

The Alan Turing Institute

Turing Lunch & Learn

The Turing Way: Reproducible,
Inclusive, Collaborative Data Science

Anne Lee Steele
Community Manager, *The Turing Way*

Pronouns: she/her/hers

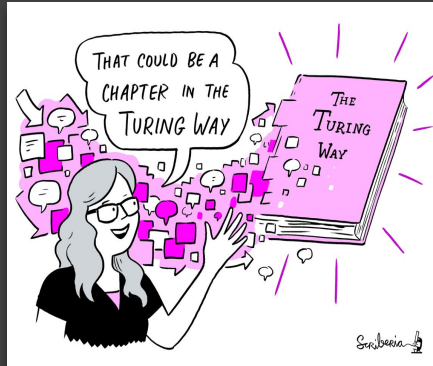


Turing Lunch & Learn

- What is *The Turing Way*?
- A brief history of ‘open’
- *The Turing Way*
 - 1) Founding
 - 2) Development & Growth
 - 3) Maintenance & Sustainability
- How you can get involved!

The Turing Way

An open guide for data science & open research.



Open Access
Book



Open Source
Community



Open Tools
Open Data
Open Hardware
Open Software



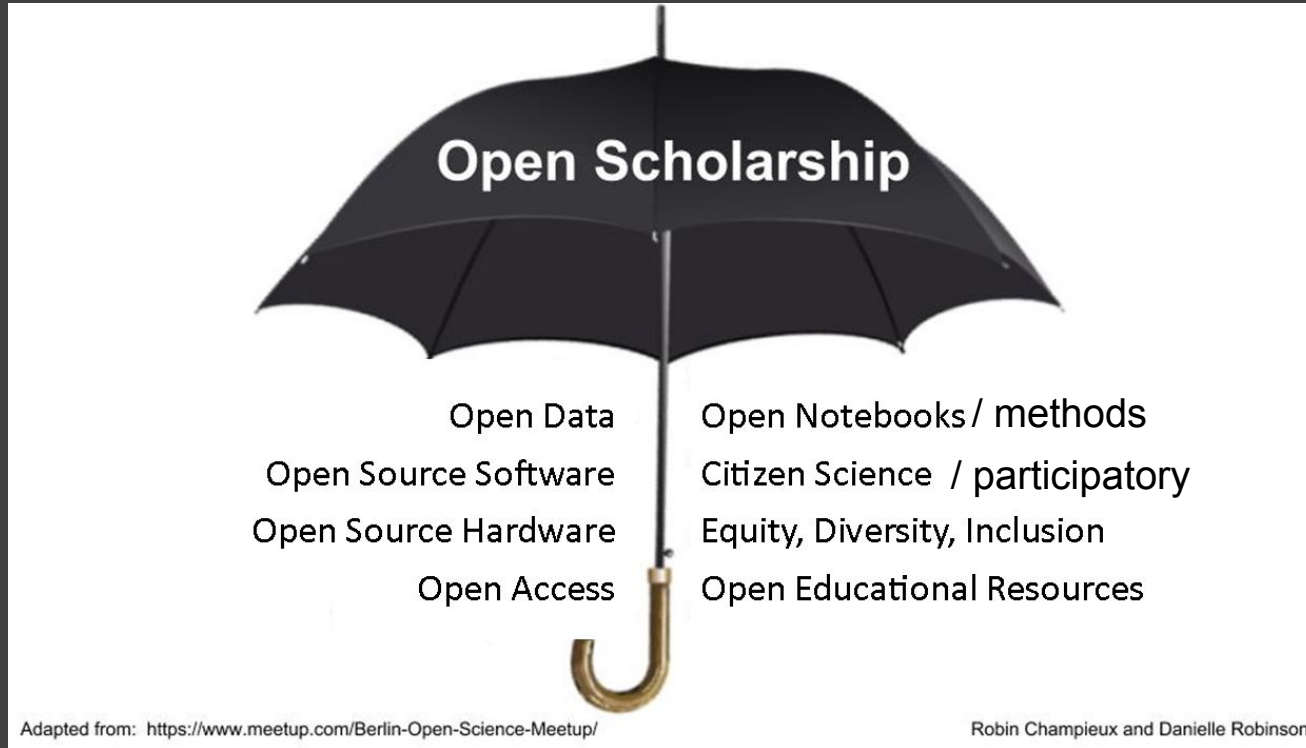
Open culture

Tools, Practices, Systems (TPS)

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



Open Science: a brief history



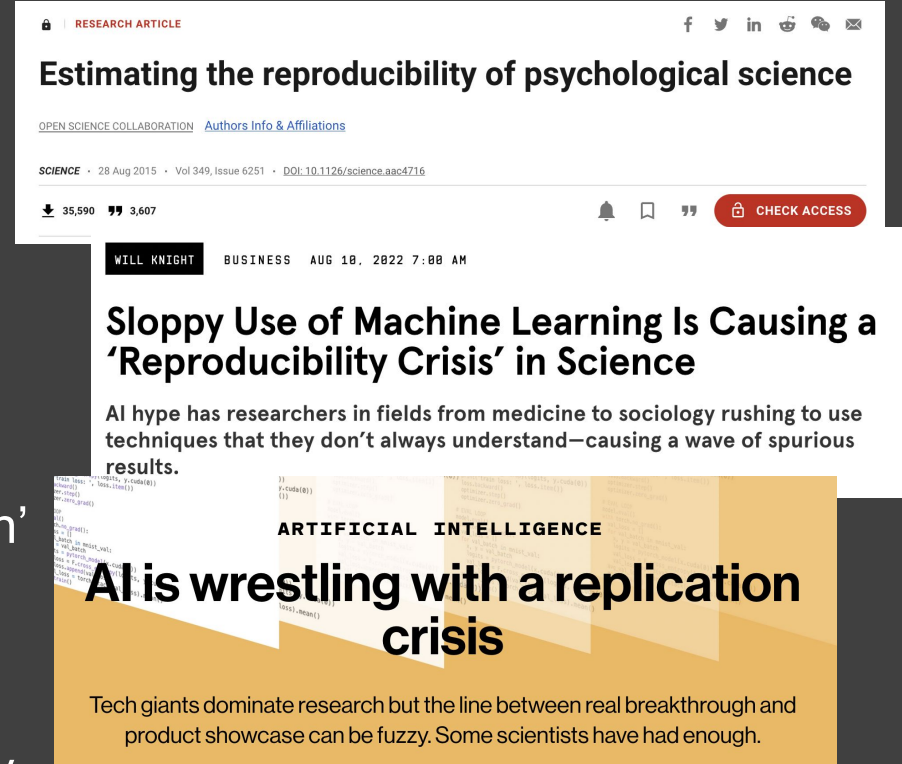
Reproducibility: A brief history

- Many scientific studies cannot be reproduced or replicated
- Associated with 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

Articles: Open Science Collaboration. *Science* <http://dx.doi.org/10.1126/science.aac4716> (2015).

Wired. wired.com/story/machine-learning-reproducibility-crisis/

MIT Tech Review, technologyreview.com/2020/11/12/1011944/artificial-intelligence-replication-crisis-science-big-tech-google-deepmind-facebook-openai/



Open Access: a brief history



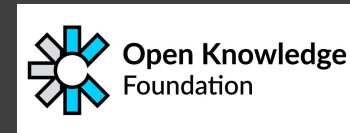
“Information is power. But like all power, there are those who want to keep it for themselves. The world’s entire scientific and cultural heritage, published over centuries in books and journals, is increasingly being digitized and locked up by a handful of private corporations.”

– Aaron Swartz, Guerilla Open Access Manifesto, 2008

Open Source: a brief history

Open Science has roots in developing tools and ways of working that aim to **shift power in the production and publication of knowledge worldwide via the open source movement.**

- Roots in free software movement
- Licensing allowed for modifications and derived works
- Developed into free and open source software (F/OSS) movement
- Influenced 'open' movements: open knowledge, open data, open access, open science



Turing Way beginnings: Reproducibility, Open Science, Open Access & Open Source



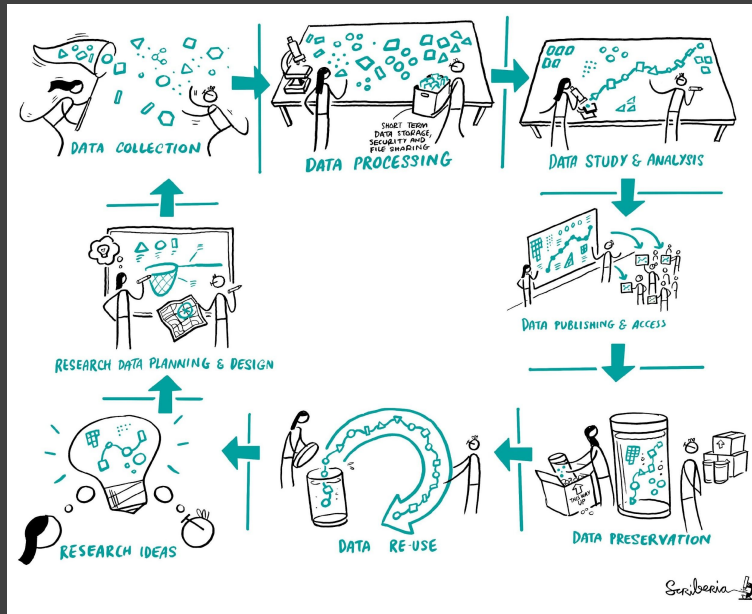
Kirstie Whitaker
Programme Lead of
Tools, Practices &
Systems Programme



Malvika Sharan
Senior Researcher,
Tools, Practices &
Systems



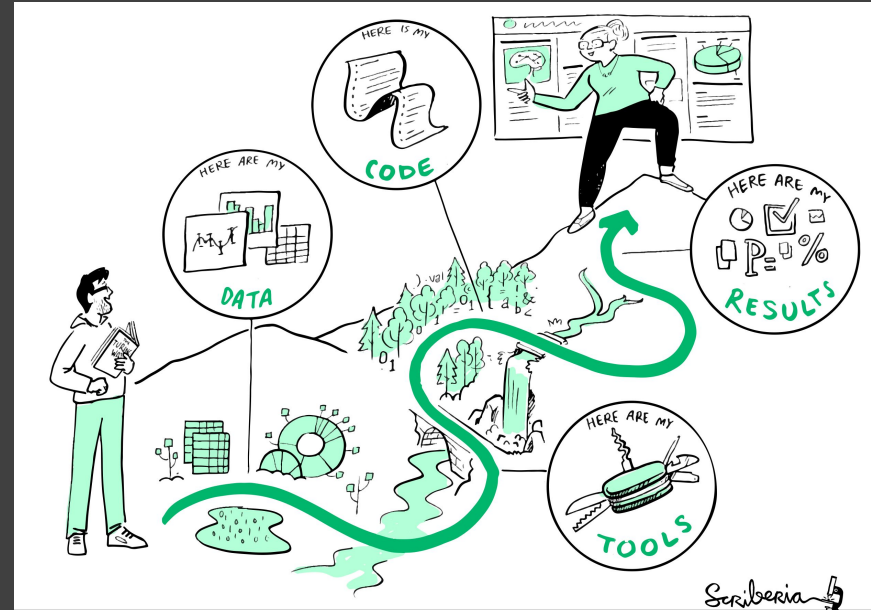
Reproducibility



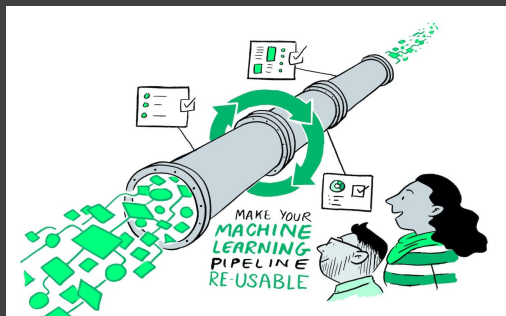
		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable

Guide for Reproducible Research

- Open research- covering open access, open data, open source software, open scholarship and more
- Version control- comprehensive guide on how to use Git
- Research data management
- Reproducible environments and code quality, testing and reviewing



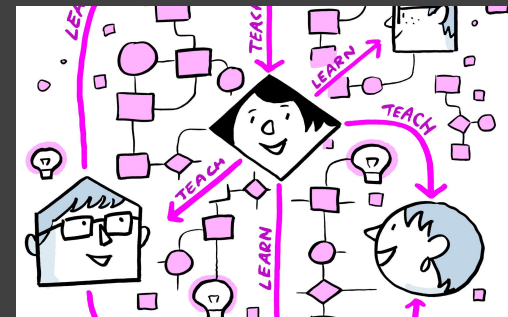
The Turing Way Guides



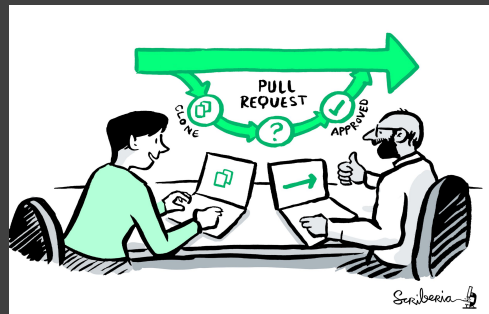
Reproducibility



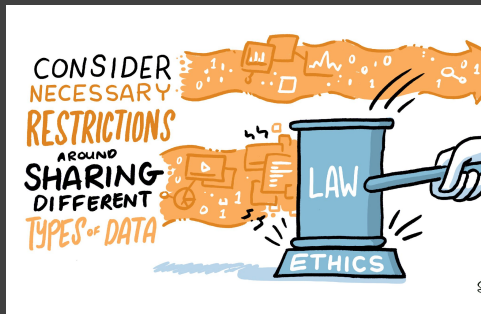
Project Design



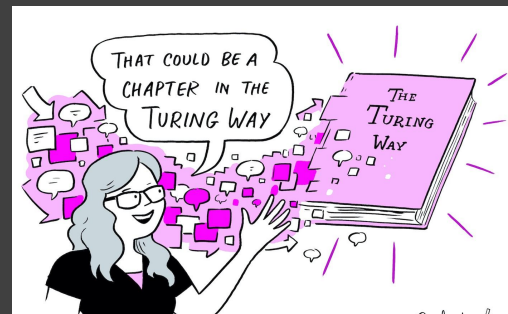
Communication



Collaboration



Ethical Research



Community Handbook

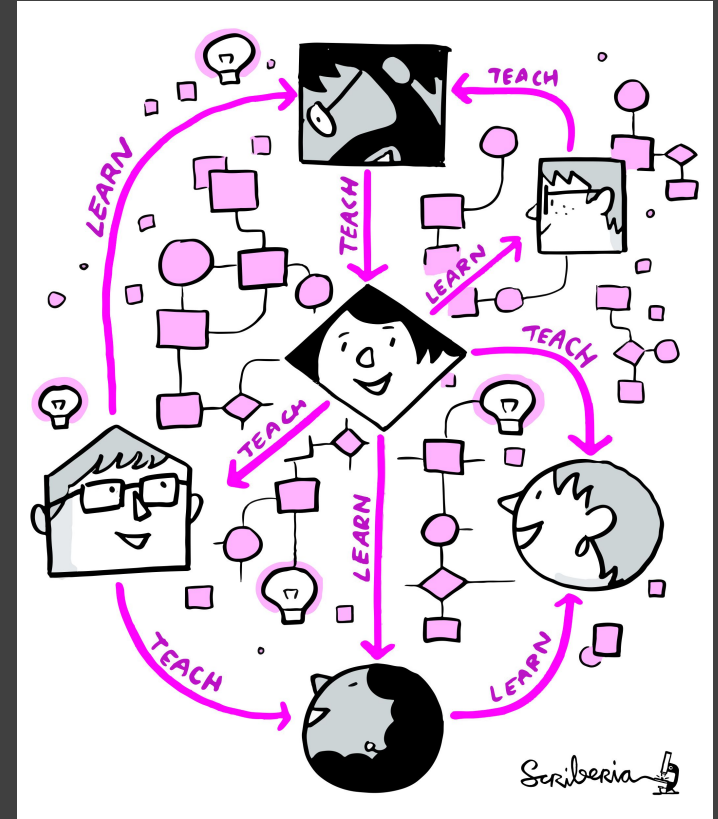
Guide for Project Design

- Planning for project design and documentation
- Creating project repositories
- Personas and pathways- considering who can contribute and how
- Code styling and 'hygiene' (linting)



Guide for Communication

- Open Scholarship and Education
- Blogs, Podcasts, Posters, Conference Talks, Social Media
- Making Research Outputs discoverable and publishable
- Authorship and Peer Review
- Communicating in Open Source Projects



Guide for Collaboration

- Getting started with GitHub, reviewing and merging contributions
- Managing a new community and team
- Leadership in data science
- Research infrastructure roles
- Remote collaboration- organising remote meetings, tools for remote collaboration, managing distributed teams



Guide for Ethical Research

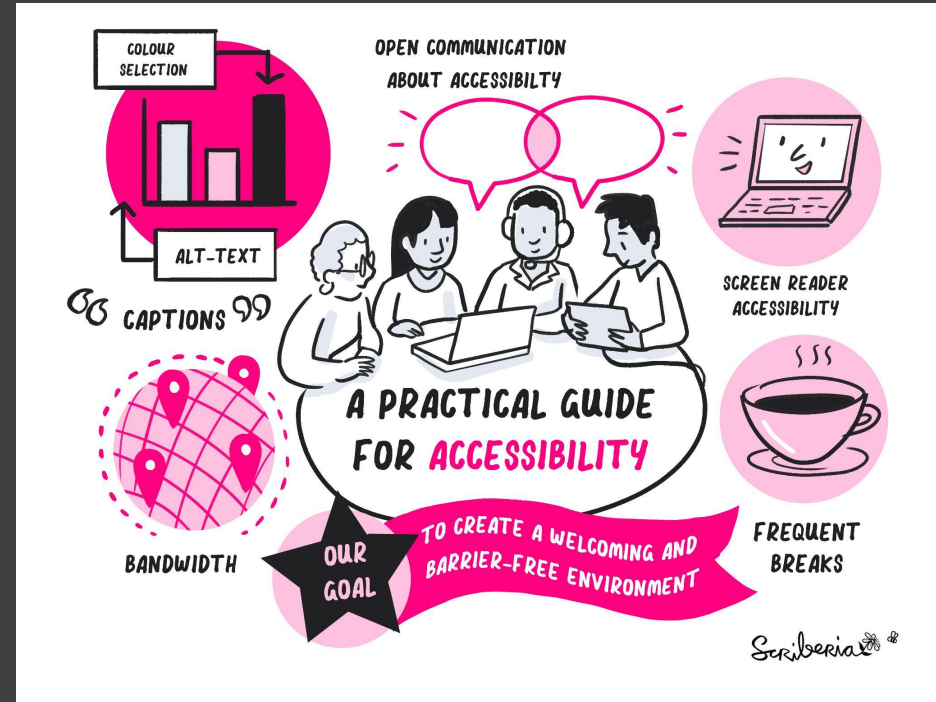
- Research ethics committees
- Ethical decisions in preclinical research
- Law, policy and human rights in ethics
- Activism for researchers
- Self-reflection



Guide for Accessibility

Being developed currently!

Recommendations for
accessible practices despite
barriers for participation



The Turing Way: Co-creating guidance together... **the way** is a journey, not a set of rules!



The Turing Way: Maintenance & Sustainability



Kirstie Whitaker

Director: Tools,
Practices & Systems
Programme (TPS)



Malvika Sharan

TPS Senior
Researcher: Open
Research & Community

4+ years

~300 Chapters

Numerous training and community
resources

Developing methods for sustainability

New pathways & projects

30+ core staff and volunteers

What is *The Turing Way* doing now?



Anne Lee Steele

Community Manager,
The Turing Way

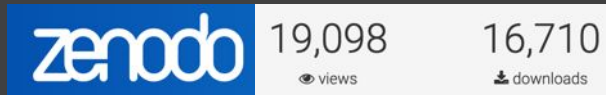


**Alexandra
Araujo Alvarez**

Project Manager

Project Growth & Recognitions

- 425+ contributors, 3500+ monthly users - supported by 30+ core members (governance)
- 2 awards and engagement with 25+ orgs
- References in 50+ peer reviewed articles and 100s of publications, reports, policy documents
- Replication/extension by 3 Turing & 7+ external projects



The Turing Way: influencing policy & industry

A review commissioned by the Secretary
of State for Health and Social Care

Better, Broader, Safer: Using Health Data for Research and Analysis



**Open
Science**

The hidden REF

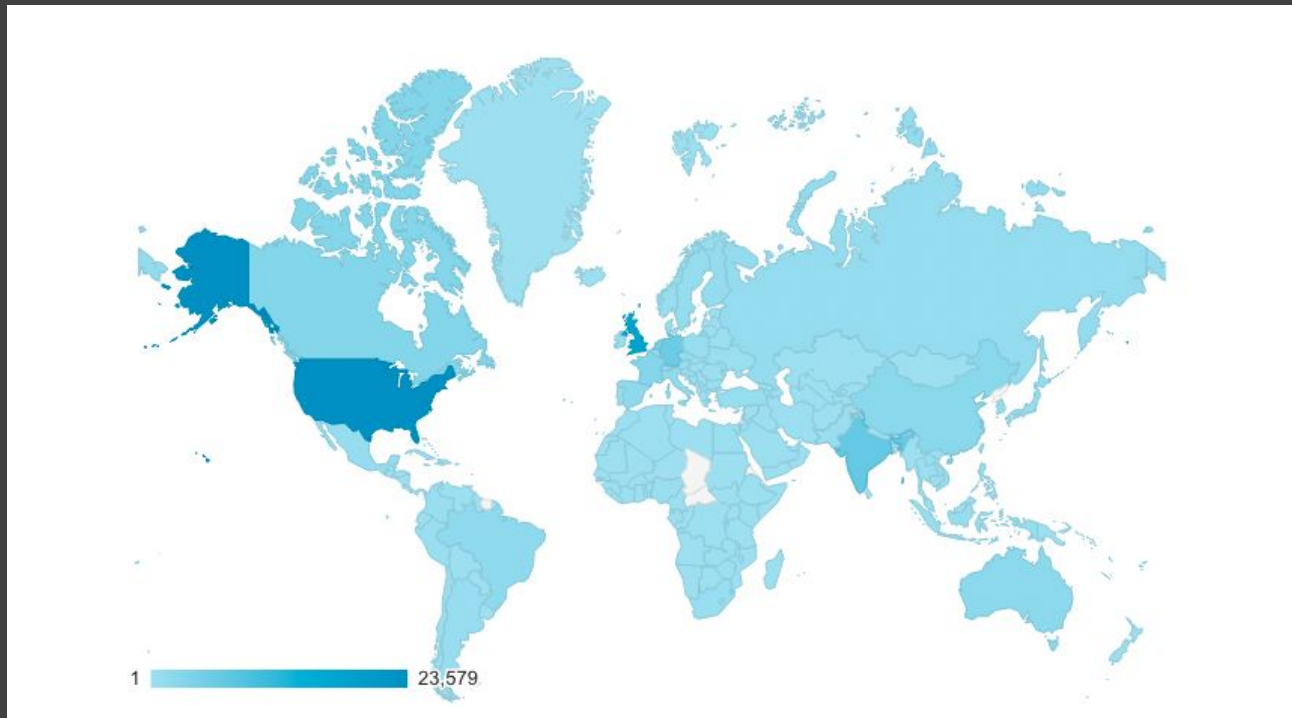
Celebrating all research outputs

About

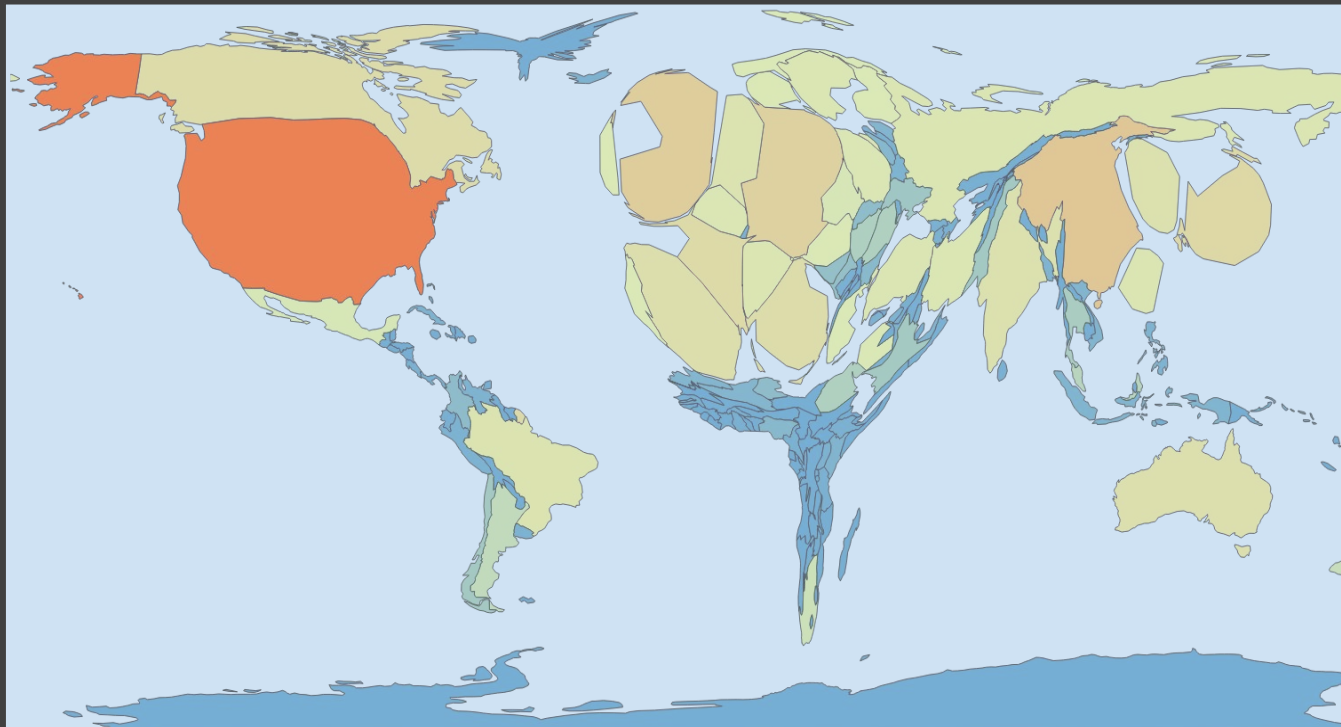
Celebrating all research outputs

The Turing Way: becoming a global resource

Beyond the
UK, we have
a global
community
and audience

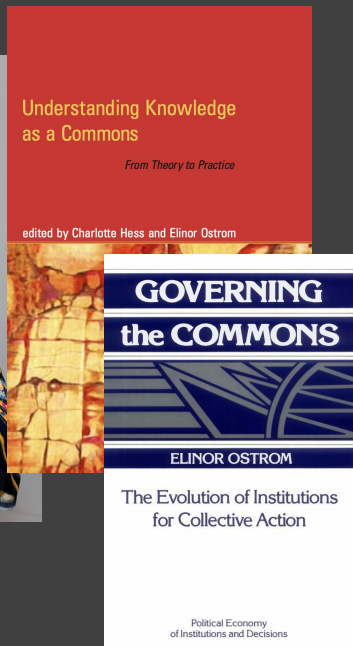


Unequal contribution and participation in Knowledge Production



World scaled by number of documents in Web of Science by authors living there, 2011 - data by Juan Pablo Alperin
https://figshare.com/articles/figure/World_scaled_by_number_of_documents_in_Web_of_Science_2012_by_Authors_Living_There/953177

Co-creating a knowledge commons



“...A commons is a shared resource that is vulnerable to social dilemmas...” Outcomes of the interactions of people and resources can be positive or negative or somewhere in-between. Frequently, within the intellectual arena, the concept of the commons is a battle cry for free speech, universal open access, and self- governance...”

Hess, C., & Ostrom, E. (Eds.). (2007). *Understanding Knowledge as a Commons: From Theory to Practice*. The MIT Press. <http://www.jstor.org/stable/j.ctt5hndf6>

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.

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Creating a commons requires changing research culture



Changing research culture: supporting localised data science

Making science open requires diverse, multilingual and locally-relevant research accessible for a wide audience.



TWTranslation





unesco

Multilingualism in Open Science

*Language enables the delivery of information and **knowledge coded in different sociocultural, political, and economic contexts.***

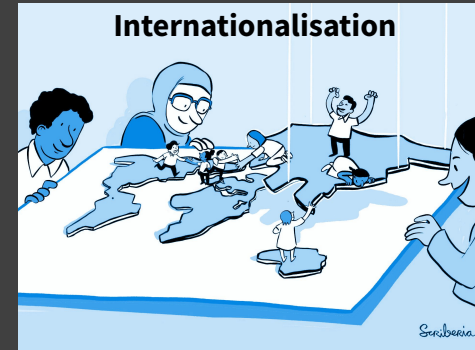
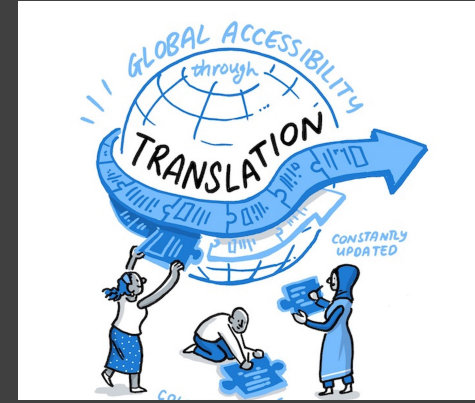
“... an inclusive construct that combines various movements and practices aiming to **make multilingual scientific knowledge openly** available ...”


UNESCO definition of Open Science


Multilingualism and Linguistic diversity. (2023, April 20). <https://www.unesco.org/en/multilingualism-linguistic-diversity>, UNESCO Open Science: <https://www.unesco.org/en/open-science> and <https://www.unesco.org/en/open-science/toolkit>

Multilingualism and Internationalisation in Open Science

- Making science open requires diverse, **multilingual and locally relevant** research accessible for a wide audience.
- Open Science **has much to gain** and offer in engaging with **geolinguistic diverse** participants.
- **Internationalisation** allows open leaders to identify and support the needs of multiple locales.





The Turing Way


Turing Way


Turing Way

OVERVIEW

README


crowdin

Language ↓	Progress	Words to translate
Arabic (ar)	<div><div></div></div>	26% • 1%
Chinese Simplified (zh-CN)	<div><div></div></div>	15% • 0%
French (fr)	<div><div></div></div>	72% • 0%
Japanese (ja)	<div><div></div></div>	68% • 0%
Portuguese, Brazilian (pt-BR)	<div><div></div></div>	73% • 1%
Spanish, Latin America (es-419)	<div><div></div></div>	13% • 0%
Turkish (tr)	<div><div></div></div>	2% • 0%



TWTranslation

[Overview](#)
[Repositories 7](#)
[Projects](#)
[Packages](#)
[People 2](#)

Popular repositories

[the-turing-way](#)
Public

Forked from alan-turing-institute/the-turing-way

Host repository for The Turing Way: a how to guide for reproducible data science

[LOG IN](#)
[SIGN UP](#)

[translation_workflow](#)
Public


☆ 3

[TTW_spanish](#)
Public

[Turkish-specific-Translation-rules](#)
Public

Turkish-specific-Translation rules

👤 1



The Turing Way is a handbook to reproducible, ethical and collaborative data science. We involve and support a diverse community of contributors to make data science accessible, comprehensible and effective for everyone.

Details

Source


Contrib

Source

Create


Last at

Manag




THE CARPENTRIES


Manag



@andreasancheztapia



@accocac




reproducible data science

Type

Language

Sort



Changing research culture: recognising all kinds of roles in research

“Research Infrastructure Roles” have emerged as a way of describing all roles and types of work that contribute to research

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](#).

Preprint

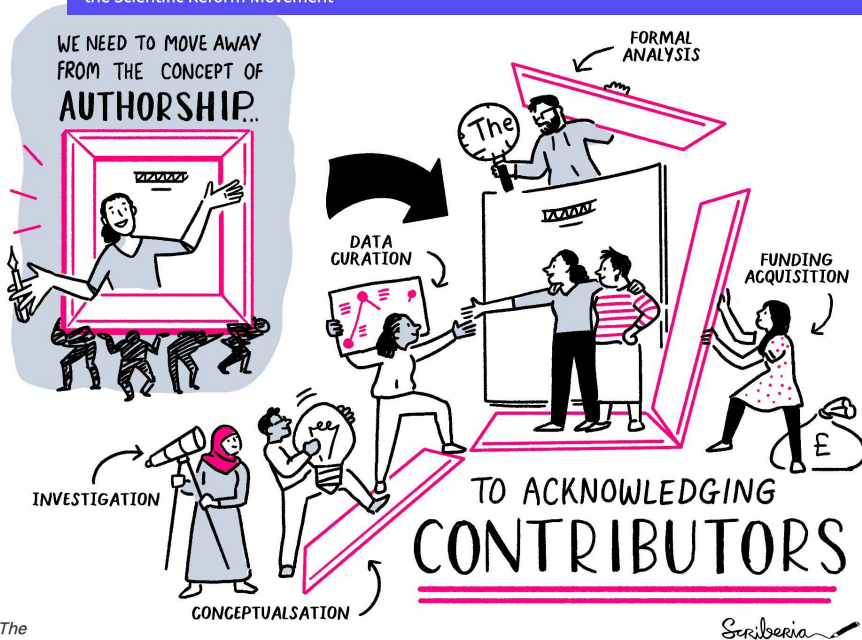
A manifesto for rewarding and recognising Team Infrastructure Roles



[View authors](#)

Summary

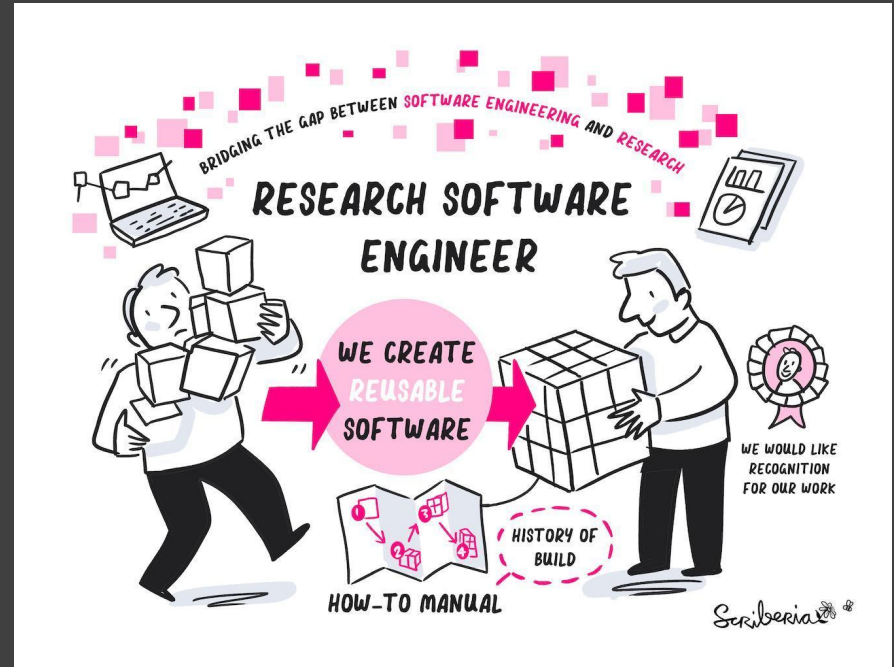
New module based on: Abstract for the Journal of Trial and Error special issue on 'Consequences of the Scientific Reform Movement'



Diversifying Research Roles



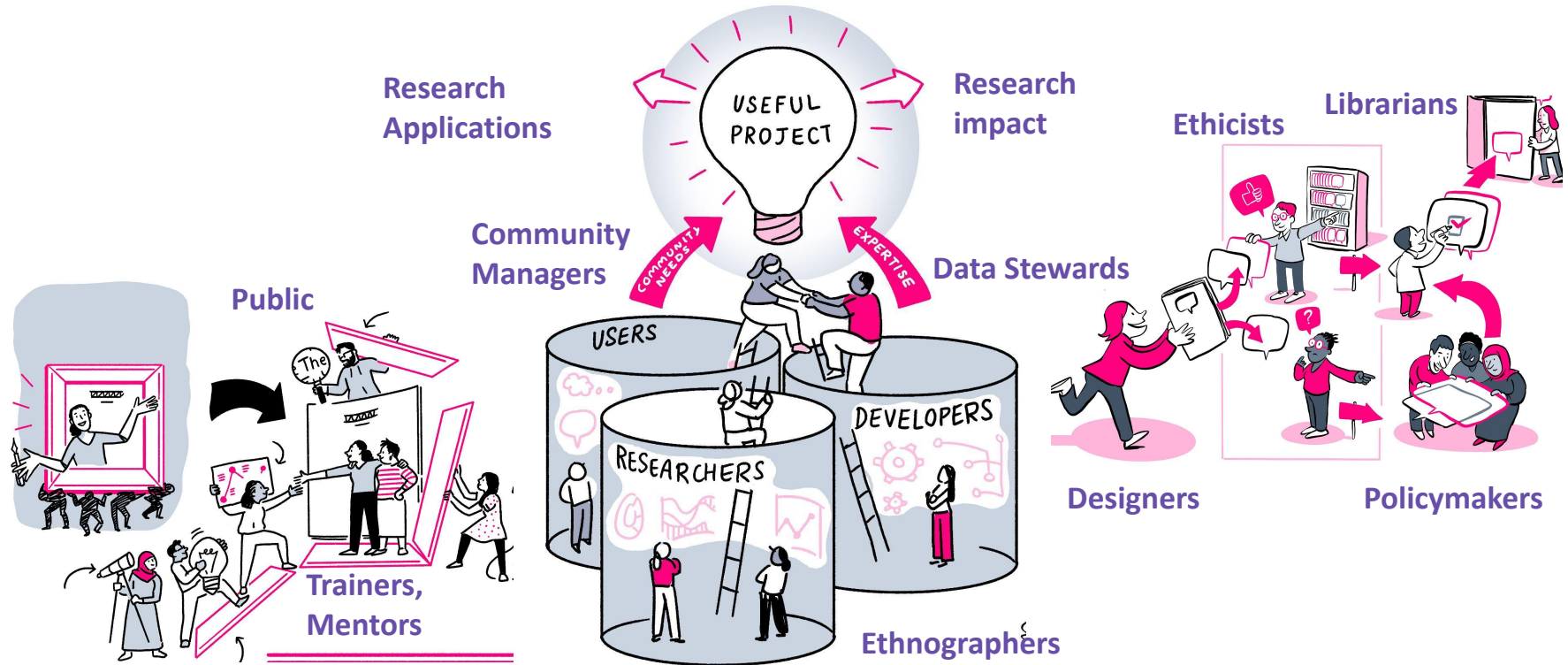
10 Years of the RSE movement



Baxter, R, Chue Hong, N, Gorissen, D,
Hetherington, J & Todorov, I 2012, 'The Research
Software Engineer', Digital Research 2012

@turingway, CC-BY 4.0, Zenodo: <https://zenodo.org/record/7848675>, DOI:
10.5281/zenodo.7994371

Diversifying Research Roles



Changing research culture: practicing open collaboration

- Using and supporting open source infrastructure: JupyterBook
- Recognising non-code contributions: All Contributors bot



All Contributors

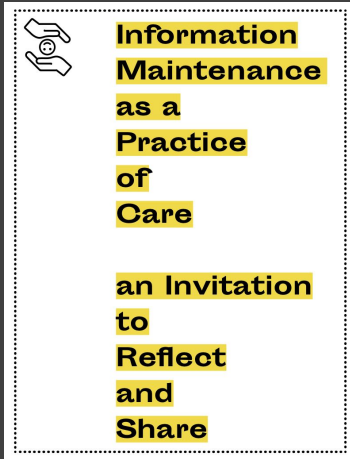
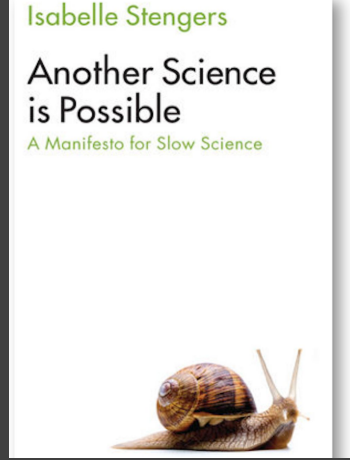
Recognize All Contributors

Including those that don't push code

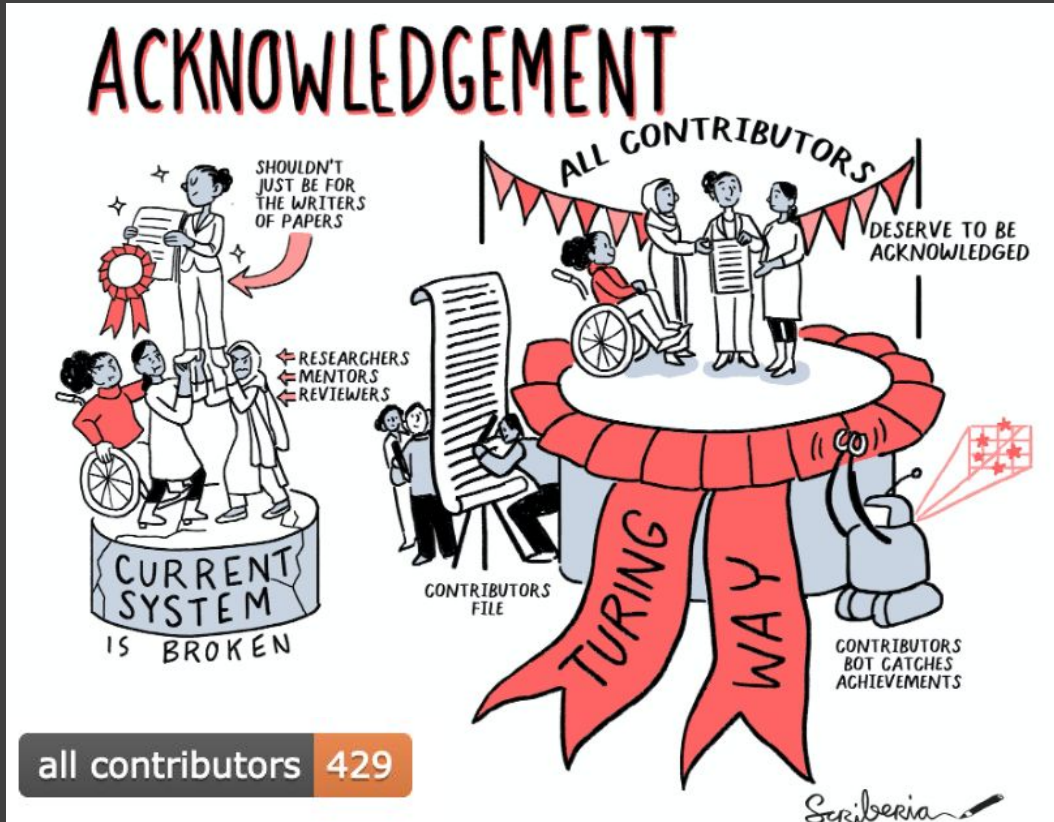
Prioritising Collaboration and Maintenance

*Slow, iterative, hidden, unglamorous, not necessarily novel
→ inclusive, intentional, incremental culture change and
more successful in the long term.*

Rewards for skills and practices through formalised policies, guidelines, incentives and paid positions when possible are not only fair but **crucial for effective big team research**.



Implementing in Open Science Communities



Afterword

Glossary

Bibliography

Contributors Record



All Contributors

Recognize All Contributors

Including those that don't push code

Cite as: *The Turing Way Community. (2022). The Turing Way: A handbook for reproducible, ethical and collaborative research (1.0.2). Zenodo.*

<https://doi.org/10.5281/zenodo.7625728>

Open Leadership is about moving away from what is acknowledged and rewarded traditionally in research



Photo: twitter.com/katerhardy/status/1498644624235286531

Comment | [Published: 08 February 2023](#)

Quality research needs good working conditions

[Rima-Maria Rahal](#) , [Susann Fiedler](#), [Adeyemi Adetula](#), [Ronnie P.-A. Berntsson](#), [Ulrich Dirnagl](#), [Gordon B. Feld](#), [Christian J. Fiebach](#), [Samsad Afrin Himi](#), [Aidan J. Horner](#), [Tina B. Lonsdorf](#), [Felix Schönbrodt](#), [Miguel Alejandro A. Silan](#), [Michael Wenzler](#) & [Flávio Azevedo](#)

[Nature Human Behaviour](#) **7**, 164–167 (2023) | [Cite this article](#)

28k Accesses | **1** Citations | **981** Altmetric | [Metrics](#)

CAREER COLUMN | 14 April 2022

Time to re-think the divide between academic and support staff

Research professionals should not be split into two categories, say [Marta Teperek](#), [Maria Cruz](#) and [Danny Kingsley](#).

Quality research needs good working conditions. [Nature Human Behavior](#) (2023) doi.org/10.1038/s41562-022-01508-2

Time to re-think the divide between academic and support staff. [Nature Career Column](#) (2022) doi.org/10.1038/d41586-022-01081-8

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Localisation & Translation

How can we ensure that our resources are accessible for a global community?

Research Infrastructure Roles

How can we recognise all kinds of roles in research?

Editors and Reviewers

How do we make contribution “too easy not to do”?



Different PathWAYS in The Turing Way

Trainers and Mentors

How can we use our resources to train & mentor ECRs and others?

Infrastructure Maintainers

How can we support open source infrastructure?

Practitioners Hub

How can we collaborate with industry & topic-specific fields?

Environmental Data Science

How can we support climate-related research?

Book Dash Planning

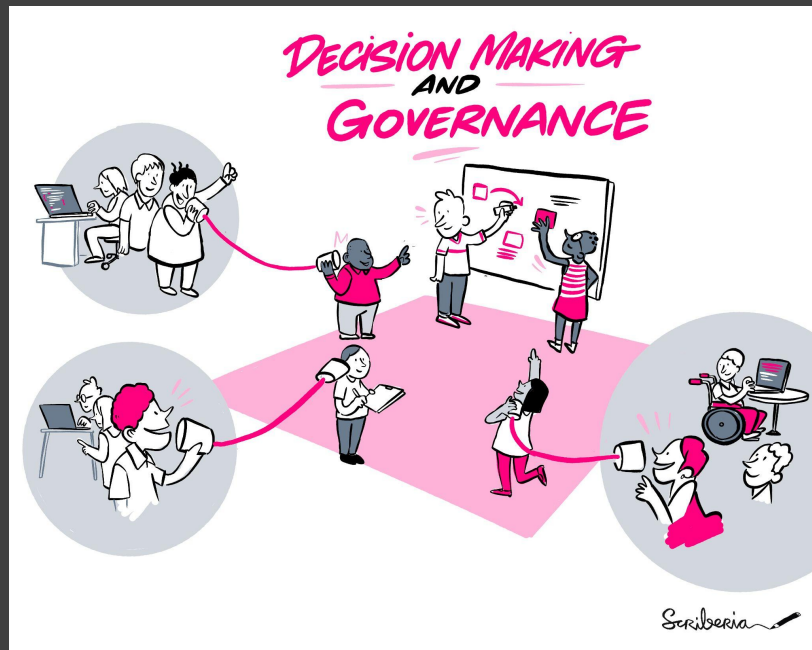
How can we plan a global event for a global community?

Accessibility

How can we be accessible for everyone?

Sharing Decision-Making Power

- Recognise **community needs** and collaborative work to address them
- Provide resources, roadmap and **roles** that improve shared agency
- Ensure **transparency** by making implicit knowledge explicit
- **Balance** structure with adaptability
- Improve governance **iteratively**



Growing *The Turing Way*: moving at the speed of trust

- Shifting from a grassroots open science project to a **global collaboration takes intentional care**
- Working towards shifting mindset to **sustainability first** in infrastructure as well as environment.

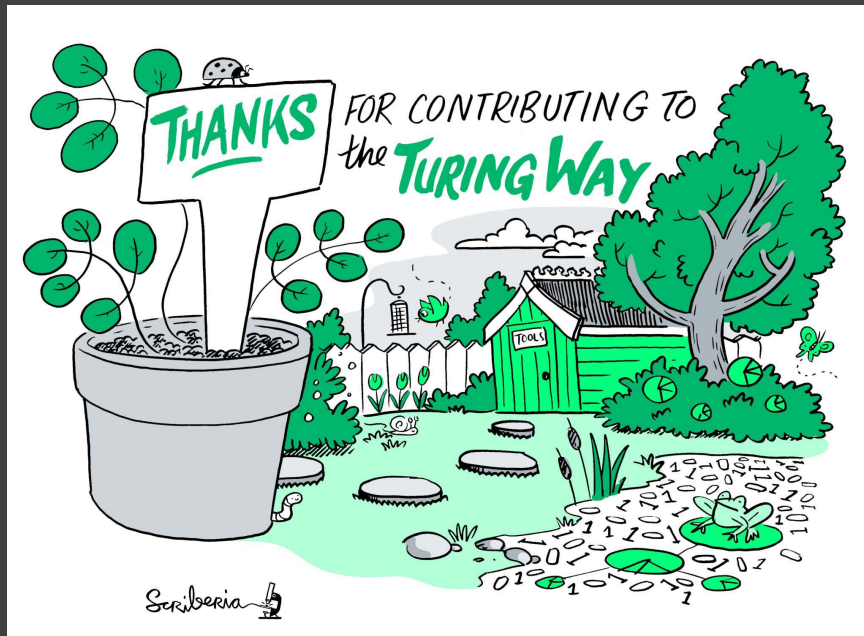
Facilitating & maintaining in many WAYS



Global knowledge production: from open science to knowledge equity

*“Responsible research should go beyond normative practices of doing reproducible science and be more intentional about the conditions of its production. **This requires expanding thinking about openness to include epistemic diversity, communities and excluded knowledges**”*

- *Leslie Chan in “Global Dynamics in Responsible Research” symposium by The Einstein Foundation*



Move fast and break things
Collaborate, move slowly, maintain things

X

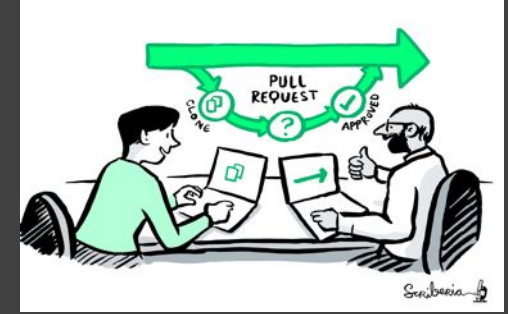
How can you get involved?



Write & review



Maintain & improve



Mentor contributions



Make it global

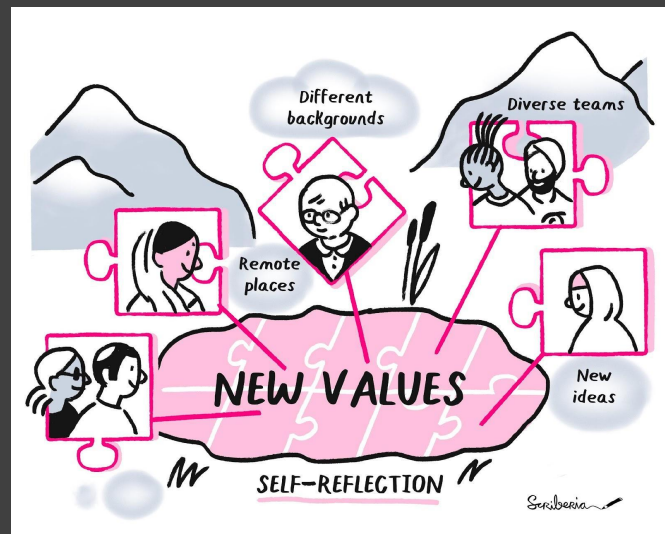


Connect with The Turing Way Community

- *Translation co-working*: Tuesday (16:00 UTC)
- *Collaboration Cafes*
 - 1st & 3rd Wednesdays (14:00 UTC)
- *Outreachy*
- *Book Dash*: May and November yearly



Your contribution is important - *we record and acknowledge* in the README file and in the book.

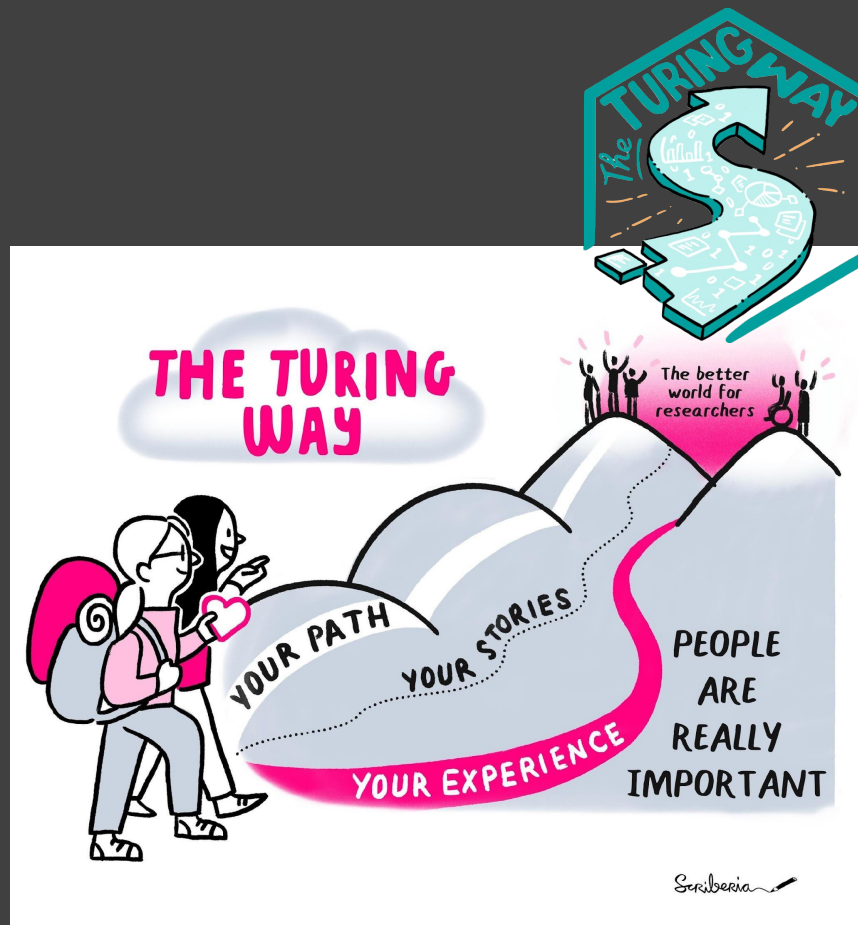


the-turing-way.start.page

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!



Acknowledgements & Links

The
Alan Turing
Institute

The Turing Way Community

- Localisation and Translation Team & Research Infrastructure teams!
- Kirstie Whitaker, Malvika Sharan, Alexandra Araujo Alvarez + many Turing Way Core Team and Turing's TPS team members
- Book: the-turing-way.netlify.com,
- Twitter: twitter.com/turingway, Mastodon: fosstodon.org/@turingway
- GitHub: github.com/alan-turing-institute/the-turing-way
- Useful links & opportunities are listed here: <https://bit.ly/turingway>



Slides reuses previous talks developed by several Turing Way members.

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