

# The Alan Turing Institute

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Open science for reproducible, ethical  
and collaborative research:  
Challenges and Opportunities

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[Abasiri@turing.ac.uk](mailto:Abasiri@turing.ac.uk), [ana.basiri@glasgow.ac.uk](mailto:ana.basiri@glasgow.ac.uk)

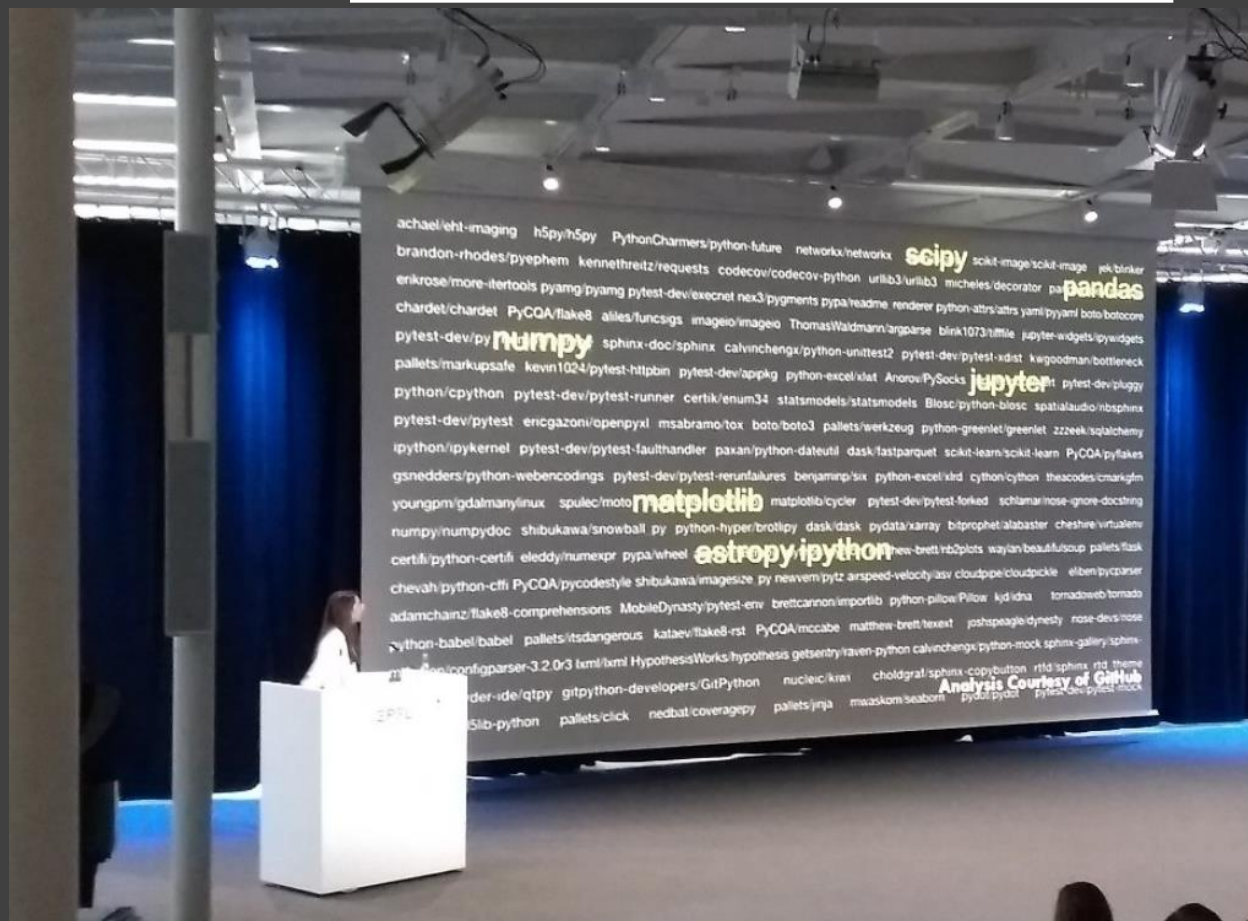






Liza Darrous 🍷 @LizaMGD · Oct 18, 2019

Thanks [#EPFLOpenScienceDay](#) for providing this prestigious opportunity to celebrate how [#OpenScience](#) helped realise this wonderful project. Katie Bouman told us how it was more than just a team of scientists, but also a team of packages & the people behind them that achieved this!



# Governing the Commons: Elinor Ostrom



Extensively researched communities and  
provided principles for how commons can  
be governed equitably and sustainably –  
debunking “Tragedy of the Commons”.

2009 Nobel Laureate  
(1933-2012)

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press. doi: 10.1017/CBO9780511807763, | Kenneth, J. A., Robert, O. K., & Simon, A. L. (2012). Elinor Ostrom: An uncommon woman for the commons. *PNAS*, 109(33), 13135–13136. doi: 10.1073/pnas.1210827109

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# Knowledge Commons

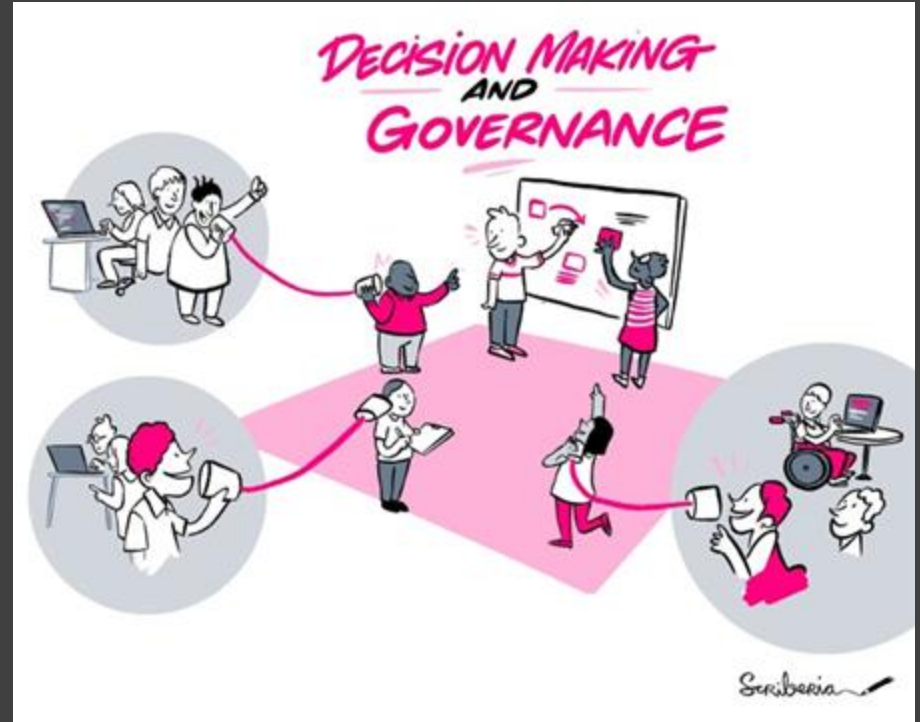
*Information, data, and content that is collectively owned and managed by a community of users - without depleting their quantity or quality.*

- To whom does knowledge/privilege belong?
- Who benefits from the production and circulation of knowledge?
- Who gets to participate in the knowledge production processes?
- In what ways can systems be used to increase the agency of more people over knowledge production, circulation and benefits?



# Collective benefits

**Digital Commons** include free and open source software, open access journals, community-led projects and platforms — part of **Open Science**.



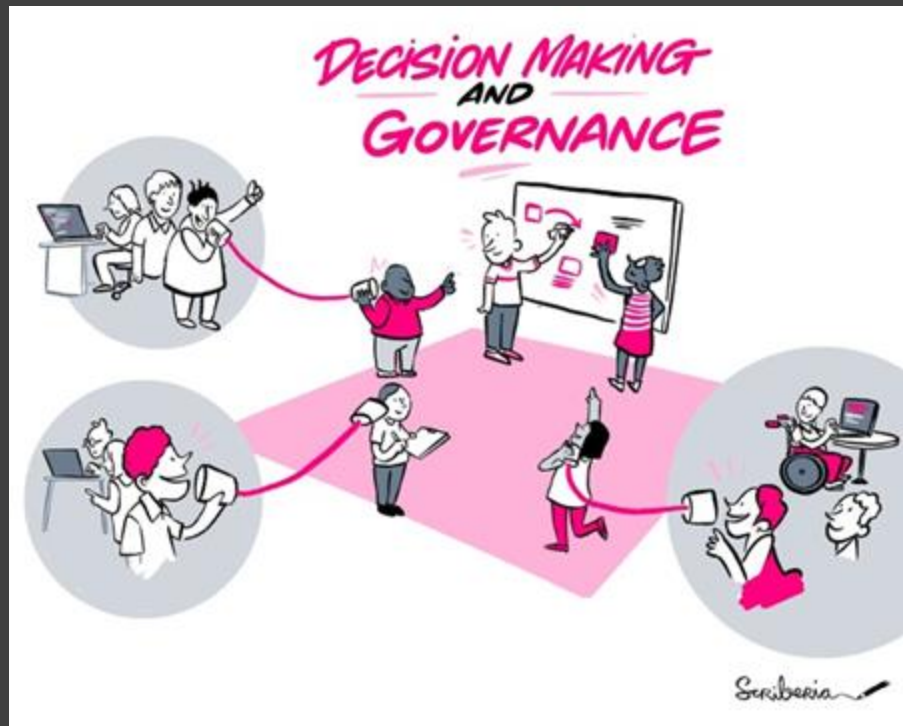
Digital commons | David Bollier. Retrieved from <http://www.bollier.org/category/tags/digital-commons>

@malvikasharan, @turingway, Image by Scriberia for The Turing Way , CC-BY 4.0, Zenodo: <https://zenodo.org/record/7716933>

# Collective benefits

*You already know and practice openness.*

**Open Science** as a common language merely validates what others may consider marginal or inconsequential.



# Open Science

Everyone can **freely access, reuse, reproduce, build upon and distribute** research objects.



Kelly, Anthony, "With Head, Heart and Hand: Dimensions of Community Building" (Boolarong Press) ISBN 978-0-86439-076-9,  
Wenger, McDermott, Snyder, A Guide to Managing Knowledge: Cultivating Communities of Practice. HBS (2002)  
@malvikasharan, @turingway, Image by Scriberia for The Turing Way , CC-BY 4.0, Zenodo: <https://zenodo.org/record/7716933>

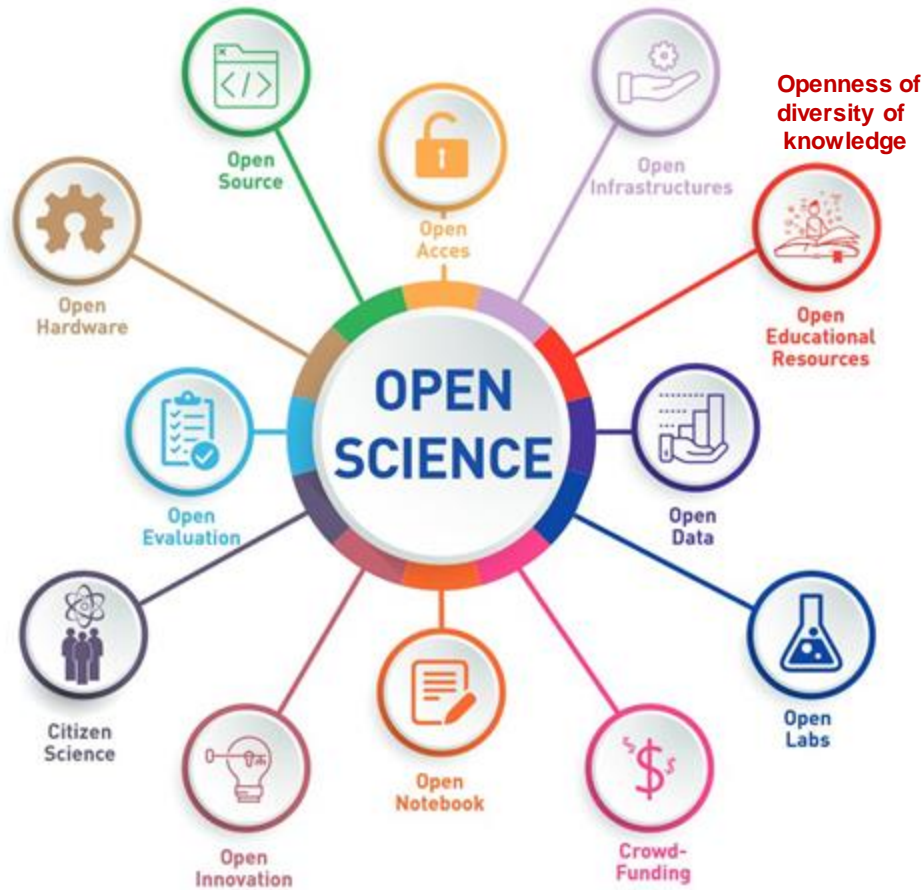


# Open Science

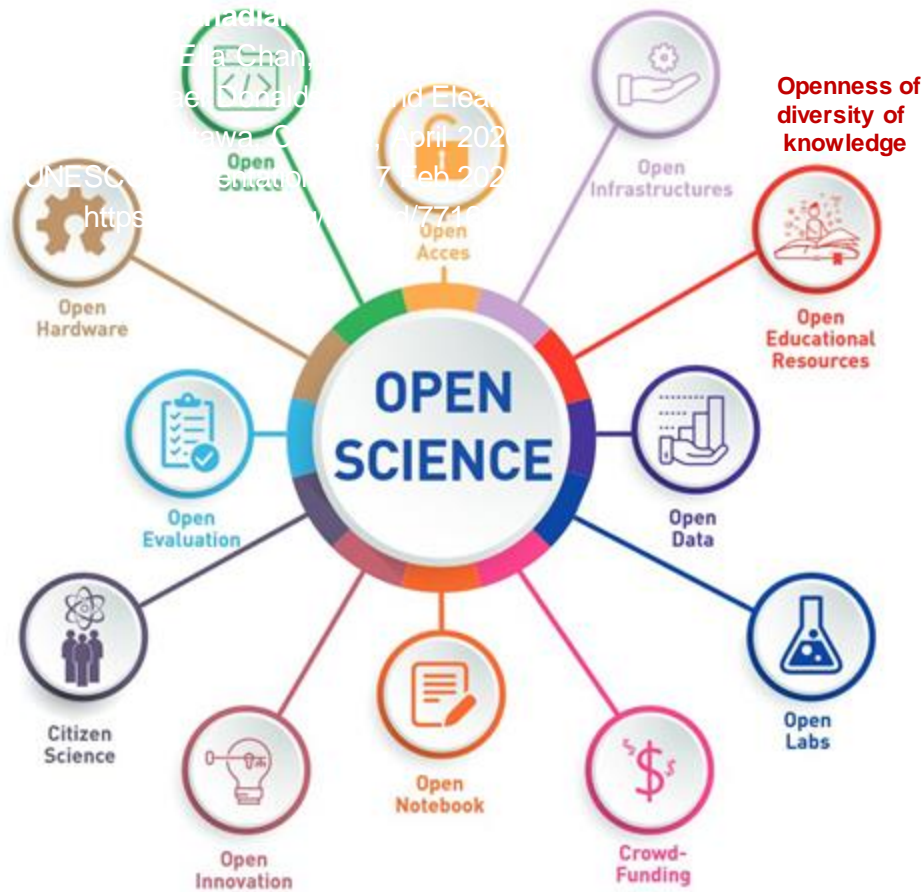
Everyone can **freely access, reuse, reproduce, build upon and distribute** research objects.

Community framework for **collaboration, peer production and sustainability.**





*UNESCO regards science as a human right -- the greatest collective endeavour -- that has significant value as a common good.*



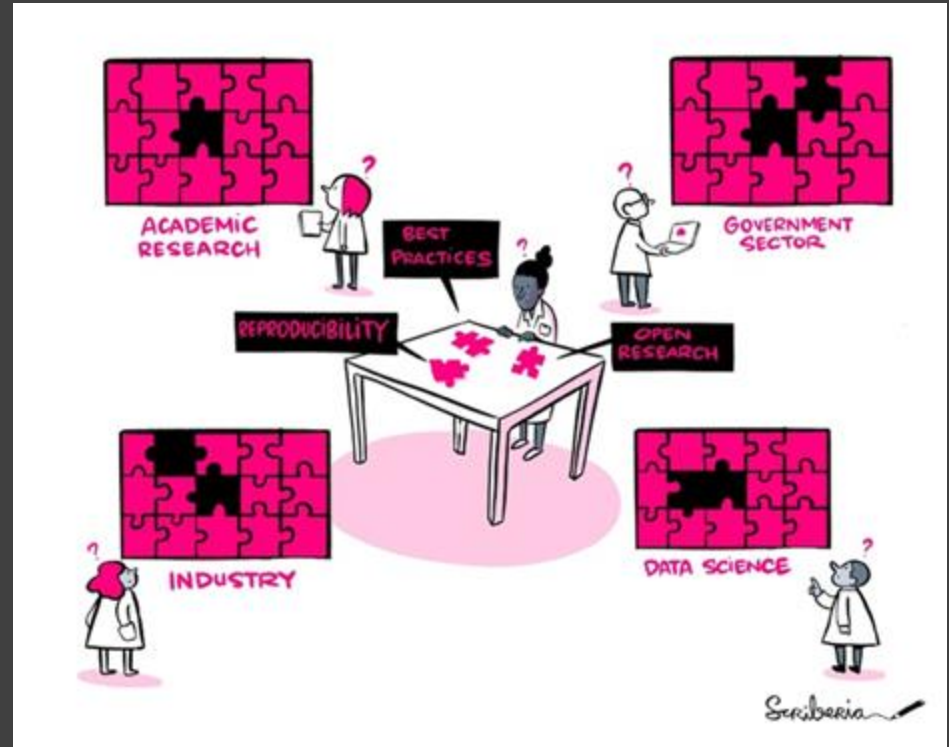
*UNESCO regards science as a human right -- the greatest collective endeavour -- that has significant value as a common good.*

... aims to turn right to Open Science into duty to be exercised by researchers, institutions, educators, publishers, employers, libraries, and policymakers, facilitated by Member States.

# Integrating open science

Open Science means different things in different contexts, and hence, there is no fixed “best practice”.

Many barriers to openness.



# The Turing Way

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An Open Science and community lead guide on Data Science.

We involve and support a **diverse community** to make research **reproducible, ethical, and collaborative** for everyone.





# The Alan Turing Institute

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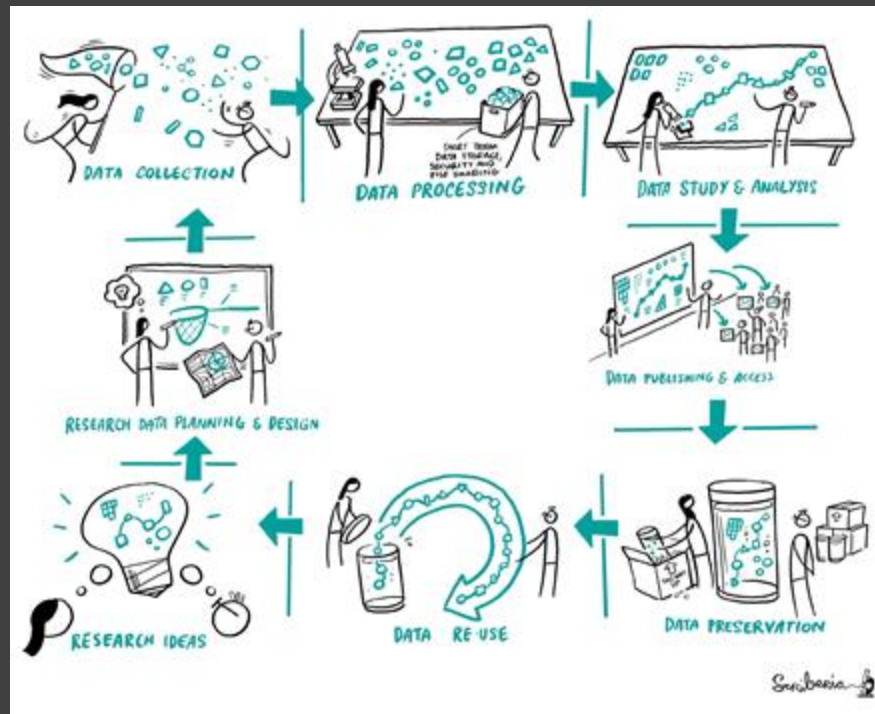
## *The Turing Way:*

A guide to reproducible, ethical and  
inclusive data science



*“too easy not to do”*

An **Open Source community-driven** (different skills and backgrounds) guide to reproducible, ethical and inclusive data science that is **beneficial for everyone**.



## Acknowledgements:

- Kirstie Whitaker, Project Lead
- Malvika Sharan, Community Manager
- *The Turing Way* community, friends & collaborators

The  
Alan Turing  
Institute



## Useful links:

- Book: [the-turing-way.netlify.com](https://the-turing-way.netlify.com)
- Twitter: [twitter.com/turingway](https://twitter.com/turingway)
- Newsletter: [tinyletter.com/TuringWay](https://tinyletter.com/TuringWay)
- GitHub: [github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)
- Slack: <https://tinyurl.com/jointuringwayslack>
- Artwork by Scriberia: <https://doi.org/10.5281/zenodo.3332808>



# The Alan Turing Institute

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The national institute  
for data science and  
artificial intelligence



# Challenges

Advance data science and artificial intelligence to...





## Tools, Practices and Systems

- Trustworthy systems
- Transparent reporting
- Inclusive interoperable design
- Ethical integrity
- Respectful co-creation
- Leadership in open research



# The Turing Way: Book on Reproducibility



Kirstie Whitaker

Director: Tools,  
Practices & Systems  
Programme (TPS)

*“We need to share the responsibility for open and reproducible science.*

*That along with good collaboration, communication and ethics should be seen as fundamental scientific methods.”*

*The Turing Way* is a lightly opinionated guide to reproducible data science.

Our goal is to provide all the information that researchers need at the start of their projects to ensure that they are easy to reproduce at the end.

This also means making sure PhD students, postdocs, PIs, and funding teams know which parts of the “responsibility of reproducibility” they can affect, and what they should do to nudge data science to being more efficient, effective, and understandable.

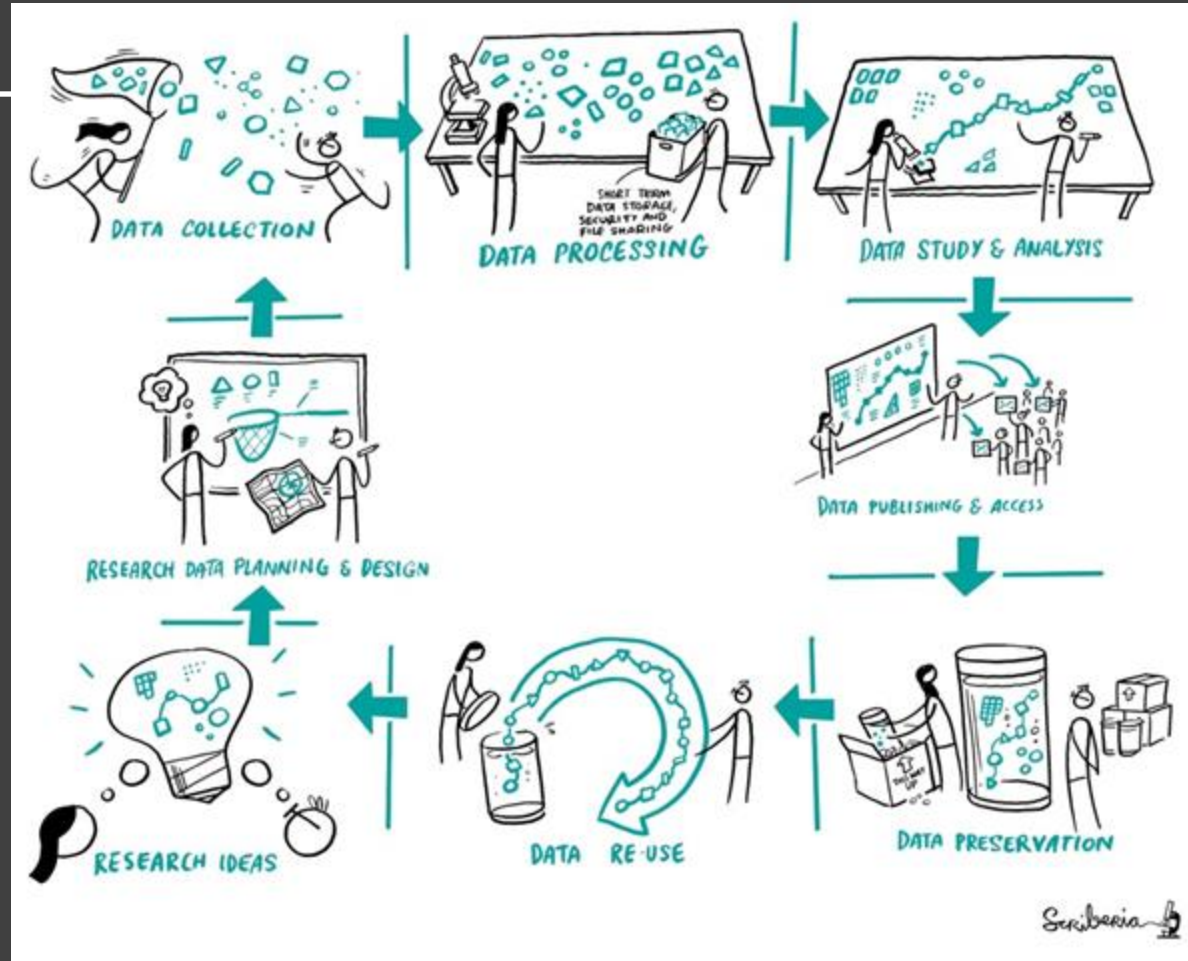


# Reproducibility

		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable

# Reproducibility

		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable



^



licence. DOI: [10.5281/zenodo.3332807](https://doi.org/10.5281/zenodo.3332807).



# The Turing Way Guides



*Reproducibility*



*Project Design*



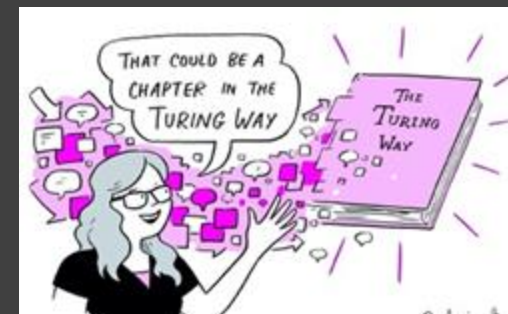
*Communication*



*Collaboration*



*Ethical Research*

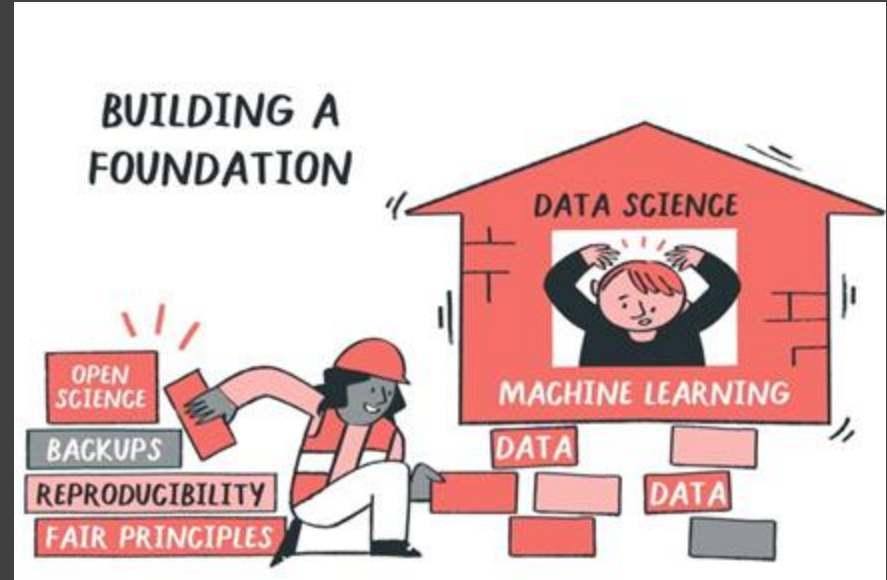


*Community Handbook*

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## Foundational skill-set

Purpose of openness is to ensure **scientific integrity and quality outcomes**, achieved by applying **reproducible, ethical, collaborative and inclusive** research practices.



# Guide for Communication



Overview of Guide for Communication

Open Scholarship

Blogs for Research

Communication

Social Media for Research Communications

Making Research Objects Citable

Publishing Different Article Types

Communications in Open Source Projects

Authorship and Contributions on Academic Articles

Peer Review

# Guide for Collaboration

Getting Started With GitHub

Maintainers and Reviewers  
on GitHub

Managing a New  
Community and Team

Leadership in Data Science

Research Infrastructure  
Roles

Remote Collaboration

Shared Ownership in Open  
Source Projects



# Guide for Ethical Research

Introduction to Research

Ethics

Research Ethics Committees

Workflows

Ethical Decisions in

Preclinical Research

Law, Policy and Human

Rights in Ethics

Activism for Researchers

Internal Policy Advocacy

Self-Reflection





# Guide for Project Design

## Overview of Project Design

Planning for Project Design

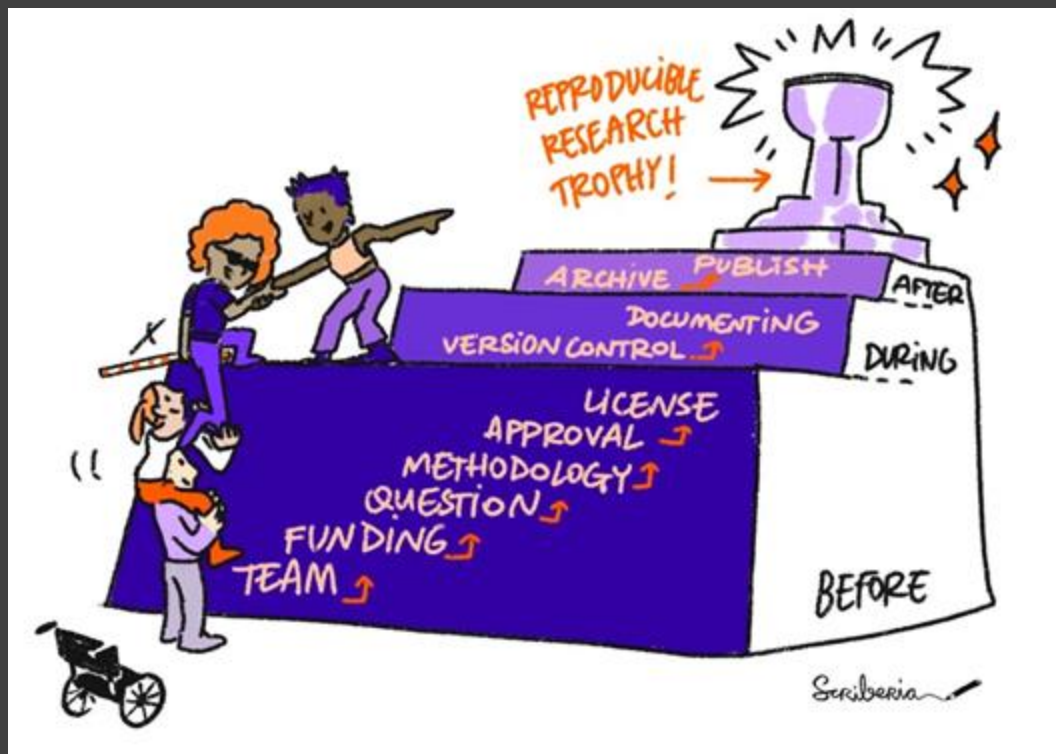
Communication and  
Collaboration

Reproducibility Methods

Version Control and  
Documentation

Sharing Your Research  
Work

Creating Project Repositories





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

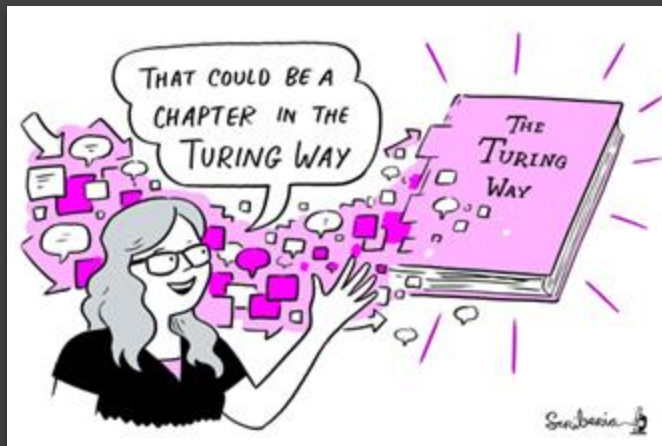
**GitHub:**  
[github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)

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

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

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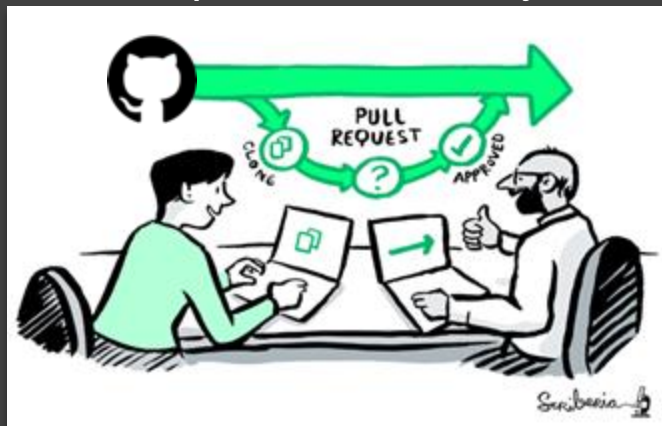
## A Book



## A Community



## An Open Source Project



## A Culture of Collaboration





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

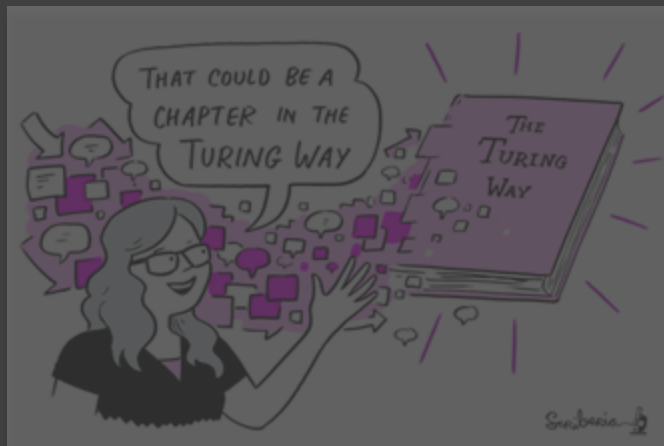
**GitHub:**  
[github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)

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

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

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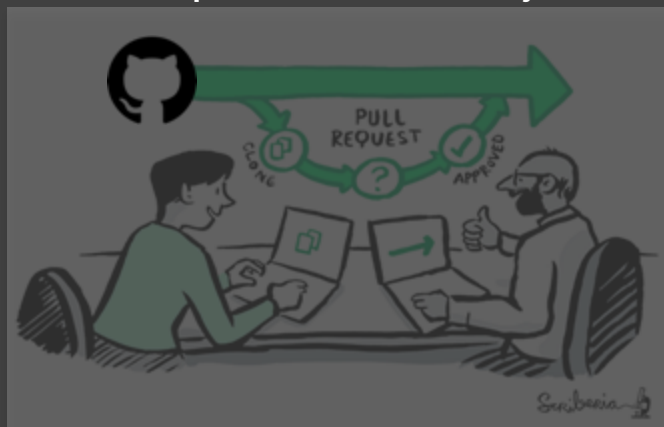
## A Book



## A Community



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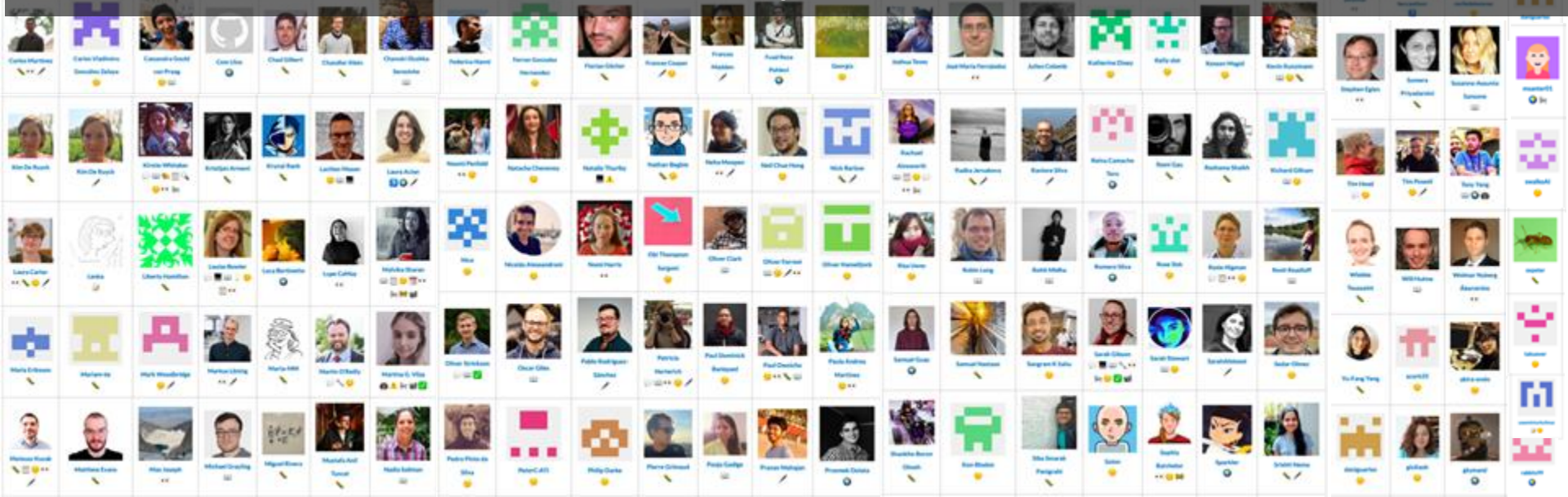
## A Culture of Collaboration







Thanks to our community of contributors & users!



<a href="#">.github</a>	Remove prettier configuration
<a href="#">book</a>	minor update
<a href="#">communications</a>	Fix typos
<a href="#">conferences</a>	Add KW formatting pedantry
<a href="#">project_management</a>	Update online-collaboration-cafe.md
<a href="#">templates</a>	Updating Github templates
<a href="#">tests</a>	Add "et cetera" as a deprecated Latinism
<a href="#">workshops</a>	Remove mis-pasted text

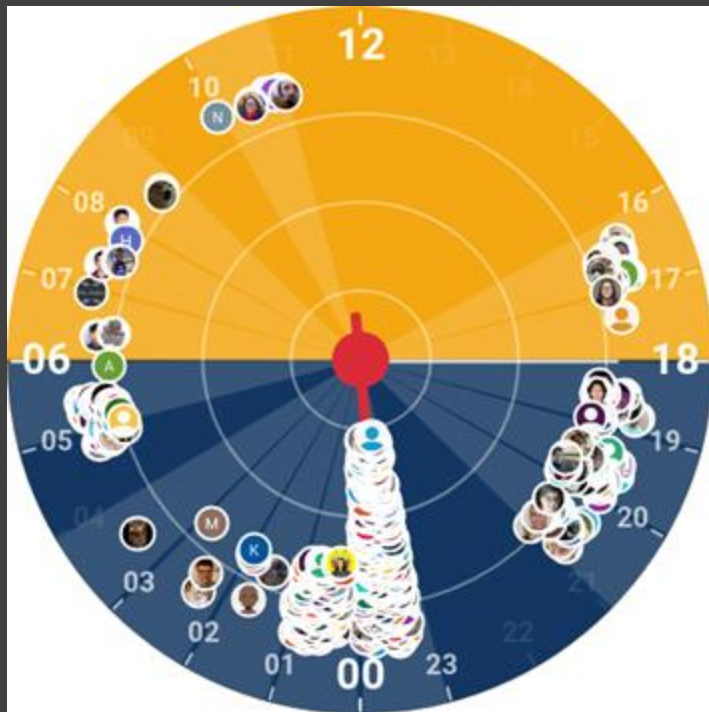
<a href="#">.all-contributorsrc</a>	Merge pull request #991 from alan-turing-institute/all-contributors/a...	5 days ago
<a href="#">.gitignore</a>	ignore pptx in workshop folder	9 months ago
<a href="#">.travis.yml</a>	add html-proof file again	last month
<a href="#">CODE_OF_CONDUCT.md</a>	her -> their	6 months ago
<a href="#">CONTRIBUTING.md</a>	Update CONTRIBUTING.md	2 months ago
<a href="#">GOVERNANCE.md</a>	Read through months later	5 months ago
<a href="#">LICENSE.md</a>	Fix typo in licence	2 months ago
<a href="#">README.md</a>	Merge pull request #991 from alan-turing-institute/all-contributors/a...	5 days ago
<a href="#">book_skeleton.md</a>	Update book_skeleton.md	13 months ago
<a href="#">contributors.md</a>	Add myself to contributors.md	11 months ago
<a href="#">tips_and_tricks_survey.md</a>	Update tips_and_tricks_survey.md	14 months ago
<a href="#">ways_of_working.md</a>	Adjust team contact section	5 months ago



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

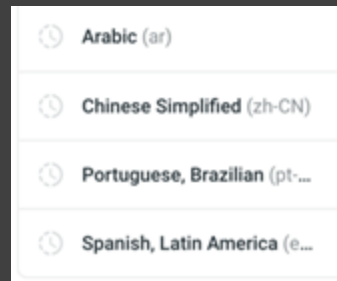
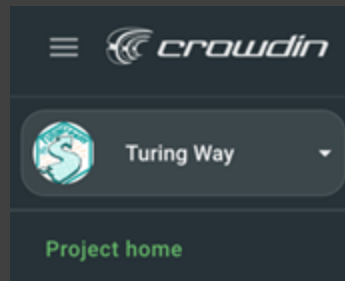


# Global community: translation & contextualisation

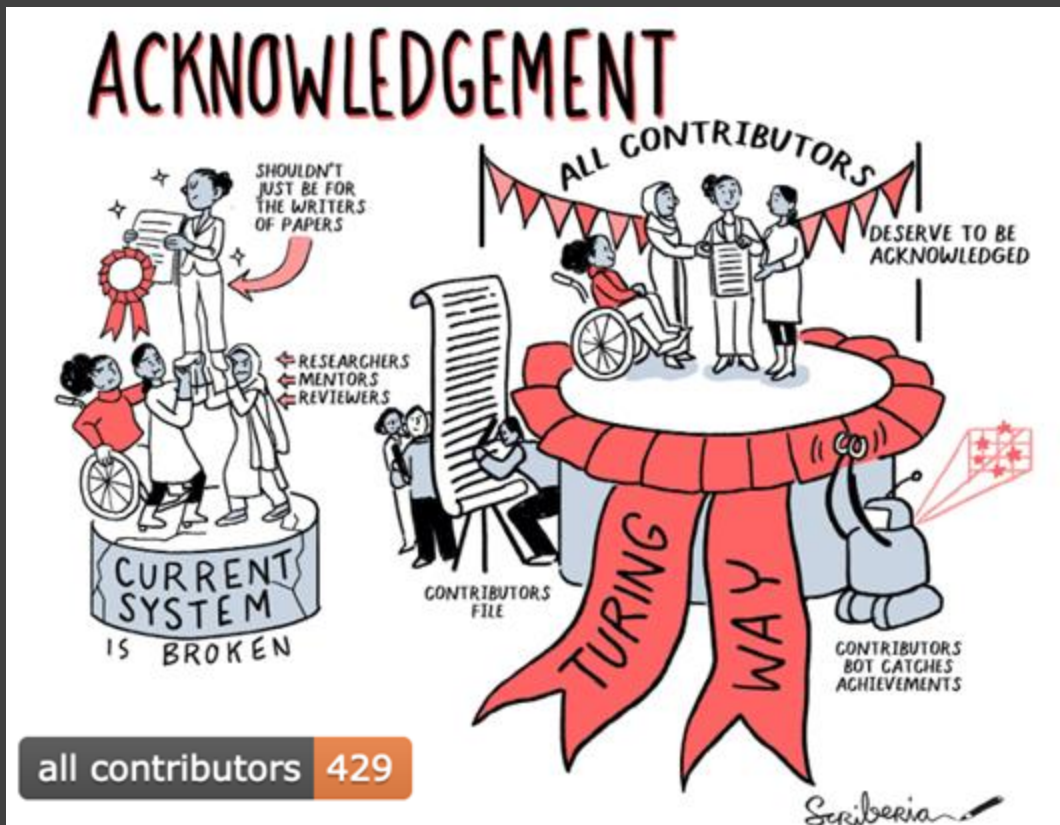


all contributors 429

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



# Recognition for all Contributors



Afterword

Glossary

Bibliography

Contributors Record



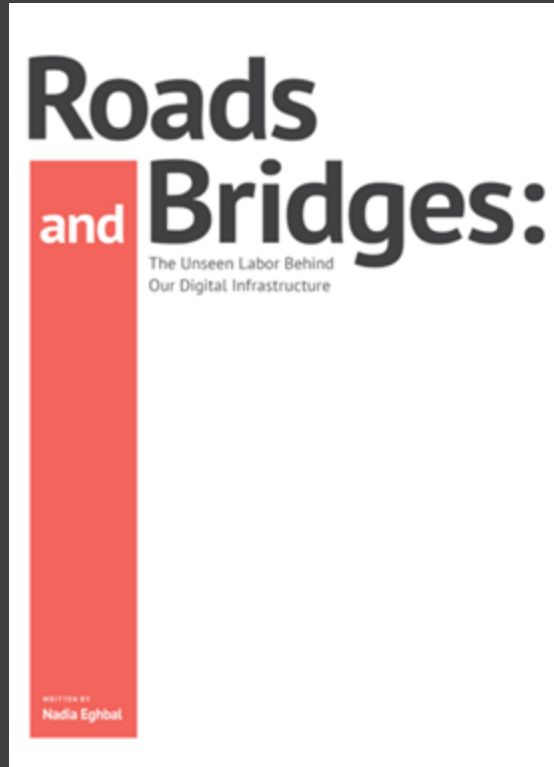
All Contributors

**Recognize All Contributors**

Including those that don't push code

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>

# Inclusion & recognition



## Practices Panel

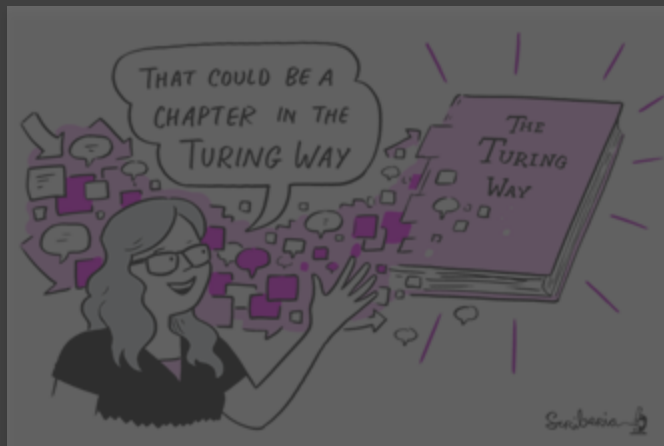
Highly commended:  
*The Turing Way*, The  
Alan Turing Institute



Diverse Economy Iceberg - 2017, D'Ignazio, C., & Klein, L. (2020). 7. Show Your Work. PubPub.  
<https://data-feminism.mitpress.mit.edu/pub/0vgzaln4/release/3>, Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure.  
<https://hidden-ref.org/hidden-ref-award-ceremony/>,



## A Book



## A Community



### 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)

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### Email:

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

## An Open Source Project

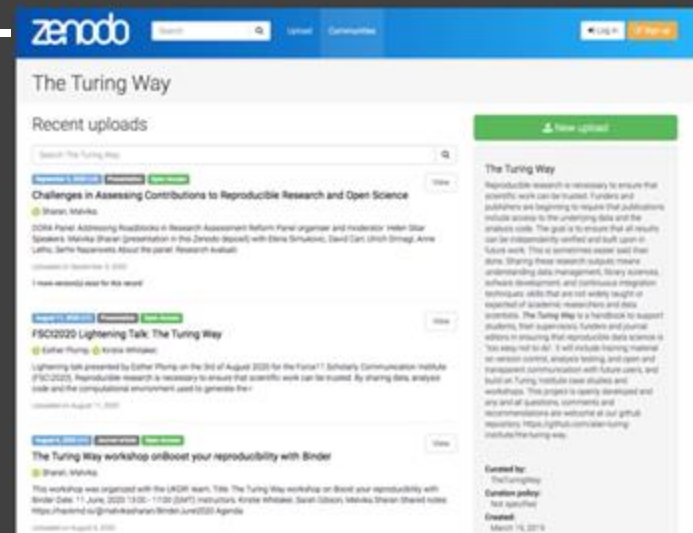


## A Culture of Collaboration



# An open source project

- Everyone can freely read, reuse, distribute, modify and help develop.
- The project belongs to *The Turing Way* community.
- Built on open source infrastructure:
  - Git, Jupyter Book, Binder, project bots etc.
  - Nelfy: the-turing-way.[netlify](https://zenodo.org/communities/the-turing-way).app/welcome





# Project Growth & Recognitions

- **4+ years, >260 Chapters**, community resources
- **425+ contributors, 3500+ monthly users** - supported by 20+ core members (governance)
- **Replication/extension** by 3 Turing & 6+ external projects (e.g. ONS, UCL, Uni Oxford, LIBER: Association of European Research Libraries)



# Qualitative/notable impacts

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Resources are being used by **learners, educators, community builders, policy makers and researchers** globally

- **NASA - Transform to Open Science** - 5 years Mission for capacity building
- Recommended in **Goldacre Review for modern open working** into health data
- NASA OpenCore, CodeRefinery, Library Carpentries training materials
- Reproducibility of scientific results in the EU 2020 report
- An Emerging Technology Charter by **Mayor of London (2021 policy)**
- Innovation Scholars: **UKRI grant 2020** (funding call)
- Cited by 40+ peer-reviewed articles & 100+ online publications



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

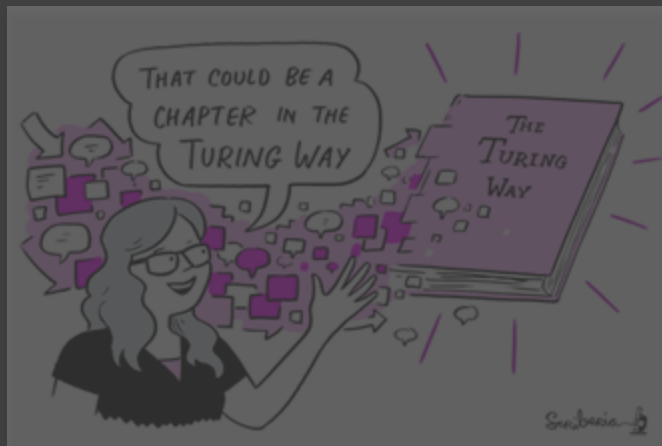
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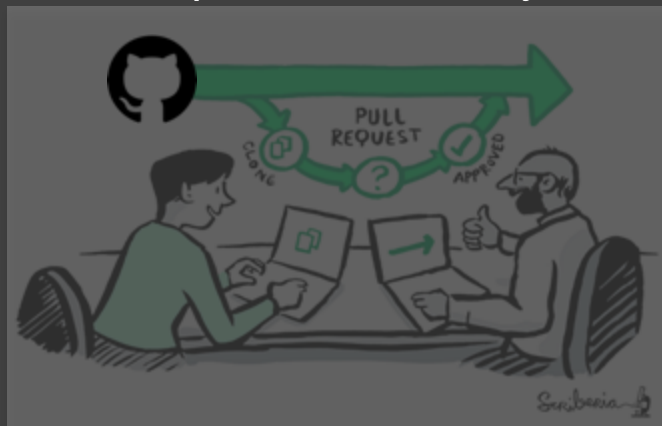
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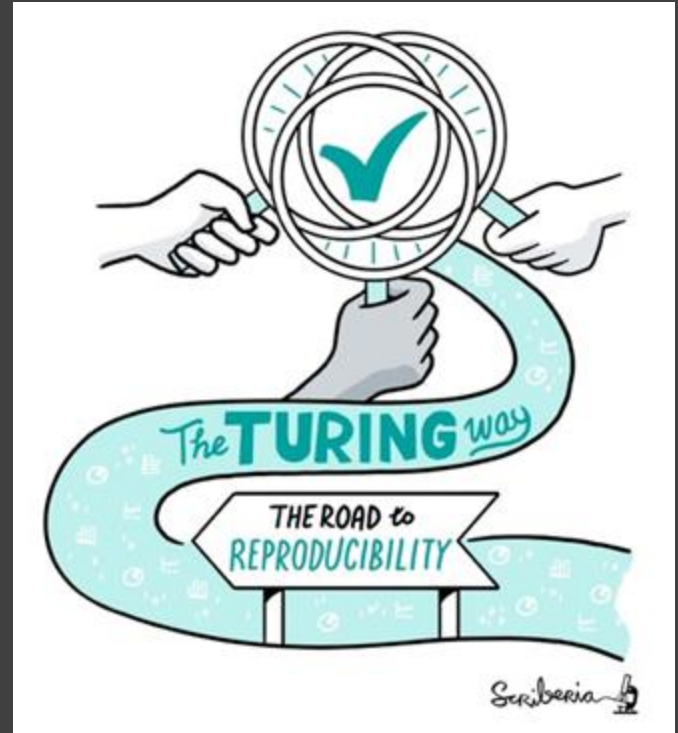
## A Culture of Collaboration



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## A note on the name

- This is **not** a Turing project (although it has great support from the Institute)
- We are creating guidance together, **the way** is a journey not a set of rules



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## Community Building

Open is by default not:

- Inclusive
- Accessible
- Community-led

**Intentional designing**





# Pathways for collaboration



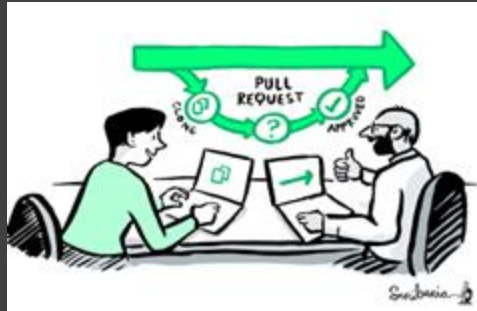
*Diverse Perspectives*



*Combined Efforts*



*Equitable Participation*



*Open Recognition*



*Co-Creation*

## Research Infrastructure Roles ^

Community Managers

Overview

Data Stewards Overview

Data Steward Personal Story

Data Wrangler Overview

Research Software Engineers  
Overview

Research Software  
Engineering Personal Story

Research Application  
Manager Overview

Research Infrastructure  
Developer Overview

Remote Collaboration ✓

Shared Ownership in Open  
Source Projects ✓

Guide for Ethical Research ✓

Community Handbook ✓

# Examples of Research Infrastructure Roles

This initial list of examples of Research Infrastructure Roles that has been expanded as part of *The Turing Way* Hackathon Workshop at the [Big Team Science conference 2022](#).

- Community manager
- Project manager
- Research software engineer
- Research application manager
- Programme manager
- Data steward
- Data wrangler
- Research infrastructure developer
- Partnerships development manager
- Grant application manager
- Community engagement lead
- Librarian
- Communications manager
- Events manager
- Participatory research manager



@malvikasharan, @turingway, <https://the-turing-way.netlify.app/collaboration/research-infrastructure-roles.html>,

CC-BY image by *The Turing Way* and Scriberia, Zenodo: <https://doi.org/10.5281/zenodo.3332807>. Presentation DOI: 10.5281/zenodo.7716933

# Opportunities for connections



*Co-working Calls & Collaboration Cafés*



*Biannual Book Dash Events*

# ***Book Dash Applications are open!***

**22 - 26 May 2023**

***London, UK***

***(and worldwide!)***

## **Apply to**

- Participate in a week-long event with *The Turing Way* community
- Meet other community members from around the world
- Join an ongoing project or team
- Host a local hub within your university, city or region



**Have any questions about the application process?**

- Email *The Turing Way* team: [theturingway@gmail.com](mailto:theturingway@gmail.com)
- Contact the Community Manager: Anne Lee Steele, [asteele@turing.ac.uk](mailto:asteele@turing.ac.uk)



# Reflect, Unlearn, Reframe: Community Care in times of digital burnout

31 March, 14:00 - 15:30 UTC – *Register on Eventbrite*



**Agnes Kiragga**  
Technical Lead  
African Population Health  
Research Council



**Chris Hartgerink**  
CEO & Founder  
Liberate Science



**Mayya Sundukova**  
Resident Fellow  
Open Life Science



**Patricia Herterich**  
Resident Fellow  
Open Life Science



**Eirini Zormpa**  
Community Manager  
AIM-RSF & The Turing Way






# The Turing Way Community Handbook

## Community Handbook

- Code of Conduct
- Ways to Enter the Project
- Style Guide
- Maintaining Consistency
- Chapter Templates and Contribution Workflow
- Acknowledging Contributors
- Monthly Newsletters
- Book Dash Events
- Community Coworking Calls
- Template Collection



# Environmental Data Science book or EDS




Environmental Data Science Book

Search this book...

- Welcome
- PREAMBLE
- About EDS book
- Audience
- Usage
- Citation and reuse
- Contribute
- GALLERY
  - Exploration
  - Preprocessing
  - Modelling

## Welcome

Environmental Data Science book or EDS book is a **living, open and community-driven** online resource to showcase and support the publication of data, research and open-source tools for collaborative, reproducible and transparent Environmental Data Science.



Reproducible, scalable, & shareable  
ENVIRONMENTAL DATA SCIENCE

*Fig. 1* Illustration by Scriberia as part of The Turing Way book dash in November 2021. Zenodo.  
<http://doi.org/10.5281/zenodo.5706310>



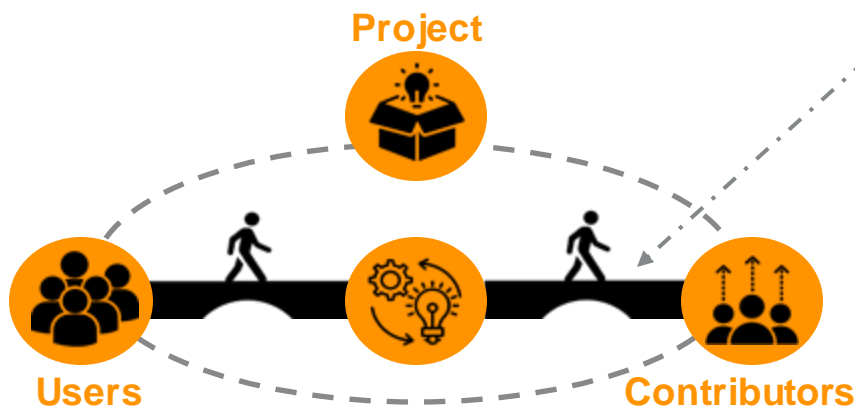
Alejandro Coca



Anne Fouilloux

*Jamila Mifdal, and Raquel Carmo. “Detecting floating objects using deep learning and Sentinel-2 imagery (Jupyter Notebook) published in the Environmental Data Science book.” ROHub. Jan, 2022.*

<https://w3id.org/ro-id/b34facfa-cea8-48f5-89f6-f11ce00812a9>.



Strategic and technical support for Stakeholder  
Engagement and Participation

## Community Management



### Researchers and collaborators



# Broader Recognition for Research Infrastructure Roles

- **The Turing Way Practitioners Hub**  
in close collaboration with orgs  
(government, industry, public  
sector)
- **The Turing's Skill Policy Award**  
for engaging with policy ecosystem -  
led by **Dr. Emma Karoune**



21-22 March  
QEII, London



The  
Alan Turing  
Institute

**CATAPULT**  
Digital



## Join my team! - Senior Research Associate

*Conduct community-based research with Practitioners Hub stakeholders leading to high-quality interdisciplinary cross-sector collaboration, and their communications openly.*

Deadline: 12 March

Salary: £51,025-£52,500 +  
benefits, Visa sponsorship is  
possible.





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# The Turing Way Events

- *Collaboration Cafes*
  - 1<sup>st</sup> & 3<sup>rd</sup> Wednesdays (14:00 UTC)
- *Coworking Calls*
  - Mondays (10:00 UTC)
- *Slack + more ways to connect!*

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

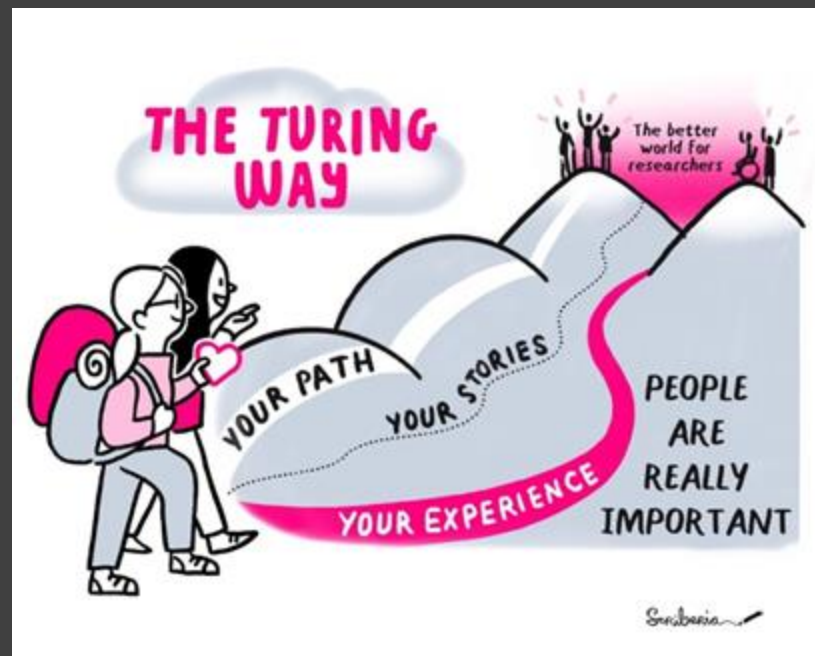


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## Meeting you where you are!

- i. Join the community
- ii. Learn a new skill
- iii. Share your skills
- iv. Collaborate with others
- v. Mentor others' contributions
- vi. Represent this community

*We value your participation!*



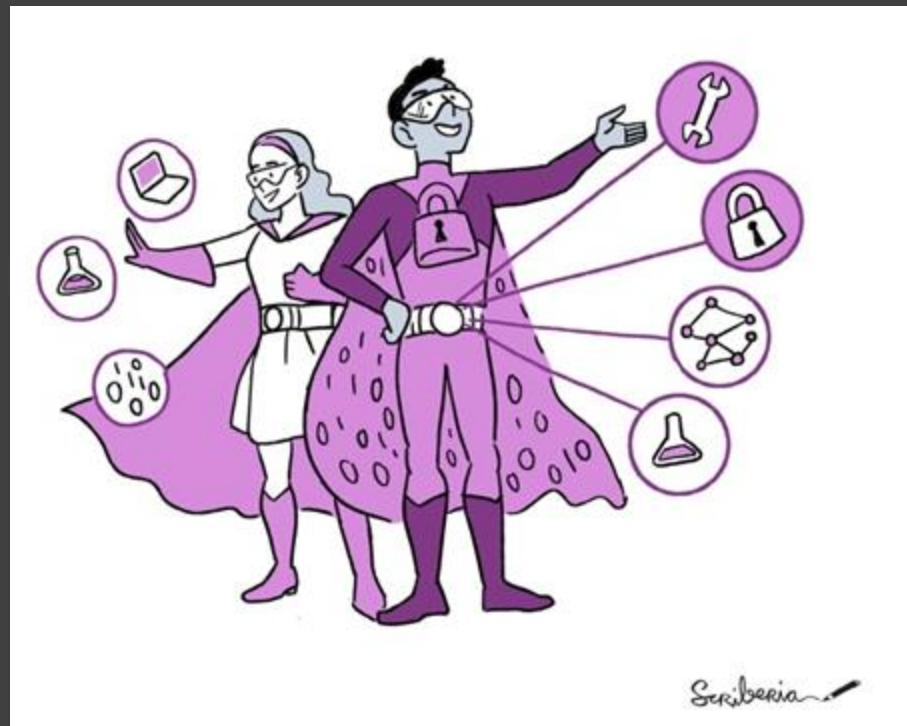
# What does open mean to You?

- Learning from the ‘**Commons**’
- Purpose is to ensure scientific integrity and quality outcomes:  
**The Turing Way**
- Hidden labour, collaborative process, **community practices**
- Building open science skills with a **global community**



# Reimagining Openness

Open Science is not a radical approach, but a **tool to learn, unlearn, challenge, dismantle and reimagine research infrastructure** that prioritises equitable participation, co-creation and culture change.



# Acknowledgements & Links

The  
Alan Turing  
Institute

## *The Turing Way* Community

- Kirstie Whitaker, Anne Lee Steele, Alexandra Araujo Alvarez + many Turing Way Core Team and Turing's TPS team members
- Book: [the-turing-way.netlify.com](https://the-turing-way.netlify.com), Twitter: [twitter.com/turingway](https://twitter.com/turingway)
- GitHub: [github.com/alan-turing-institute/the-turing-way](https://github.com/alan-turing-institute/the-turing-way)
- Useful links & opportunities are listed here: <https://bit.ly/turingway>



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