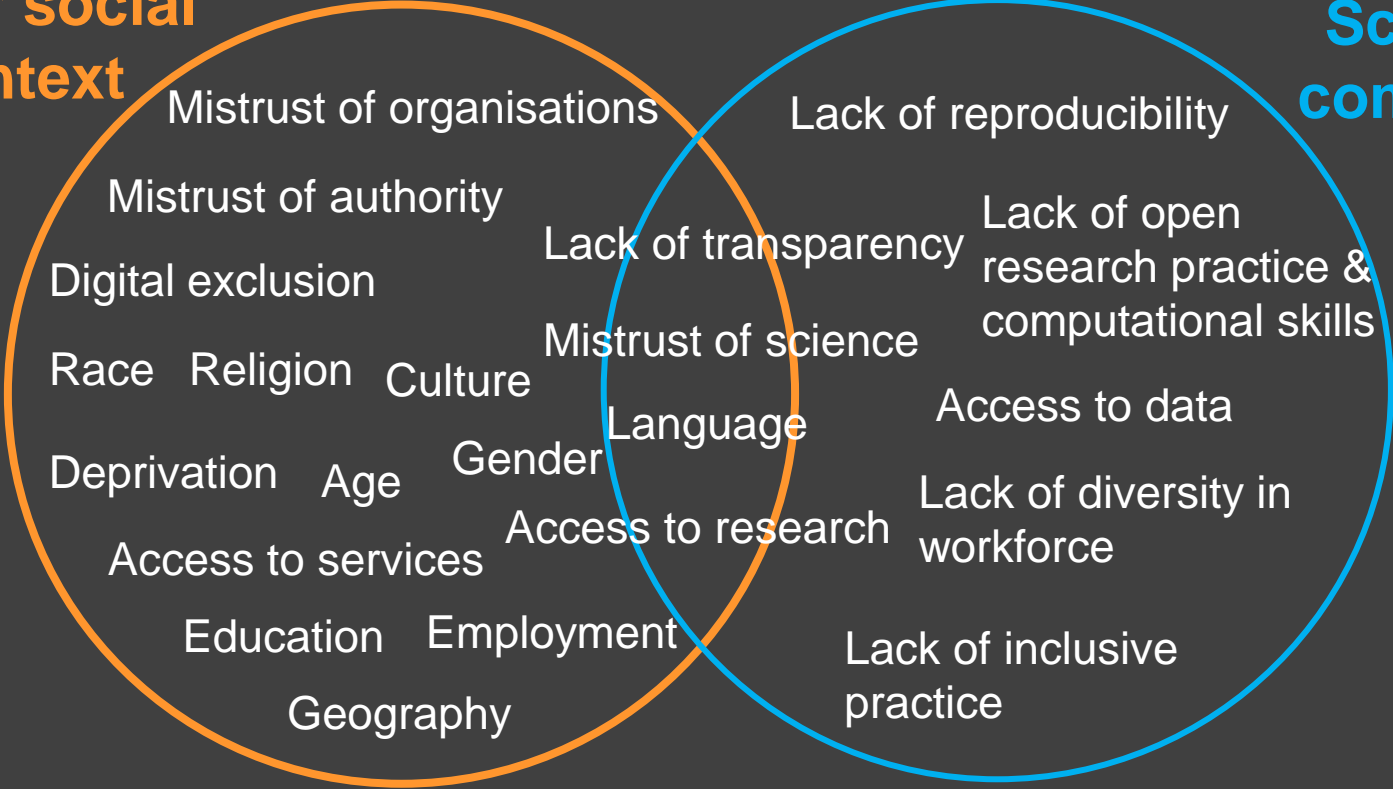
“Health inequalities are not inevitable and can be significantly reduced. They stem from avoidable inequalities in society.”

**But inequalities are not just in wider society.  
Also in our scientific community!**

# Barriers to health equity

**Wider social context**

**Scientific community**



slido



**What do you think are the largest barriers to health equity in your work?**

① Start presenting to display the poll results on this slide.

# Covid-19 as an example of public mistrust in science

## Poor vaccine take-up in BAME communities is not just down to hesitancy

Published: March 1, 2021 12:41pm GMT



THE CONVERSATION

## Three ways to improve the uptake of COVID vaccines by ethnic minority groups in the UK

Published: December 15, 2021 11:28am GMT



UCL

[UCL Home](#) » [UCL News](#) »

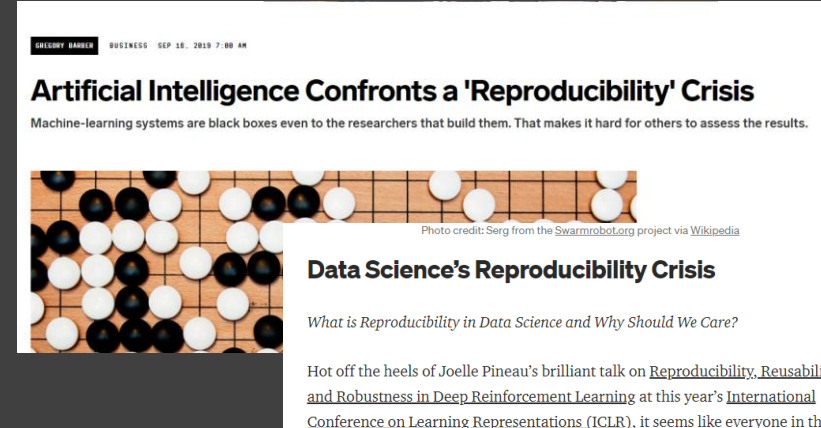
Covid-19 vaccine uptake among minority groups was driven by mistrust

## Covid-19 vaccine uptake among minority groups was driven by mistrust

7 April 2022

# Reproducibility Crisis as an example of mistrust in scientific community

- Many scientific studies are difficult or impossible to reproduce
- Often mentioned in regards to psychology and medicine but is pervasive across many scientific fields
- Range of causes: questionable research practices, 'publish or perish' culture, statistical issues
- Link with open science movement- push for openness and transparency



**Artificial Intelligence Confronts a 'Reproducibility' Crisis**  
Machine-learning systems are black boxes even to the researchers that build them. That makes it hard for others to assess the results.


Photo credit: Serg from the [Swarmrobot.org](#) project via [Wikipedia](#)

### Data Science's Reproducibility Crisis

*What is Reproducibility in Data Science and Why Should We Care?*

Hot off the heels of Joelle Pineau's brilliant talk on [Reproducibility, Reusability, and Robustness in Deep Reinforcement Learning](#) at this year's [International Conference on Learning Representations \(ICLR\)](#), it seems like everyone in the data science world (or at least in the data science research world) is talking about replicability and reproducibility.

This problem isn't unique to data science. In fact, according to 2016 survey by *Nature* magazine, [most scientific fields are facing a reproducibility crisis](#). Ironically, according to survey respondents, one of the most important factors



**Molecular Brain**  
Home About [Articles](#) Submission Guidelines

Editorial | [Open Access](#) | [Published: 21 February 20](#)

### No raw data, no science: another possible source of the reproducibility crisis

Tsuyoshi Miyakawa [✉](#)

[Molecular Brain](#) 13, Article number: 24 (2020) | [Cite this article](#)  
50k Accesses | 63 Citations | 2240 Altmetric | [Metrics](#)

#### Abstract

A reproducibility crisis is a situation where many scientific studies cannot be reproduced.

slido



**Who do you think is harmed  
by health inequities in your  
field?**

① Start presenting to display the poll results on this slide.



# Tackling barriers to increase equity

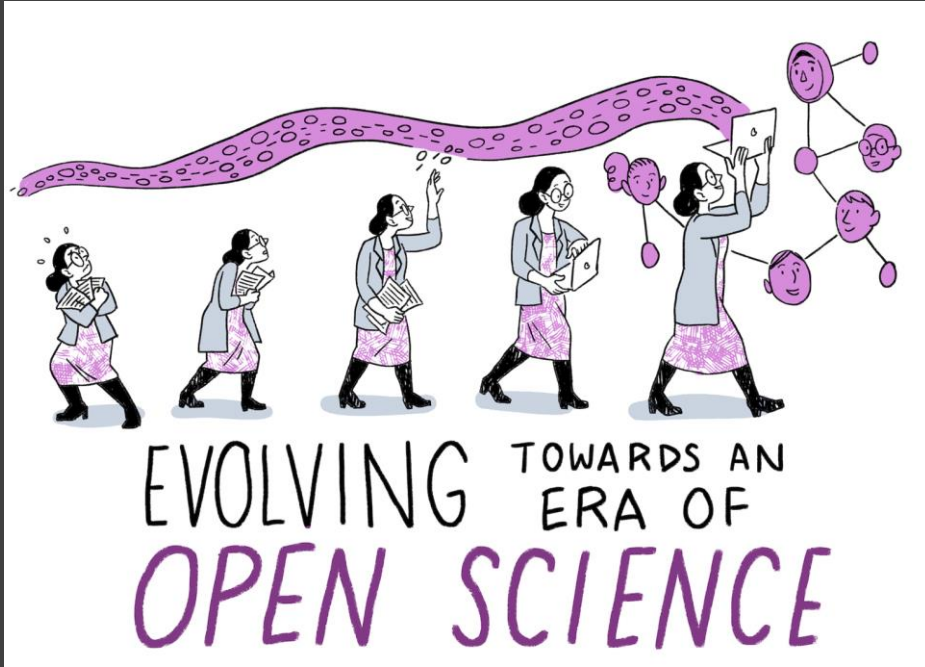
Lack of trust

Inappropriate  
scientific  
communication

Lack of  
access

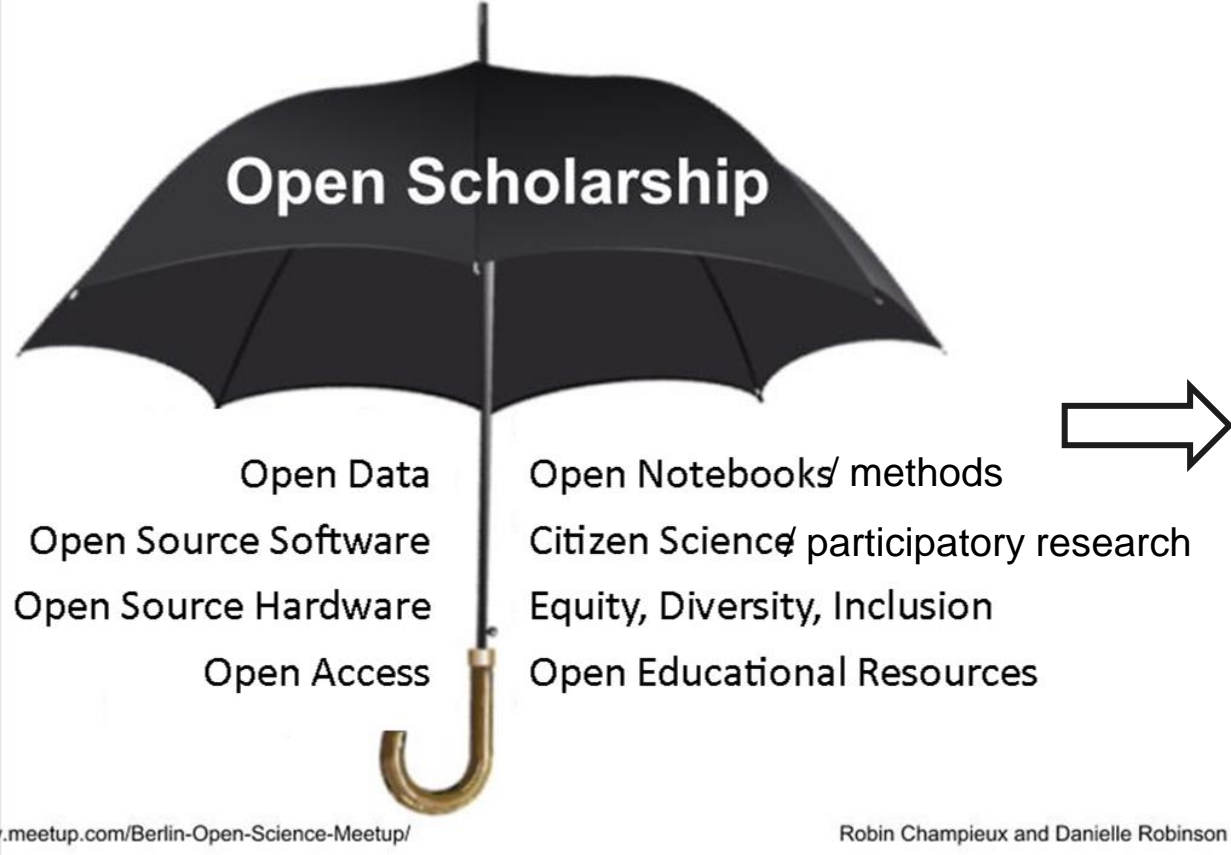
**Open Science** aims to transform research by making it more transparent → accessible → reliable → reproducible → reusable → collaborative → beneficial to society.

# Using Open Science to build trust



- Open Science practices **remove barriers** from sharing and using scientific resources **at all stages** of research.
- Make research findings **accessible to all** rather than keeping them locked away (for example, behind a paywall).
- Consider equality, diversity and inclusion as **integral** to research.

# What is Open Research?



## Open Scholarship

Open Data

Open Notebooks/ methods

Open Source Software

Citizen Science/ participatory research

Open Source Hardware

Equity, Diversity, Inclusion

Open Access

Open Educational Resources

meetup.com/Berlin-Open-Science-Meetup/

Robin Champieux and Danielle Robinson

**Transparency** →  
**Reproducibility** →  
**Research Quality** →  
**Sustainability**

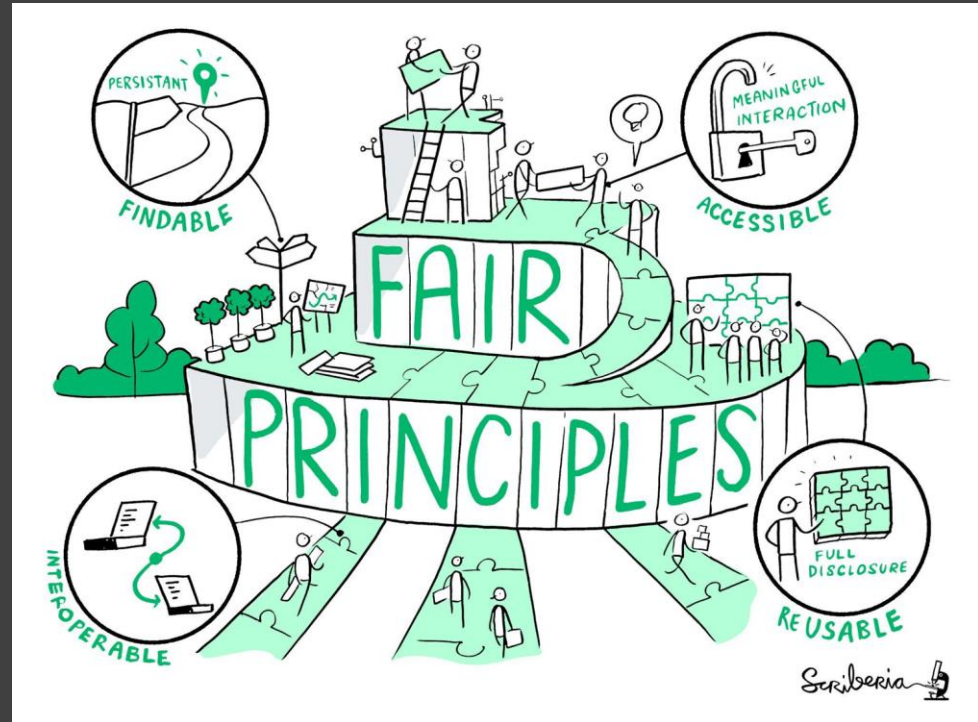
+

**Collaboration** →  
**Inclusive Research** →  
**Equity and Diversity** →  
**Global Accessibility**

# Making research sustainable

Embedding open research practices

- Making research outputs open access and FAIR
- Reproducible research



# Making research globally accessible

## Embedding equality, diversity and inclusion

- Translation
- Consideration of others needs to do research or access research
- Take Citizen Science approaches
- PPIE representation throughout research projects
- Communicate effectively with our communities
- Use digital technologies to increase access and inclusion



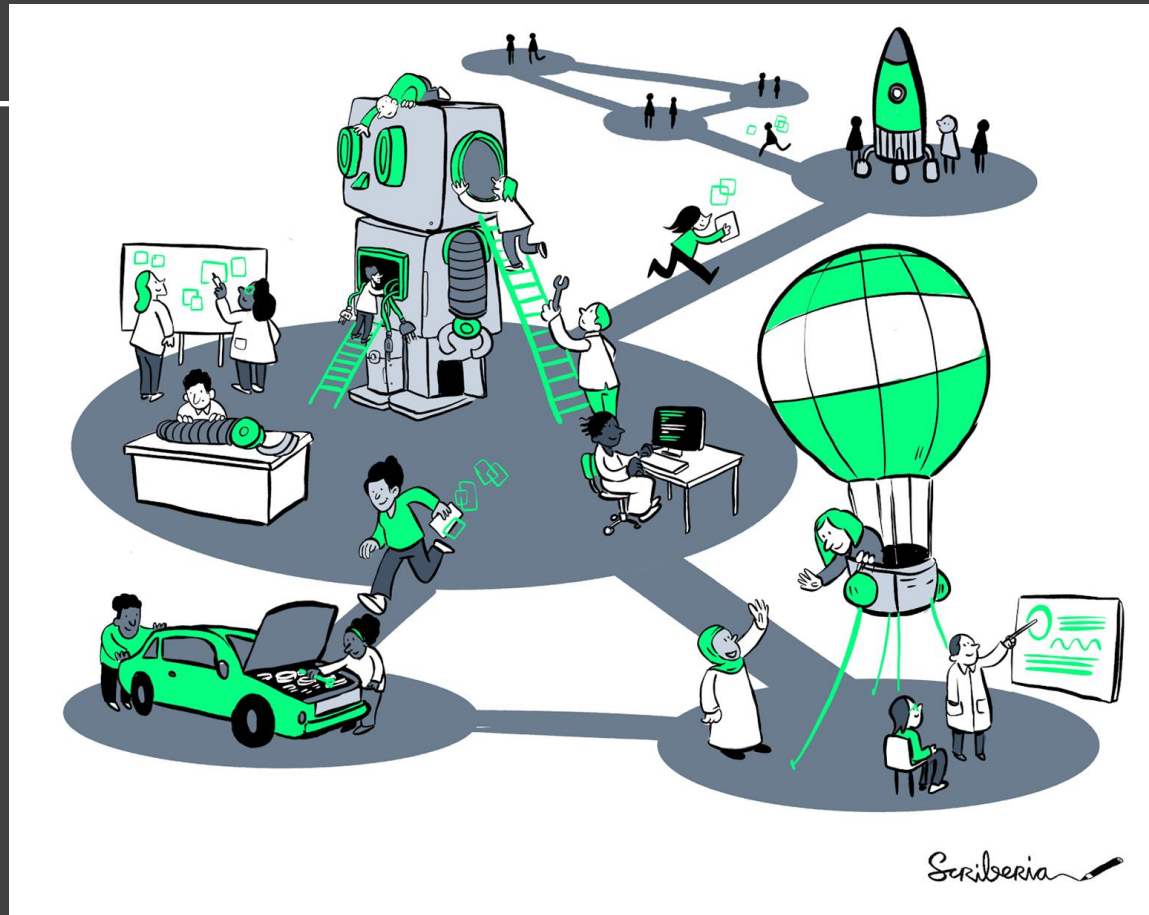
slido



**What benefits could open research bring to your work?**

① Start presenting to display the poll results on this slide.

# Use cases





# Turing-RSS Health Data Lab

- Effective Collaboration
  - Knowledge sharing
- Reproducibility
- Accessible Outputs
  - Open access articles
  - Open source code
  - Blogs
  - Non-technical reports

## Time varying association between deprivation, ethnicity and SARS-CoV-2 infections in England: A population-based ecological study



Tullia Padellini,<sup>a,1</sup> Radka Jersakova,<sup>b,1</sup> Peter J. Diggle,<sup>c</sup> Chris Holmes,<sup>b,d,e</sup> Ruairidh E. King,<sup>e</sup> Briec C.L. Lehmann,<sup>d</sup> Ann-Marie Mallon,<sup>e</sup> George Nicholson,<sup>e</sup> Sylvia Richardson,<sup>b,d</sup> and Marta Blangiardo<sup>a,\*</sup>

<sup>a</sup>MRC Centre for Environment and Health, Department of Epidemiology and Biostatistics, Imperial College London, UK

<sup>b</sup>The Alan Turing Institute, London, UK

<sup>c</sup>CHICAS, Lancaster Medical School, Lancaster University, UK

<sup>d</sup>University of Oxford, UK

<sup>e</sup>MRC Harwell Institute, Harwell, UK

<sup>f</sup>MRC Biostatistics Unit, University of Cambridge, UK

### Summary

**Background** Ethnically diverse and socio-economically deprived communities have been differentially affected by the COVID-19 pandemic in the UK.

**Method** Using a multilevel regression model we assessed the time-varying association between SARS-CoV-2 infections and areal level deprivation and ethnicity from 1st of June 2020 to the 19th of September 2021. We separately considered weekly test positivity rate and estimated debiased prevalence at the Lower Tier Local Authority (LTLA)

The Lancet Regional Health - Europe  
2022;15: 100322  
Published online 13 February 2022  
<https://doi.org/10.1016/j.lanepe.2022.100322>

The Alan Turing Institute

Home + News

### South Asians in poorer areas more at risk of catching COVID-19

Monday 14 Feb 2022

Paper - <https://doi.org/10.1016/j.lanepe.2022.100322>

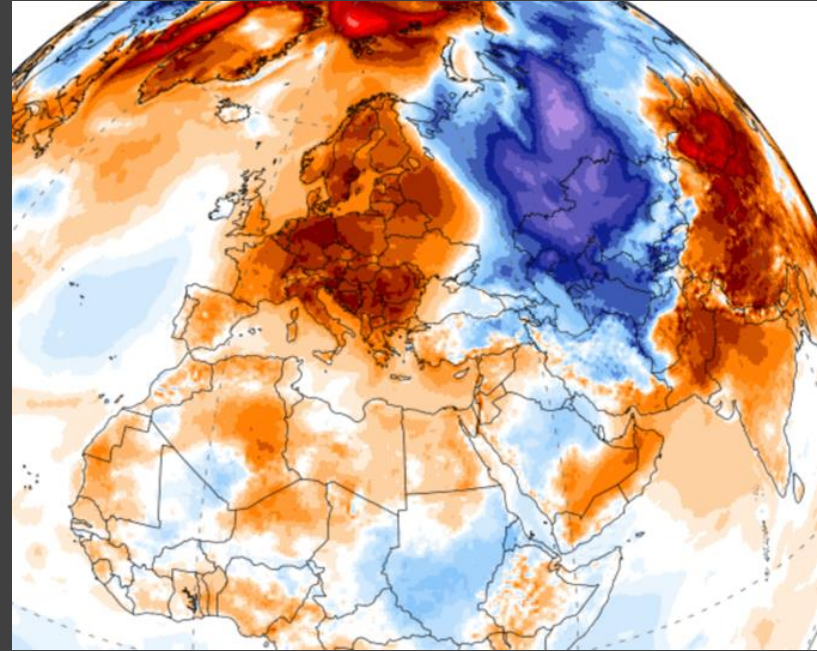
Blog - <https://www.turing.ac.uk/news/south-asians-poorer-areas-more-risk-catching-covid-19>



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## DyME-CHH: Synthetic populations for climate-change related health research

- Improve population-level outcomes through targeted local intervention amidst more extreme climate (e.g. heat, flooding)
- Centering vulnerable populations in local gov adaptation strategies
- Importance of open & documented climate projections data



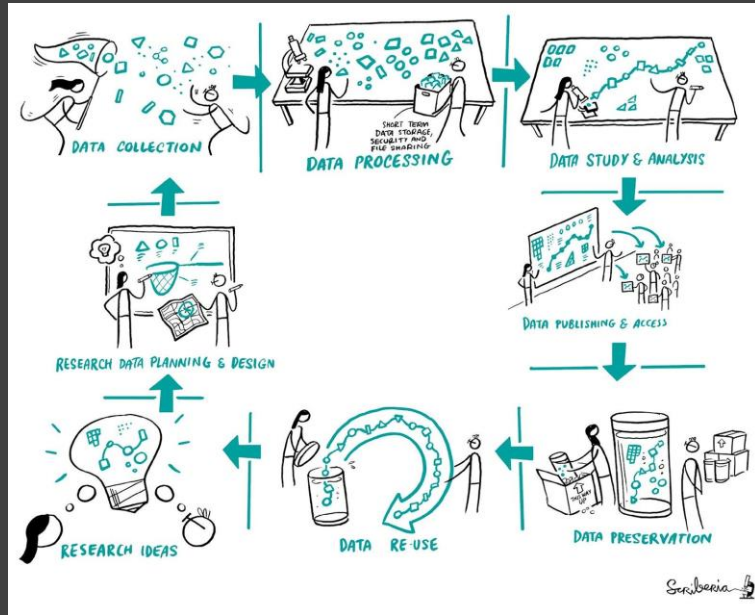
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# *The Turing Way*

An **Open Source** project that involves and supports its **diverse community** to make data science **reproducible, ethical, collaborative and inclusive** for everyone.



# Reproducibility



		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable

# Guide for Reproducible Research

## Guide for Reproducible Research

- Overview
- Open Research
- Version Control
- Licensing
- Research Data Management
- Reproducible Environments
- BinderHub
- Code quality
- Code Testing
- Code Reviewing Process
- Continuous Integration
- Reproducible Research with Make
- Research Compendia
- Credit for Reproducible Research
- Risk Assessment
- Case Studies



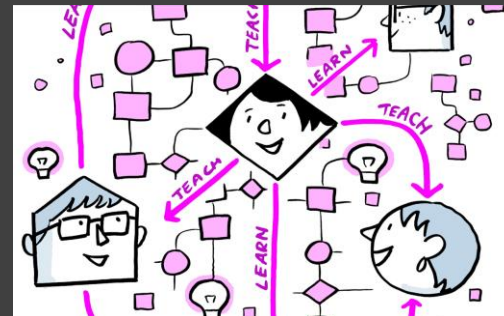
# The Turing Way Guides



Reproducibility



Project design



Communication



Collaboration



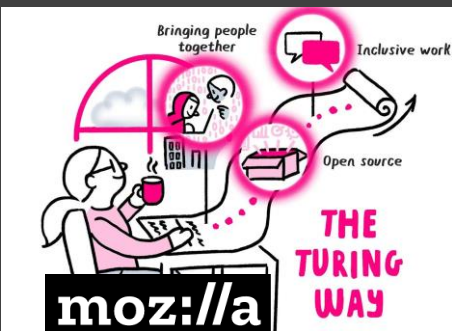
Ethical research



Community handbook



# The Turing Way



250+ live chapters, 340+ contributors, 3000+ Twitter followers, 3000+ monthly visitors of five guides.

2 project leads, a community manager, 10+ part paid staff, volunteer members, 4 translation and localisation leads.



Proposal by Kirstie Whitaker approved

Create README.md  
KirstieJane committed on 1 Nov 2018

**Book Dash 2020**,  
Project expanded to **five guides**,  
Community Handbook, social media,  
Translation started. **238 contributors**.

2021

2022

2018

2019

2020

The Alan Turing Institute

Book launched with **10 members, 3 chapters**, many workshops, **2 Book Dashes**. Year ended with Several chapters by **67 contributors**



Logo was designed with Scriberia

Project growth, **134+ chapters** citation in peer reviewed articles, government reports and policies, new projects emerged as extension. **309 contributors**

hidden REF

Highly commended: The Turing Way, The Turing Way Community, The Alan Turing Institute

@turingway, @jen\_gineered, @ekaroune, @aleesteele, CC-BY 4.0, Zenodo: 10.5281/zenodo.7104648



**Book:**  
[the-turing-way.netlify.app/](https://the-turing-way.netlify.app/)

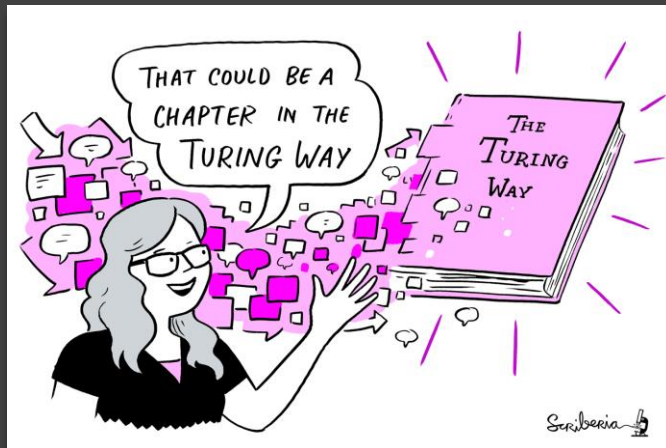
**GitHub:**  
[github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)

**Twitter:**  
[twitter.com/turingway](https://twitter.com/turingway)

**Email:**  
[theturingway@gmail.com](mailto:theturingway@gmail.com)

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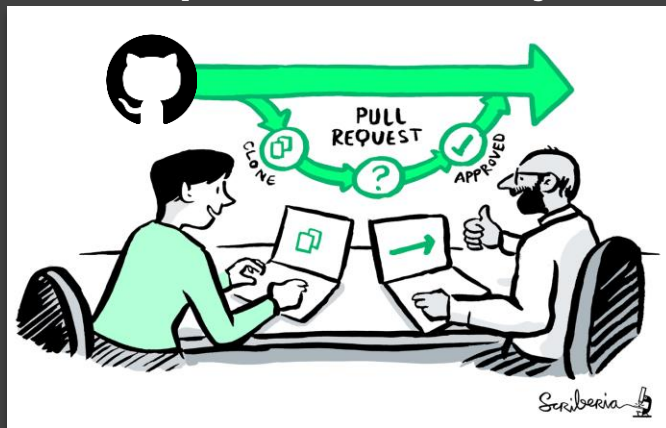
## A Book



## A Community



## An Open Source Project



## A Culture of Collaboration



# Equity through open source infrastructure

📁 .github	Remove prettier configuration	last month
📁 book	minor update	5 days ago
📁 communications	Fix typos	14 days ago
📁 conferences	Add KW formatting pedantry	last month
📁 project_management	Update online-collaboration-cafe.md	14 days ago
📁 templates	Updating Github templates	11 months ago
📁 tests	Add "et cetera" as a deprecated Latinism	6 days ago
📁 workshops	Remove mis-pasted text	13 days ago
📄 .all-contributorsrc	Merge pull request #991 from alan-turing-institute/all-contributors/a...	5 days ago
📄 .gitignore	ignore pptx in workshop folder	9 months ago
📄 .travis.yml	add html-proof file again	last month
📄 <u>CODE_OF_CONDUCT.md</u>	her -> their	6 months ago
📄 <u>CONTRIBUTING.md</u>	Update CONTRIBUTING.md	2 months ago
📄 <u>GOVERNANCE.md</u>	Read through months later	5 months ago
📄 <u>LICENSE.md</u>	Fix typo in licence	2 months ago
📄 <u>README.md</u>	Merge pull request #991 from alan-turing-institute/all-contributors/a...	5 days ago
📄 <u>book_skeleton.md</u>	Update book_skeleton.md	13 months ago
📄 <u>contributors.md</u>	Add myself to contributors.md	11 months ago
📄 <u>tips_and_tricks_survey.md</u>	Update tips_and_tricks_survey.md	14 months ago
📄 <u>ways_of_working.md</u>	Adjust team contact section	5 months ago



**GitHub:**  
<https://github.com/alan-turing-institute/the-turing-way>



# Equity through documentation

## Chapter proposal: Open Infrastructure #2337

[Open](#) 13 tasks [loleg](#) opened this issue on 28 Apr · 13 comments · May be fixed by #2407

[Edit](#) [New Issue](#)

**loleg** commented on 28 Apr · edited · Contributor

There is an interest to branch our communities by developing a chapter for **Open Infrastructures** for research. This chapter would set the context and provide a vision for how to evaluate tools and platforms with a Turing Way perspective on reproducibility, ethical alternatives and collaboration in practice.

We should start by defining "open infrastructure", e.g. as a term that encompasses a wide range of practices for providing and decentralising access to resources and knowledge that is essential to sustain online research and other forms of digital collaboration. The chapter should contrast cloud computing or infrastructure-as-a-service with under-the-desk hardware, address some of the risks of bringing your own device to reproducibility, provide some tips about negotiating and partnering with the IT departments of your institute or institution, and most importantly explain how to properly evaluate and document the infrastructure of a scientific effort.

### Context

There have been a number of discussions of the term in this project already, notably in the context of [Binder project](#), and most recently in a call with [@aleesteel](#) at a [Frictionless Data](#) meetup organised by [@sapetti9](#).

Some relevant content already exists in the [Guide for Reproducible Research](#) (where this chapter would seem to most likely fit), the [Guide for Collaboration](#) (notably in the coverage of GitHub as an open platform, and shared ownership of open source projects), and [Research Infrastructure Roles](#) (mentioning the architectural and engineering work involved).

Working across various levels of abstraction - from programming languages and package landscapes of R, Python, Julia, to standards focused groups like the ones behind [Data Packages](#) - to more specific projects like [Jupyter](#), [LivenessMark](#) or [Docker](#), we can appreciate how critical guidance on solid principles of infrastructure (software / hardware / cloud) can be to open research projects and open data publication. Let us start a [Discussion](#), schedule a call, and go from there.

### Resources

- Tools, practices and systems group at Alan Turing Institute
- Reproducible Computational Environments Using Containers (Carpentries)
- Bring Your Own Device (privacyrights.org) debate
- Open Textbook covers issues in the business world
- <https://ethical.net/> + <https://alternativeto.net/> + <https://www.openhub.net/> +++

### Who can help?

- [@loleg](#) - software engineering background with some science lab support experience, plus I know a few things about what it takes to write a good handbook - this would be my first contribution to the Turing Way, and I would be happy to spend a bit of time to brainstorm, research and collaborate on this with you folks here;

### Updates

- Write chapter outline
- Add material to the chapter
- Combine materials into a readable chapter
- Proofread
- Request reviews
- Address reviews
- Merge to main branch.
- Add to Wikipedia

**Assignees**  
No one—assign yourself

**Labels**  
[Idea-for-discussion](#)

**Projects**  
[The Turing Way Project Management](#)  
Status: Chapters -

**Milestone**  
No milestone


**Development**  
Successfully merging a pull request may close this issue.

[\[WIP\] Write Open Infrastructure chapter](#)  
JimCircadian/the-turing-way

**Notifications** [Customize](#)  
[Unsubscribe](#)  
You're receiving notifications because you're watching this repository.

**5 participants**

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[Convert to discussion](#)  
[Delete issue](#)



## The Turing Way

Search this book...

Welcome

- Guide for Reproducible Research
- Guide for Project Design
- Guide for Communication
- Guide for Collaboration
- Guide for Ethical Research
- Community Handbook**
- Code of Conduct
- Style Guide
- Maintaining Consistency
- Contributing and Developing
- Chapters - Templates and Workflow
- Acknowledging Contributors
- Monthly Newsletters

## Community Handbook


*This is a community handbook that discusses aspects of The Turing Way project that one can use for participating in this community.*

*The Turing Way* is a community-led book project that involves diverse perspectives of researchers, funders, educators, learners and various stakeholders from around the world.

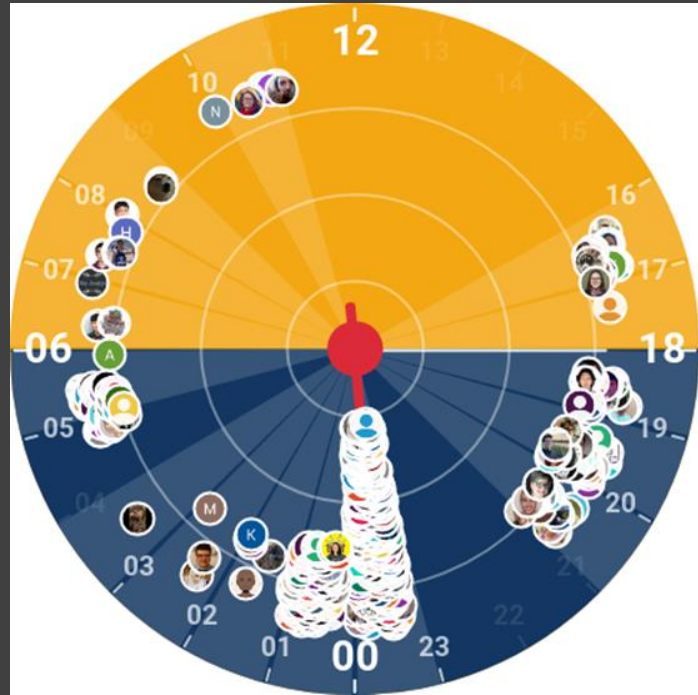
The Community Handbook part of this book aims to provide information about the project, ways of working, and other aspects that can make community participation equitable for our members.

We are incredibly grateful to our community members who are the readers, co-authors, contributors, collaborators, maintainers, helper and supporters.

Thank you for joining the incredible journey of *The Turing Way!*



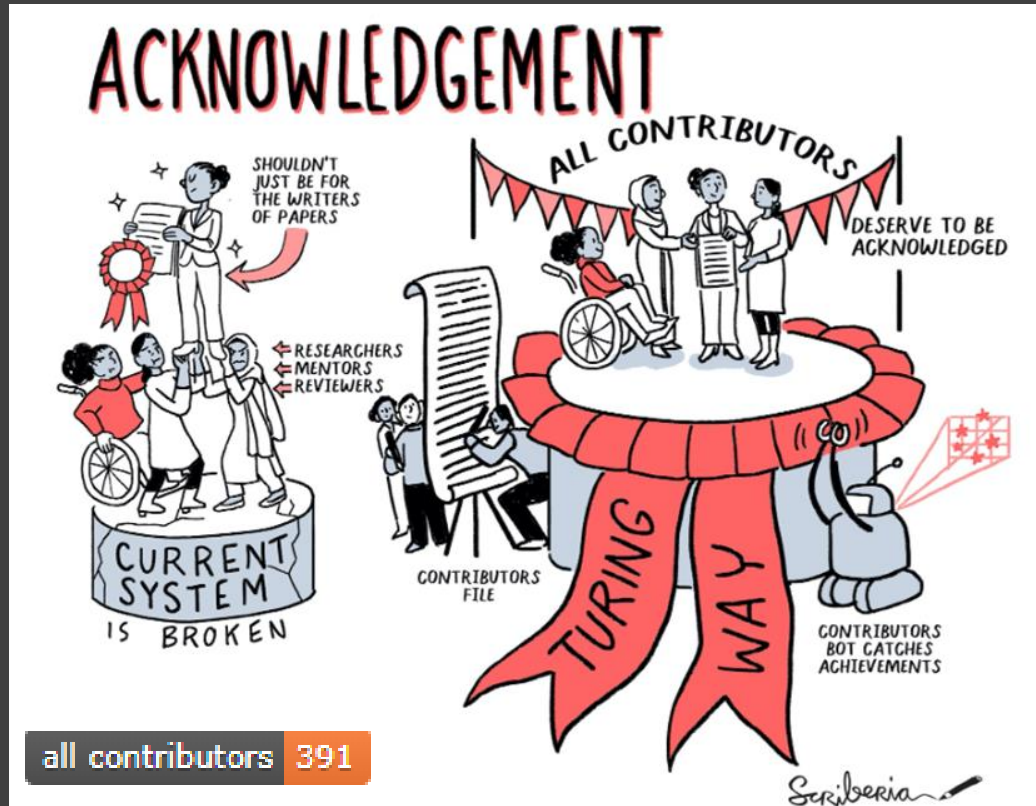
# Equity through translation



all contributors 391

Camila Rangel-Smith ( <a href="#">crangelsmith</a> )	Senior Research Data Scientist, The Alan Turing Institute	The Turing Way Translation and Localisation Co-Lead
Batool Almarzouq ( <a href="#">BatoolMM</a> )	Postdoctoral Researcher, KAIMRC and Honorary Research Fellow, The University of Liverpool	The Turing Way Translation and Localisation Co-Lead
Alejandro Coca Castro ( <a href="#">acocac</a> )	Postdoctoral Research Associate, The Alan Turing Institute	The Turing Way Translation and Localisation Co-Lead
Andrea Sánchez-Tapia ( <a href="#">AndreaSanchezTapia</a> )	Independent researcher	The Turing Way Translation and Localisation Co-Lead

# Equity through recognition



## Record of Contributions

Personal Highlights from *The Turing Way* Contributors

### A

#### Achintya Rao

Alejandro Coca

Alexander Morley

Andrea Sanchez Tapia

Andreea Avramescu

Ankur Kumar

Anna Krystalli

Arielle Bennett

## Collaborating Organisations and Projects

Delft University of Technology - Faculty of Applied Sciences

Netherlands eScience Center

FAIR Cookbook

Open Life Science

Remote Computational Project Resource

Cite as: *The Turing Way Community*. (2021). *The Turing Way: A handbook for reproducible, ethical and collaborative research* (1.0.1). Zenodo. <https://doi.org/10.5281/zenodo.5671094>

# Pathways for collaboration



Diverse Perspectives



Combined Efforts



Equitable Participation



Open Recognition



Co-Creation



# Opportunities for connections

[bit.ly/turingway](https://bit.ly/turingway)

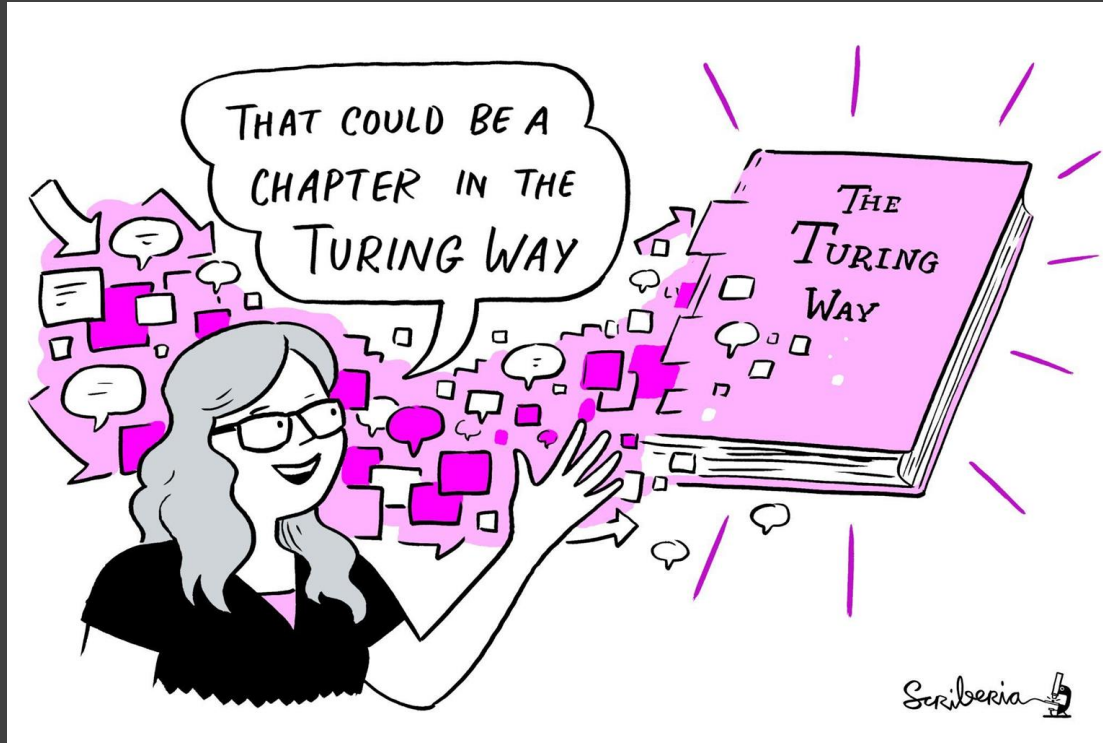


Collaboration Cafes and  
weekly coworking



Book Dash Events (in-  
person & virtual)

# Contributing to *The Turing Way*



You just need  
an idea and  
then have a  
discussion!

# Contributing to *The Turing Way*

## Questions:

- What open research practices can you implement in your work?
- Who should be a part of this process?
- Who holds the power to make this happen?

1. Personal reflection (5 mins)
2. Group discussion (15/20 mins)
3. Share out to whole group (10 mins)

# Collecting contributions


Please do capture your personal reflections and group discussion on post it notes.



We will add your notes to our issue.

Or GitHub issue:

<https://github.com/alan-turing-institute/the-turing-way/issues/2743>

## Research for Genomic Equity Conference discussion #2743

 Open EKaroune opened this issue 3 minutes ago · 0 comments

 EKaroune commented 3 minutes ago Member 

**Summary:**  
At the Research for Genomic Equity Conference, *The Turing Way* will present a workshop under the title "Increasing equity through Open Research" on the 20 October 2022.

The Turing Way is an open-source community-driven guide to reproducible, ethical, inclusive and collaborative data science. It consists of five guides on different aspects Data Science, including the Guide for Collaboration.

We will capture here discussions from our workshop.

Discussion will be guided around the question of equitable research and its impact on research outcomes

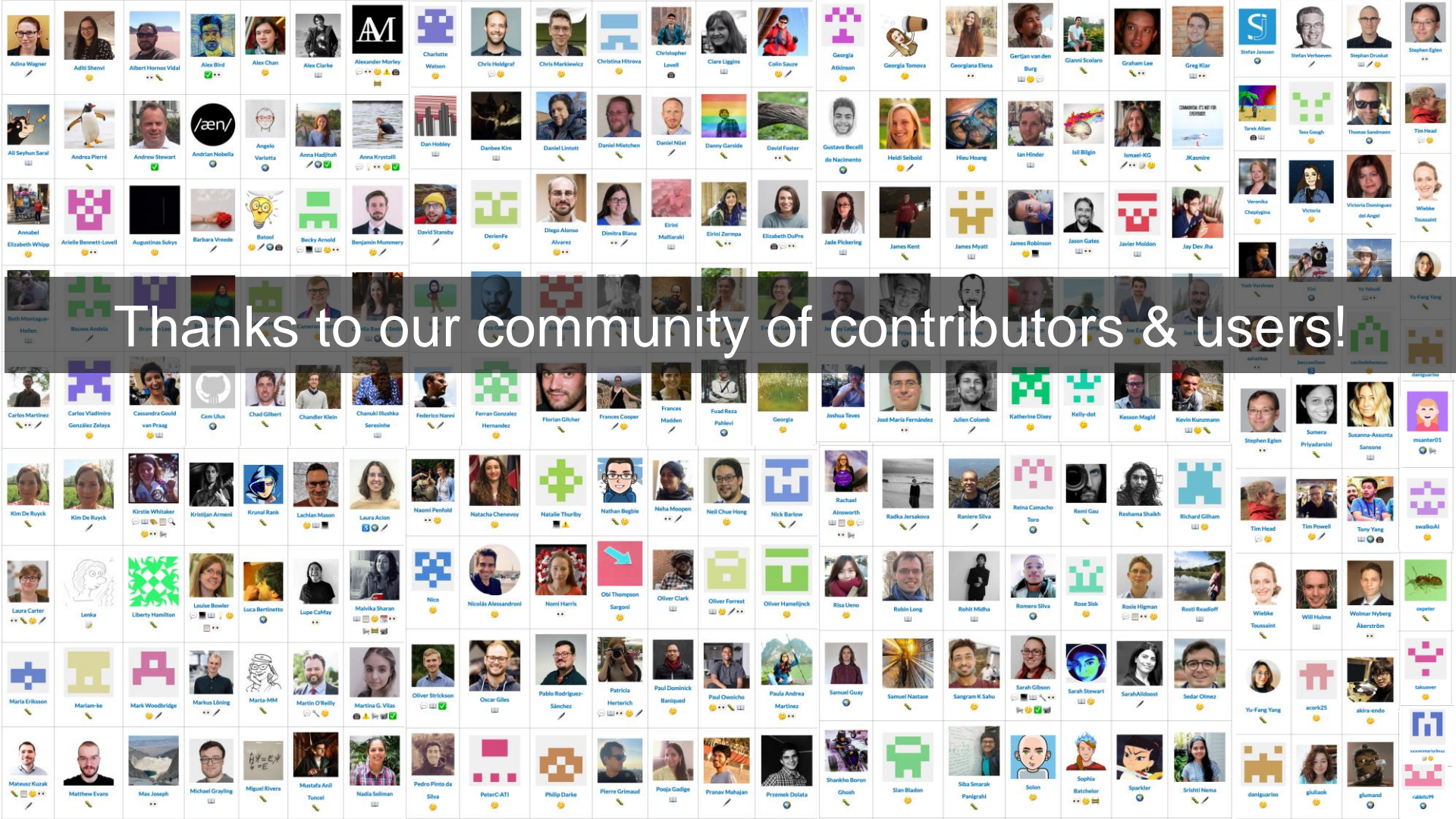
### Questions

**Contribution Guidelines:**  
Read the [Contribution guideline](#) and [Code of Conduct](#) of The Turing Way.

**Comment under this issue:**  
You can use this template to make your comment as useful as possible:

- Names of group members:
- Question:
- Details of discussion: <summary of main points of discussion, any conclusions you came to>
- Link:





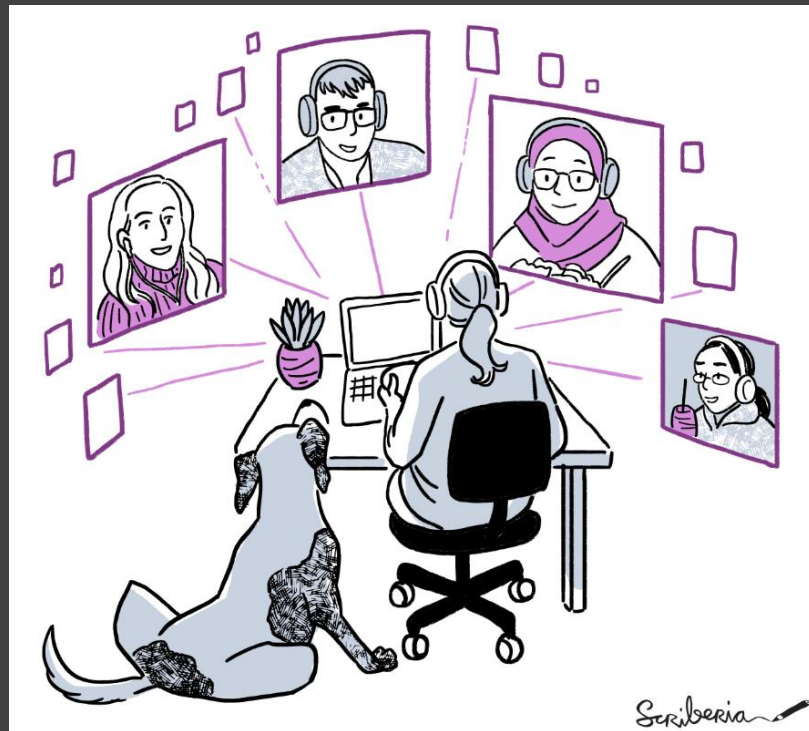
Thanks to our community of contributors & users!

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# Join a Community Event

- *Collaboration Cafes*
  - 1<sup>st</sup> & 3<sup>rd</sup> Wednesdays (14:00 - 16:00 UTC)
- *Coworking Calls*
  - Mondays (10:00 - 11:00 UTC)
- *Office Hours*
  - Fridays (10:00 - 12:00 UTC)
- *More ways to connect*

[bit.ly/turingway](https://bit.ly/turingway)



# Fireside Chat: Monthly Informal Events

***Coming soon:***  
**Citizen science and  
participatory research**

**20 October 2022  
4pm BST**

**[bit.ly/turingway](https://bit.ly/turingway)**



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# The Alan Turing Institute

## Acknowledgements:

- The Turing Way team, Kirstie Whitaker, Malvika Sharan, Anne Lee Steele
- *The Turing Way* community, contributors & collaborators

- Book: [the-turing-way.netlify.com](http://the-turing-way.netlify.com)
- Twitter: [twitter.com/turingway](https://twitter.com/turingway)
- Newsletter: [tinyletter.com/TuringWay](https://tinyletter.com/TuringWay)
- Chat: [gitter.im/alan-turing-institute/the-turing-way](https://gitter.im/alan-turing-institute/the-turing-way)
- GitHub: [github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)
- Original artwork by Scriberia: <https://doi.org/10.5281/zenodo.3332807>

