

The Alan Turing Institute

Sharing Responsibility for Reproducibility in Team Science: *The Turing Way*

Malvika Sharan, Danny Garside



About us!



Malvika Sharan

Senior Researcher - Open
Research & Community
The Alan Turing Institute



Danny Garside

Postdoctoral Visiting Fellow
The National Institutes of
Health

About us!



Malvika Sharan

Senior Researcher - Open
Research & Community
The Alan Turing Institute



Danny Garside

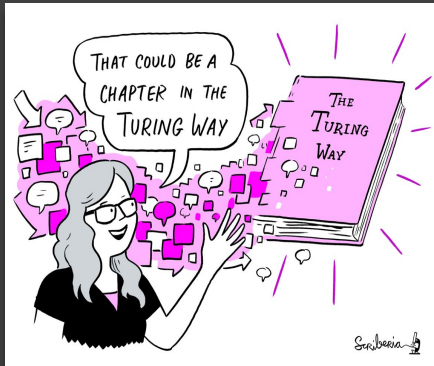
Postdoctoral Visiting Fellow
The National Institutes of
Health



Contributors to many Open
Science projects,
Maintainers of *The Turing
Way*

The Turing Way

A handbook to best practices in Data Science.

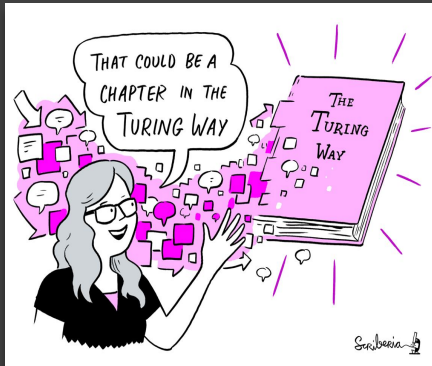


Book

The Turing Way

A **community-led** handbook to best practices in Data Science.

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

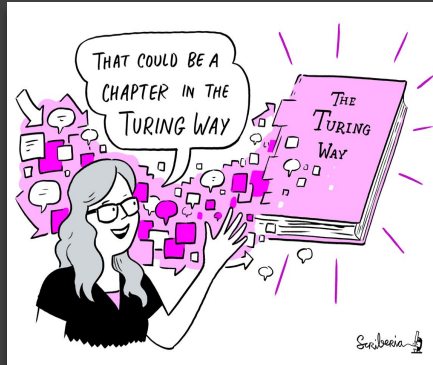


Book

The Turing Way

A community-led guide to Data Science.

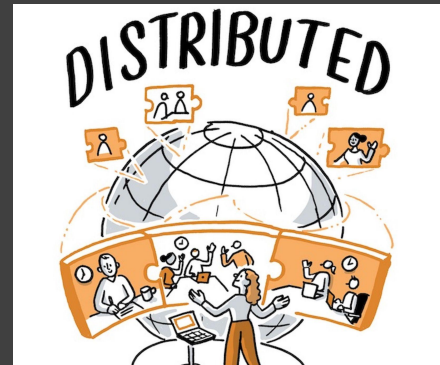
We involve and support a **diverse community** to make research **reproducible, ethical, and collaborative** for everyone.



Book



Community



Global Collaboration



Culture Change

The Alan Turing Institute

The national institute
for data science and
artificial intelligence



Tools, Practices and Systems

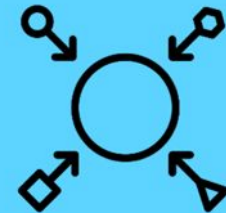
- Trustworthy systems
- Transparent reporting
- Inclusive interoperable design
- Ethical integrity
- Respectful co-creation
- Leadership in open research



Trust



Transparency



Inclusivity



Integrity



Respect



Leadership

The Turing Way: Book on Reproducibility



Kirstie Whitaker

Director: Tools,
Practices & Systems
Programme (TPS)



Malvika Sharan

TPS Senior
Researcher: Open
Research & Community



Anne Lee Steele

Community Manager,
The Turing Way

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.

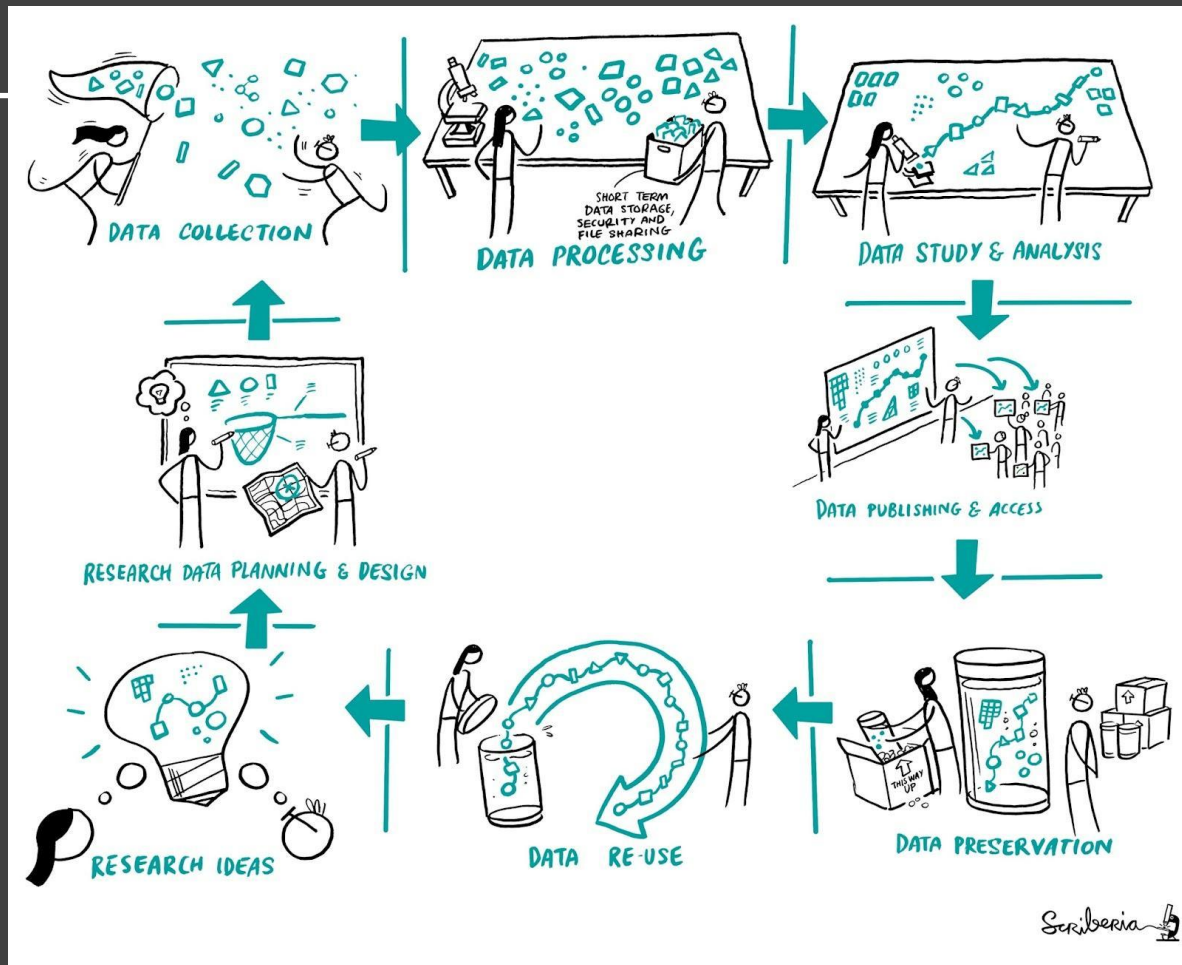


Reproducibility

		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable

Reproducibility

		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable



Scriberia

Guide for Reproducible Research

Overview

Open Research

Version Control

Licensing

Research Data Management

Reproducible Environments

BinderHub

Code quality

Code Testing

Code Reviewing Process

Reusable Code

Continuous Integration (CI)

Reproducible Research with

Make

Research Compendia



Fig. 3 The Turing Way project illustration by Scriberia. Used under a CC-BY 4.0 licence. DOI: [10.5281/zenodo.3332807](https://doi.org/10.5281/zenodo.3332807).



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



Guide for Communication



Guide for Communication

Overview of Guide for Communication

Blogs for Research Communication

Lay Summaries

Podcasts for Research Communication

Presenting Posters and Conference Talks

Social Media for Research Communications

Making Research Objects Citable

Communications in Open Source Projects

Guide for Collaboration

Guide for Collaboration

Getting Started With GitHub

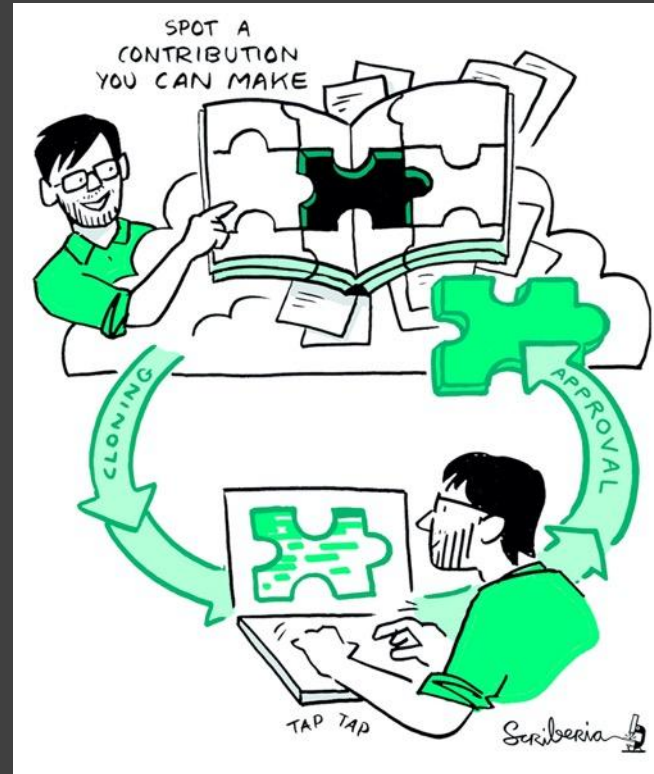
Maintainers and Reviewers on
GitHub

Managing a New Community
and Team

Leadership in Data Science

Remote Collaboration

Shared Ownership in Open
Source Projects



Guide for Ethical Research

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



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

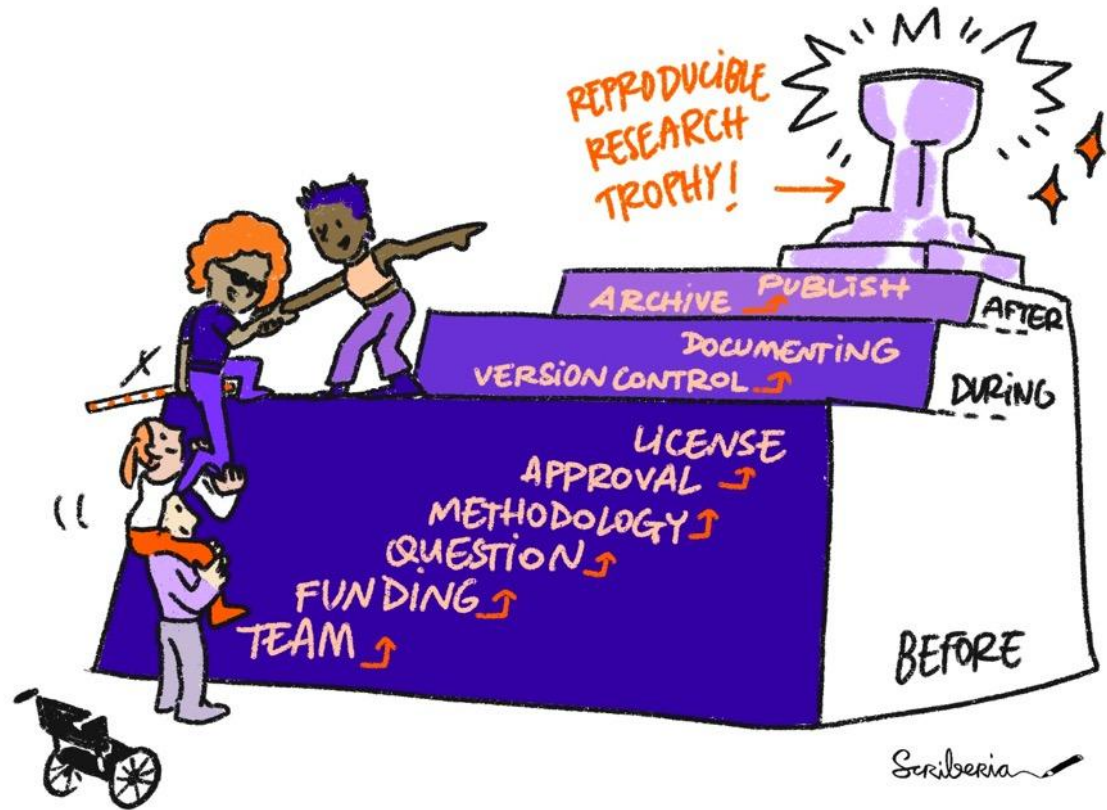
Creating Project Repositories

Personas and Pathways

File Naming Convention

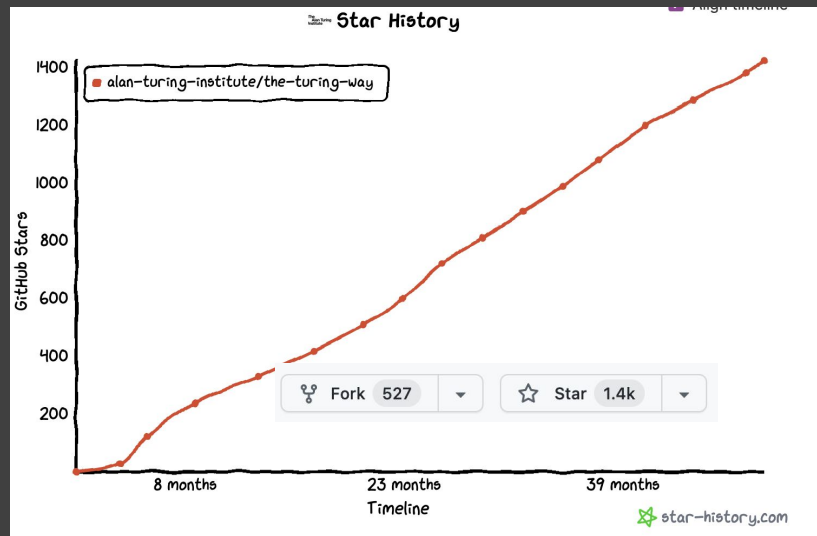
Code Styling and Linting

Sensitive Data Projects



Big Project with Big Team

- 3+ years, >250 Live Chapters
- Community resources, events, guidance, templates, training
- 390+ direct contributors and thousands of users



<https://zenodo.org/record/3332807>

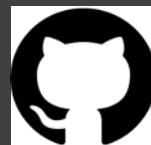


15,177

views

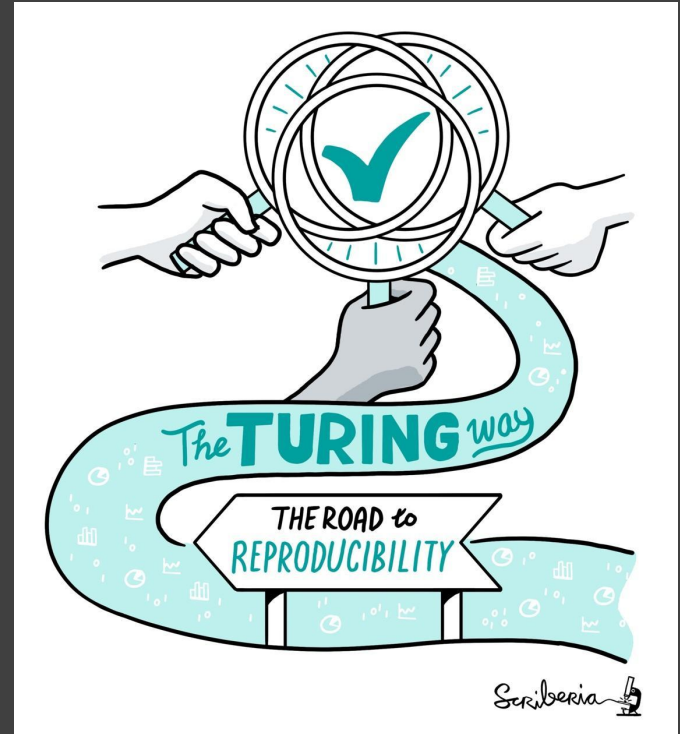
14,508

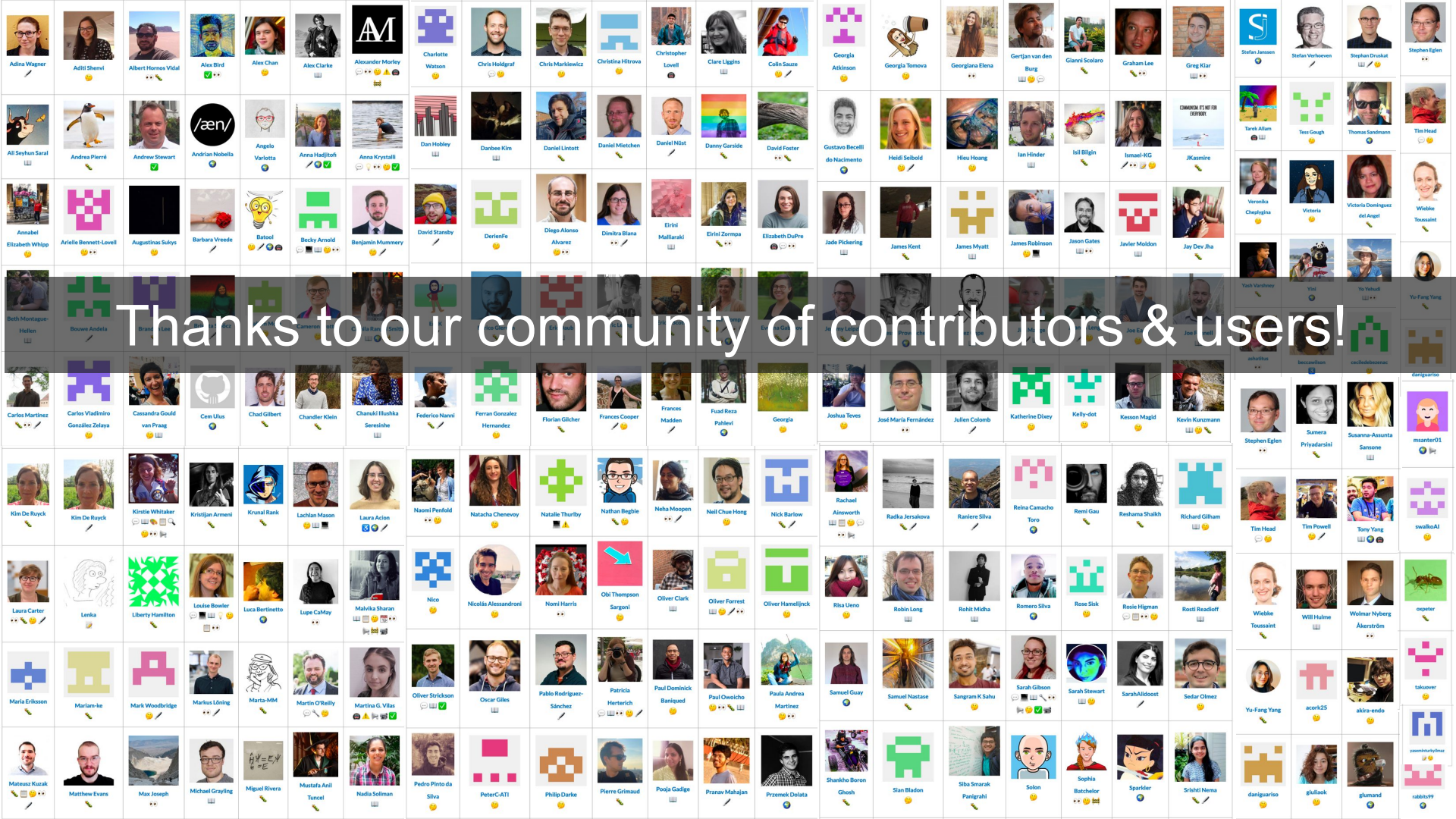
downloads



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





Thanks to our community of contributors & users!

Open Science

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

Community framework for collaboration, peer production and sustainability.



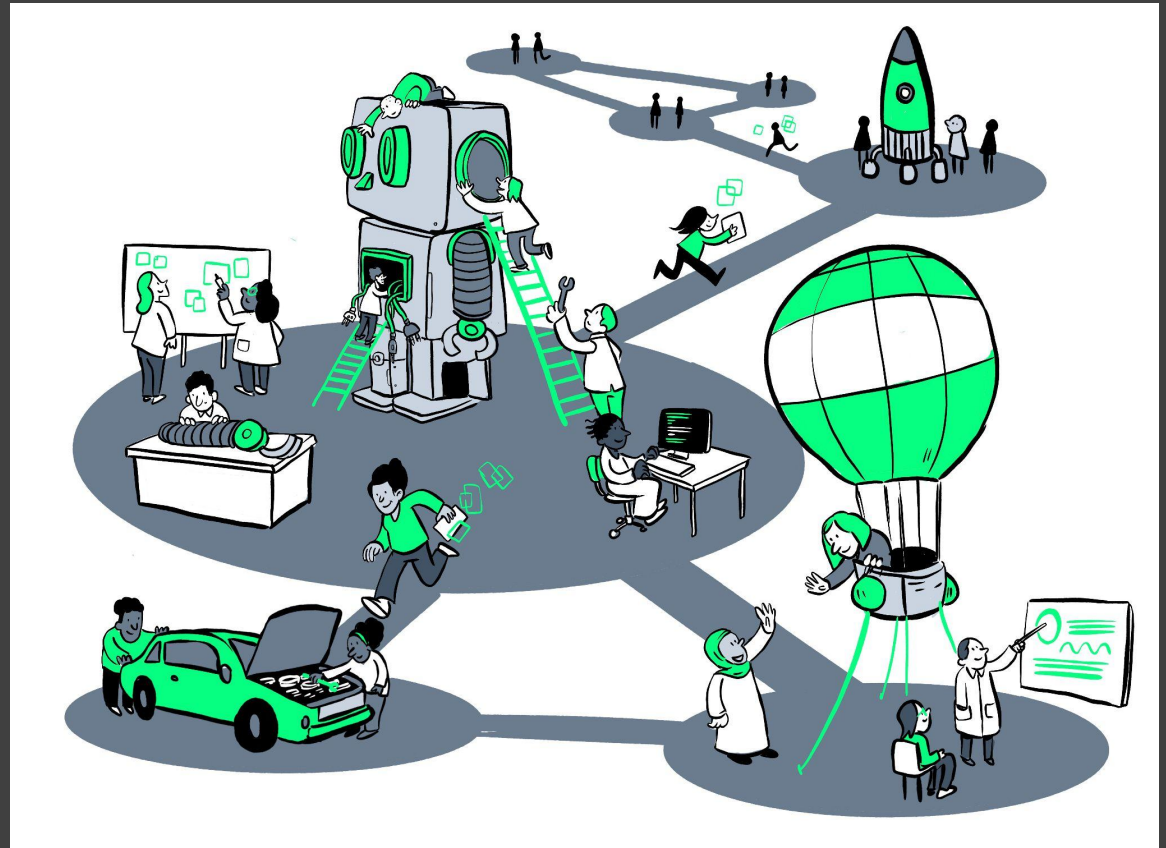
Open Science Community Building == Big Team Science

Process of granting access to skills and support that an individual or a group needs to participate in a community, and influence decision-making.



Caretakers in Big Team: an Open Science Perspective

Lave, Jean; Wenger, Etienne
(1991). *Situated Learning:
Legitimate Peripheral
Participation*. Cambridge:
Cambridge University Press.
ISBN 978-0-521-42374-8.



Roles of Caretakers in Big Team

1. **Design** for inclusion
2. **Simplify** Processes
3. **Foster** a sense of ownership
4. **Recognise** all contributions



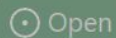
Filters ▾

🔖 Labels 72 📌 Milestones 0 New issue

✕ Clear current search query, filters, and sorts

<input type="checkbox"/>	🕒 70 Open ✓ 80 Closed	Author ▾	Label ▾	Projects ▾	Milestones ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	📌 Example Collaboration Workshop 2022 Issue collaboration-workshop good first issue #2697 by BrainonSilicon was closed 16 days ago						🔗 1 💬 1
<input type="checkbox"/>	🕒 Adding a link to cross-reference the sub-chapter on Combined datasets collaboration-workshop good first issue #2695 opened 20 days ago by EKaroune						💬 1
<input type="checkbox"/>	🕒 Adding a link to cross-reference the subchapter on Metadata collaboration-workshop good first issue #2694 opened 20 days ago by EKaroune						🔗 1 💬 1
<input type="checkbox"/>	📌 Typo in 'Research Ethics Committees Workflows' Guide carpentrycon22 good first issue #2556 by harisood was closed on 16 Aug						🔗 2 💬 3

Jupyter-book build errors #2611



da5nsy opened this issue on 25 Aug · 6 comments



da5nsy commented on 25 Aug · edited

Collaborator



Getting some fun* errors currently in building the jupyter book locally.

* where "fun" = not serious but we should work through them.

I'll put the raw output here and then we can spin out individual issues/PRs for each one as we see fit.

Here's the raw output:

```
←[91mC:\Users\cege-user\Documents\the-turing-way\book\website\afterword\glossary.md:3: WARNING: glossary term must be
←[91mC:\Users\cege-user\Documents\the-turing-way\book\website\afterword\glossary.md:9: WARNING: glossary term must be
←[91mC:\Users\cege-user\Documents\the-turing-way\book\website\afterword\glossary.md:21: WARNING: glossary term must be
←[91mC:\Users\cege-user\Documents\the-turing-way\book\website\afterword\glossary.md:27: WARNING: glossary term must be
```

alan-turing-institute / the-turing-way Public

<> Code Issues 437 Pull requests 88 Discussions Actions Projects 6

Update Jupyter Book version #2307

da5nsy merged 5 commits into main from da5nsy:updateJupyterBook on 25 Aug

Conversation 6 Commits 5 Checks 14 Files changed 2

da5nsy commented on 25 Mar

Summary

Testing the new version of Jupyter Book

What should a reviewer concentrate their feedback on?

Everything looks ok?

Acknowledging contributors

All contributors to this pull request are already named in the [table of contributors](#) in the README file.

The screenshot shows the Jupyter Book website homepage. On the left is a navigation sidebar with a search bar and a list of sections: TUTORIALS (Create your first book, Get started with references) and TOPIC GUIDES (Structure and organize content, Write narrative content, Write executable content, Build and publish outputs, Web and internet features, Sphinx usage and customization, Advanced Jupyter Book Usage). The main content area features the Jupyter Book logo (JB with a brace), the tagline "Build beautiful, publication-quality books and documents from computational content.", a "Get started" button, and a badge showing 3.1k stars and a DOI. Below this are three feature cards: "Text content" (Structure books with text files and Jupyter Notebooks with minimal configuration), "MyST Markdown" (Write MyST Markdown to create enriched documents with publication-quality features), and "Executable content" (Execute notebook cells, store results, and insert outputs across pages).

The Turing Way

This README.md file is also available in Dutch ([README-Dutch](#)), French ([README-French.md](#)), German ([README-German.md](#)), Indonesian ([README-Indonesian](#)), Italian ([README-Italian](#)), Korean ([README-Korean](#)), Portuguese ([README-Portuguese](#)), and Spanish ([README-Spanish](#)) (listed alphabetically).






















Total Contributors:

all contributors 324



Contributors

Thanks goes to these wonderful people (emoji key):

 Alex Chan 👩	 Alex Clarke 👤	 Alexander Morley 💬 🐼 🤔 ⚠️	 Ali Seyhan Saral 👤	 Andrea Pierre 🐧	 Andrew Stewart ✅	 Anna Hadjiiofi ✍️
 Anna Krystalli 💬 💡 🤖 🤔	 Annabel Elizabeth Whipp 😊	 Arielle Bennett Lovell 😊	 Barbara Vreede ✍️	 Becky Arnold 💬 🖥️ 📄 🤔 🐼	 Beth Montague-Hellen 👤	 Bouwe Andria ✍️
 Cameron Trotter 😊	 Camila Rangel Smith 👤	 Carlos Martinez Gonzalez Zelaya 💬 🐼 ✍️	 Carlos Vladimiro Gonzalez Zelaya 😊	 Cassandra Gould van Praag 😊 📄	 Chad Gilbert 🐧	 Chanuki Ilushka Seresinha 👤

Call for translators! [We're looking for translators](#) to help translate this spec for everyone!



All Contributors

Read this documentation in the following languages

한국어	中文	Bahasa Indonesia	Deutsch	Polski	
English	Português do Brasil	Español	Français	Русский	日本語

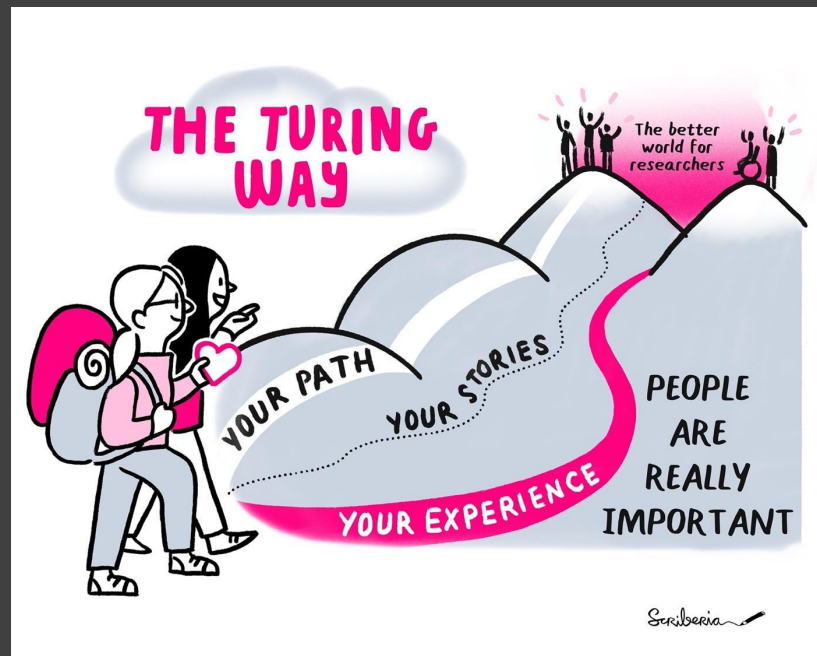
build passing localized 42% all contributors 54 Success Stars 6.6k

This is a specification for recognizing contributors to an open-source project in a way that rewards every contribution, not just code.

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!



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

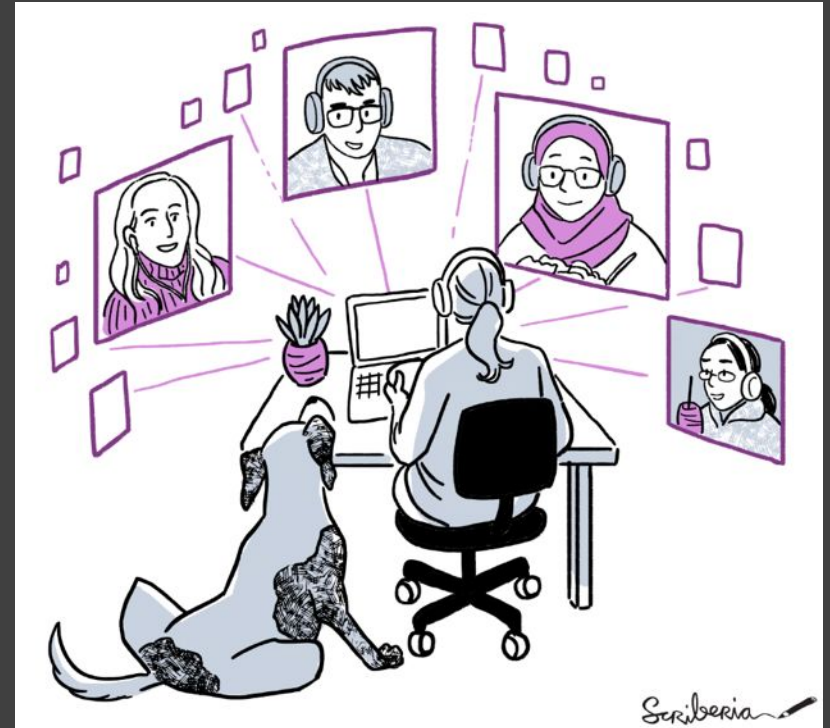
Template Collection



Join a Community Event

- *Collaboration Cafes*
 - 1st & 3rd Wednesdays (14:00 UTC)
- *Coworking Calls*
 - Mondays (10:00 UTC)
- *Onboarding Calls*
 - Fridays (17:00 UTC)
- *More ways to connect*

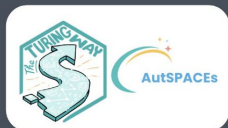
bit.ly/turingway



Supporting Citizen and Participatory Science Communities

28 October 2022, 15:00 UTC

Hosted by



Register on Eventbrite



Bastian Greshake Tzovaras

Director of Research
OpenHumans



Pen-Yuan Tsing

Founder
MammalWeb



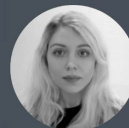
James Scott

Civil Servant
CDEI



Marc Kushner

Citizen Science Officer
NASA



Georgia Aitkenhead

Researcher
AutSPACES



Anne Lee Steele

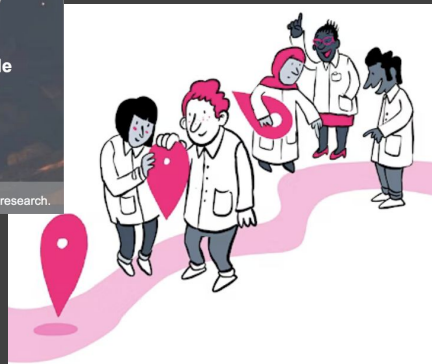
Community Manager
The Turing Way

Fireside Chat Series

This event, in October 2022, is hosted with AutSPACES. The Fireside Chat series features people, ideas & projects in open and reproducible research.

Fireside Chat, 28 October, 15:00 UTC

Community Share-out, 18 November



MULTIPLE DATES

The Turing Way Community Share-out and Contributor Celebrations - Nov 2022

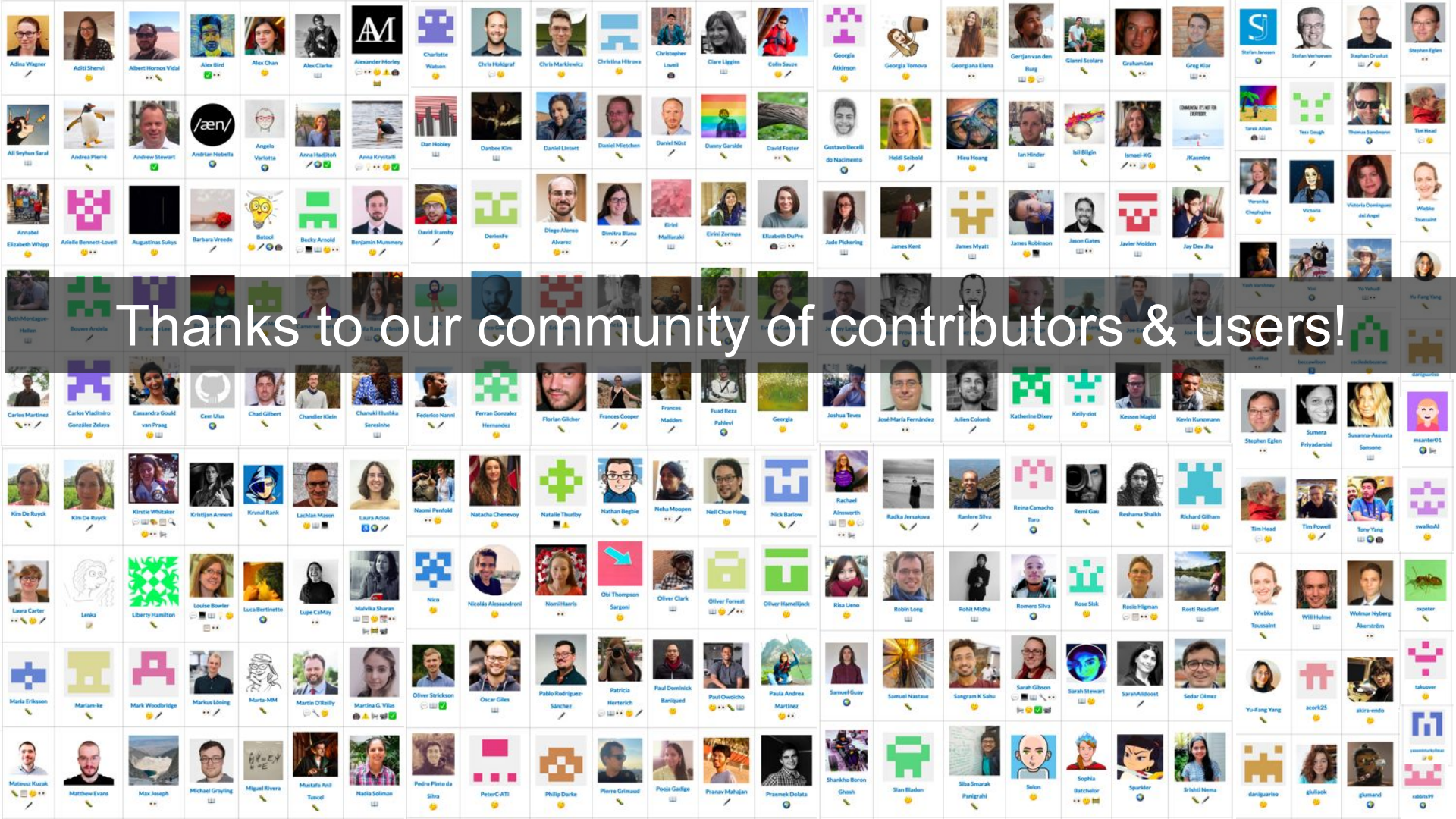
by **The Turing Way**
75 followers [Following](#)

Free

[Select a time](#)

Fireside Chat: <https://www.eventbrite.co.uk/e/supporting-citizen-participatory-science-communities-tickets-445204818597>

Community Share Out: <https://www.eventbrite.co.uk/e/the-turing-way-community-share-out-and-contributor-celebrations-nov-2022-tickets-440188835657>



Thanks to our community of contributors & users!

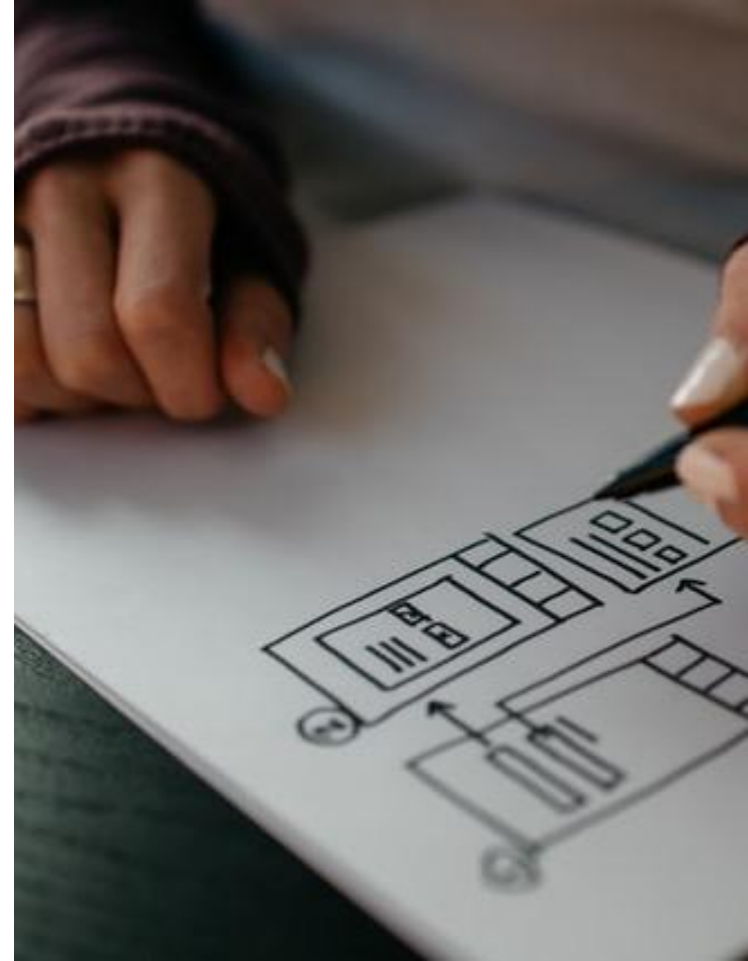
The Alan Turing Institute

Acknowledgements:

- Kirstie Whitaker, Whitaker Team Members
- *The Turing Way* community, friends & collaborators
- Book: the-turing-way.netlify.com
- Twitter: twitter.com/turingway
- Newsletter: tinyletter.com/TuringWay
- Chat: gitter.im/alan-turing-institute/the-turing-way
- GitHub: github.com/alan-turing-institute/the-turing-way
- Original artwork by Scriberia: <https://doi.org/10.5281/zenodo.3332807>



Additional Slides



Evidence of successful replication or extension

- [Quality Assurance of Code for Analysis and Research](#), Office for National Statistics , UK
- [Turing Data Stories](#) and [The Environmental Data Science book](#), The Alan Turing Institute
- [FAIR Cookbook](#) by researchers at University of Oxford, Novartis, FAIRplus Consortia
- [UCL Institute of Health Informatics Coding Club Handbook](#), University College London
- [A Citizen Science Guide for Research Libraries](#), LIBER Citizen Science Working Group

Qualitative/notable impacts

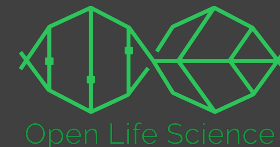
Resources are being used by **learners, educators, community builders, policy makers and researchers** globally

- NASA - Transform to Open Science - 5 years Mission for capacity building
- Reproducibility of scientific results in the **EU 2020 (report)**
- An Emerging Technology Charter by **Mayor of London (policy)**
- Innovation Scholars: **UKRI grant 2020** (funding call)
- CodeRefinery and Library Carpentries **training materials**
- Recommended in **Goldacre Review for modern open working** into health data
- Cited by **30+ peer-reviewed articles** & 100+ online publications

Virtual Community Engagement (2021)

- Communicating Goals & visions: 39 talks + 11 workshops in 2022
- Roles & Leadership: 2 leads, 1 full time CM, 14 volunteers and paid staff as contributors to the Core Team working across committees
- Communication: Documentation & asynchronous approaches, Two Book Dash yearly, Monthly Fireside Chats, Fortnightly Collab Café
- Community processes: Governance, workflows and policies that build a shared sense of agency & ownership

Open Governance for Democratic Decision-Making



open-life-science / ols-5 Public

generated from open-life-science/ols-4

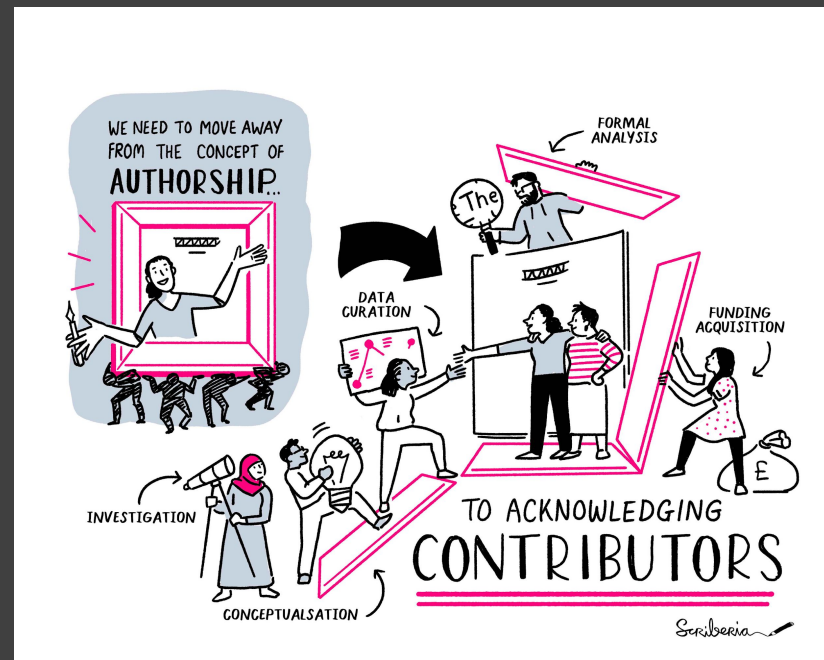
<> Code Issues 25 Pull requests 1 Discussions Actions Projects

Open Governance Models #31

Open 22 of 39 tasks aleesteele opened this issue 14 days ago · 3 comments

aleesteele commented 14 days ago · edited by malvikasharan

Project Name: "Exploring "Governance Models" for Open Science community projects as per their maturity stage"



Community Research: Learning About The Turing Way

Open

2 tasks

aleesteele opened this issue 14 days ago · 2 comments



aleesteele commented 14 days ago · edited

Collaborator

NOTE: This issue is a work in progress. Language, wording, questions, and content may change in the coming weeks.

Community Research: Learning about The Turing Way

Summary

Over the next number of months, my aim is to get to know The Turing Way community, and the Turing Way project. Because I'm a relative newcomer into the world of open science, this means that I'm not only trying to learn about *how* and *why* people contribute to the The Turing Way... but also *how* and *why* people participate in open science more broadly.

From this project, I hope to develop methodologies and ways of working that could be applicable in other contexts and with other communities (open or closed?). You will hopefully be able to find some of these resources in either the [open community building repo](#) (a kind of meta-team at the Alan Turing Institute, composed of other community managers like me!) or in the [personal repo](#) I'm making for this project.

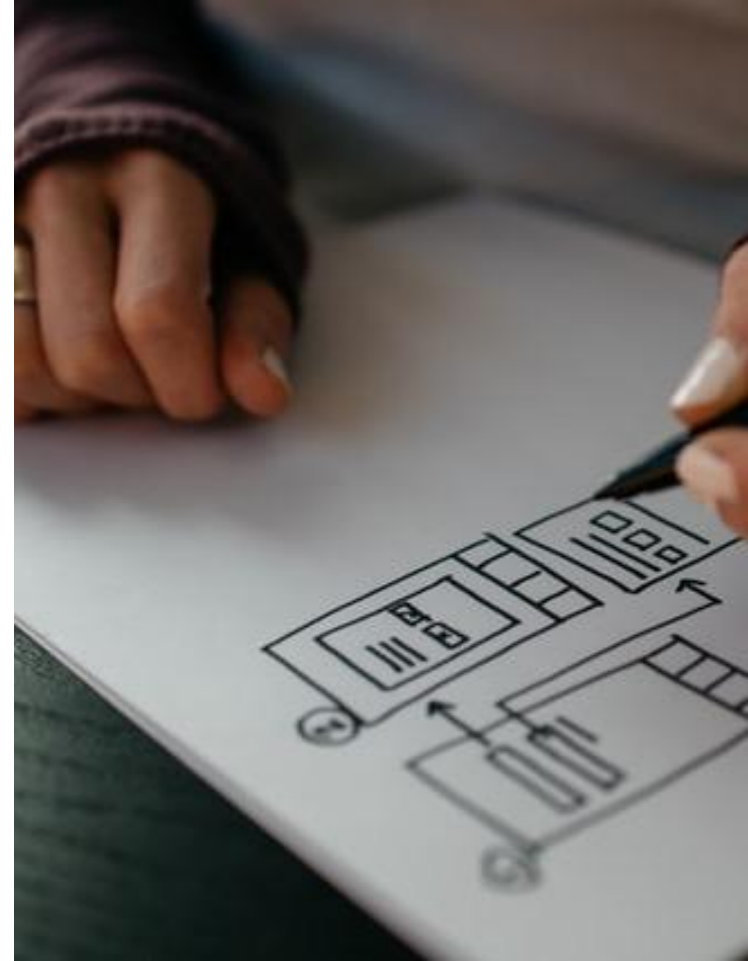


Roles of Caretakers in Big Team - Explained with Examples

1. **Design** for inclusion
2. **Simplify** Processes
3. **Foster** a sense of ownership
4. **Recognise** all contributions



1. Design for inclusion



Every contribution counts

The Turing Way fosters a culture of collaboration



Open

moz://a

Leadership



Pathways for Collaboration



Develop & share



Maintain & improve



Share resources



Review and update



Make it global



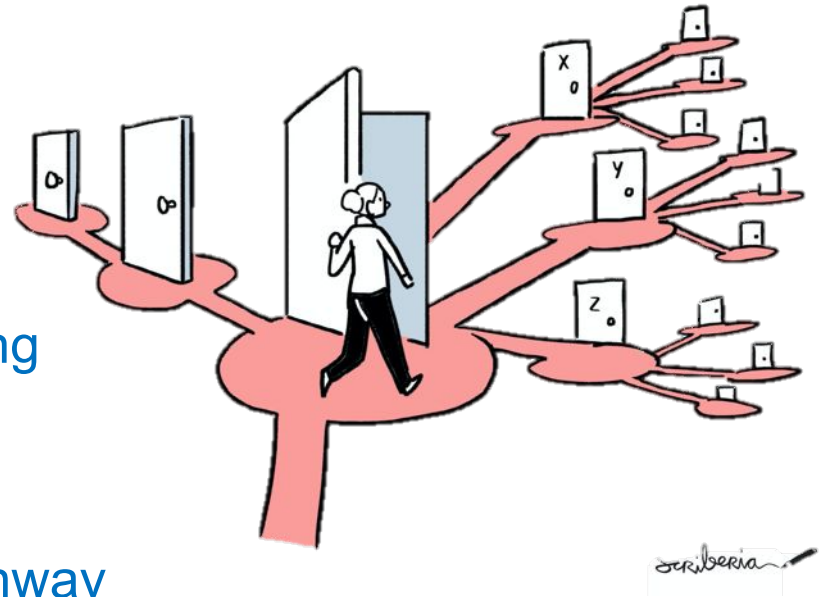
Share best practices

2. Simplify Processes

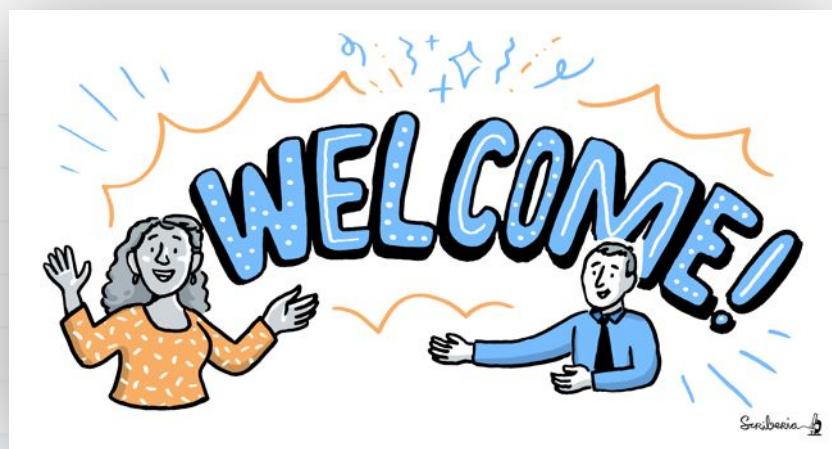


Community Resources

- [README](#), online repository
- [Contribution guideline](#), norms
- [Recommended practices](#), access
- Technical needs, [learning & mentoring](#)
- [Roles & rewards](#), support, policies
- Transparent reporting, [feedback pathway](#)



📁 .github	Remove prettier configuration	
📁 book	minor update	
📁 communications	Fix typos	
📁 conferences	Add KW formatting pedantry	
📁 project_management	Update online-collaboration-cafe.md	
📁 templates	Updating Github templates	
📁 tests	Add "et cetera" as a deprecated Latinism	
📁 workshops	Remove mis-pasted text	
📄 .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
📄 GOVERNANCE.md	Read through months later	5 months ago
📄 LICENSE.md	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
📄 book_skeleton.md	Update book_skeleton.md	13 months ago
📄 contributors.md	Add myself to contributors.md	11 months ago
📄 tips_and_tricks_survey.md	Update tips_and_tricks_survey.md	14 months ago
📄 ways_of_working.md	Adjust team contact section	5 months ago



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

The Turing Way Community Handbook

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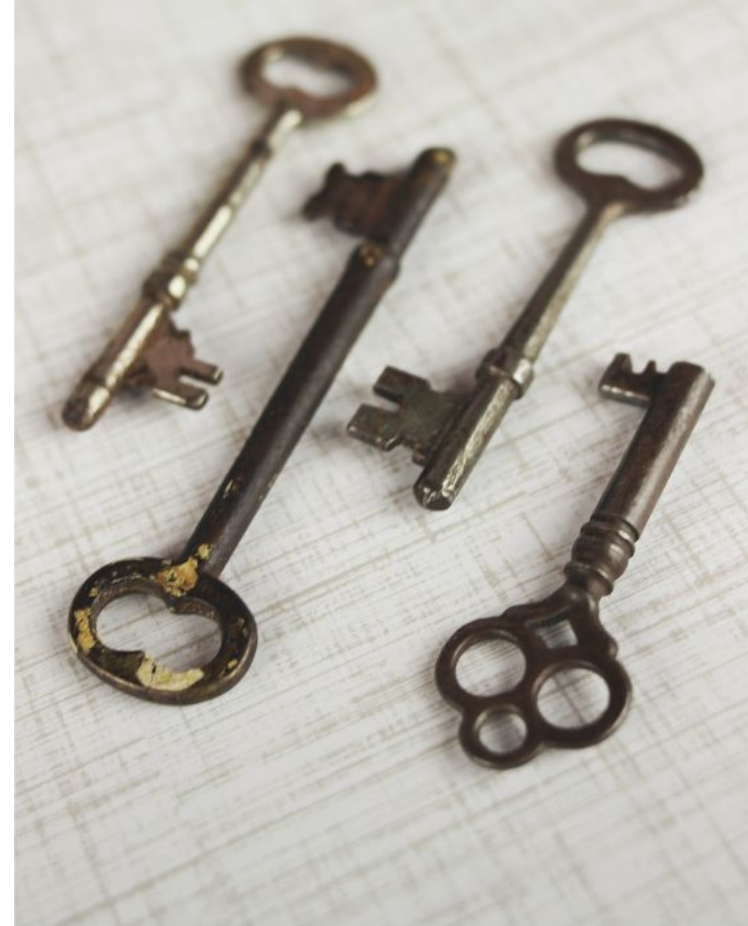
NO ISSUES
NO USERS



ERRORS
CAN PROVIDE
VALUABLE
OPPORTUNITIES
TO **PARTICIPATE**

Scriberia

3. Shared Sense of Ownership



Supporting Development

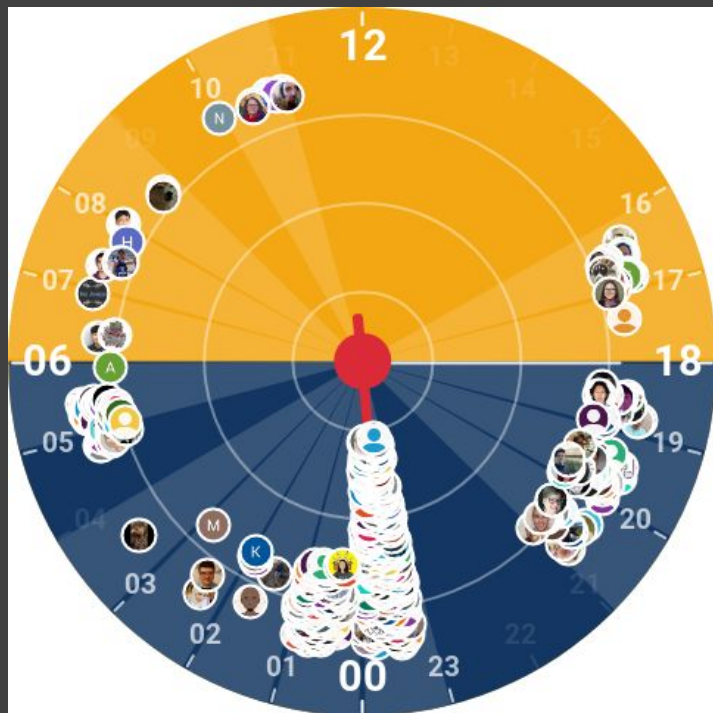


! Important

Please note that these requirements are not exhaustive or definitive, and neither are their classifications rigid. Moreover, no items are inherently more important than the other.

If you identify more consistency issues that need to be addressed, join the conversation [here](#).

Global Collaboration: Translation & Contextualisation



all contributors 322

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

crowdin

Turing Way

Project home

- Arabic (ar)
- Chinese Simplified (zh-CN)
- Portuguese, Brazilian (pt-...)
- Spanish, Latin America (e...)

Opportunities for connections



Co-working Calls & Collaboration Cafés



Biannual Book Dash Events

Collaborating Projects

Afterword

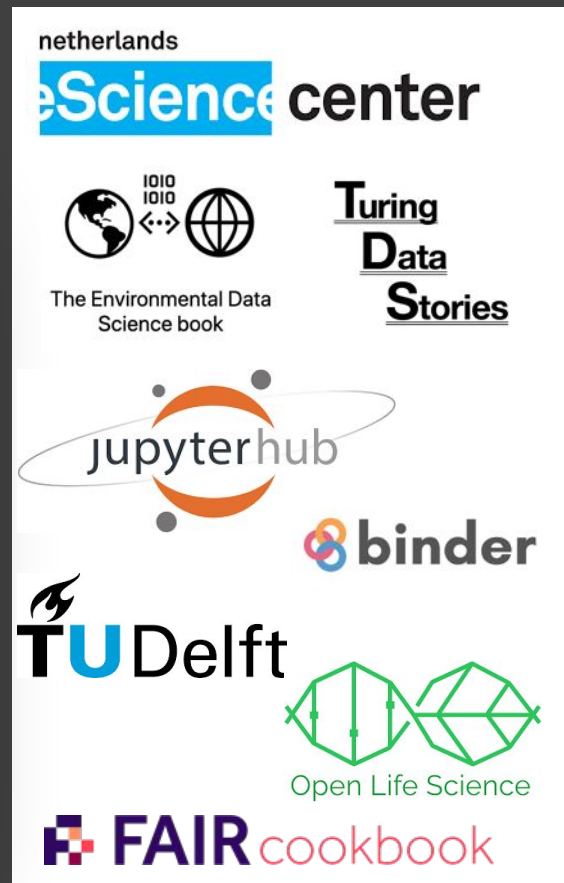
Glossary

Bibliography

Contributors Record

Collaborating Organisations

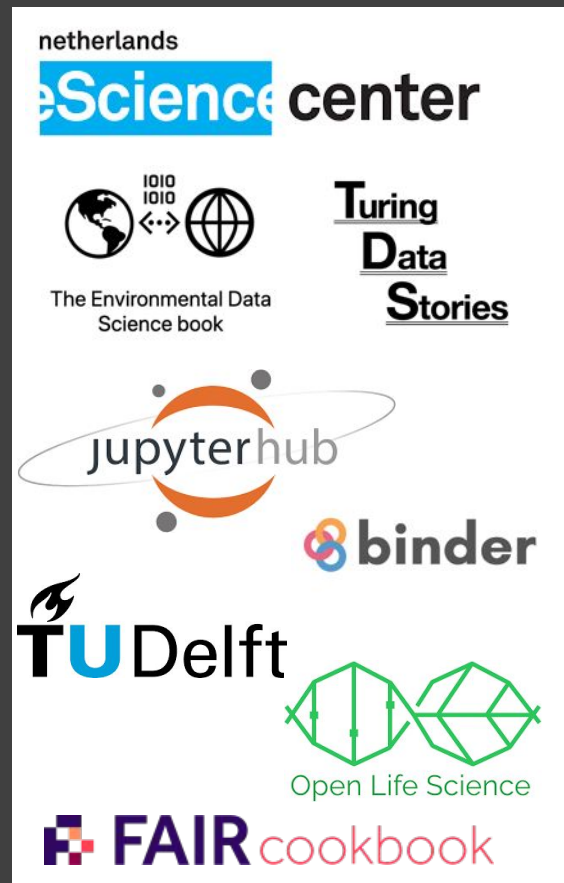
When members participate in The Turing Way community with the in-kind support of their funders and organisation, we acknowledge each member individually and list their organisations as “Collaborating organisations”. Such organisational supports are applicable when one or multiple members from a project or community collaborate to build resources in The Turing Way.



Collaborating Projects

Carlos Martinez-Ortiz (@c-martinez)	RSE community manager, Netherlands eScience Center	in-kind contribution
Esther Plomp (@EstherPlomp)	Data Steward, Faculty of Applied Sciences at Delft University of Technology	in-kind contribution
Sarah Gibson (@sgibson91)	Open Source Infrastructure Engineer, 2i2c & JupyterHub Community Development	in-kind contribution
Callum Mole (callummole)	Research Software Engineer, The Alan Turing Institute	Turing Binder Federation Membership - Project Contact

Core team members from partner projects (in-kind contributions)



4. Recognise All Contributions

D A N K E !

🚫 Issues 323

🔗 Pull requests 58

All Contributors

Recognize All Contributors

Including those that don't push code

de Jupyter Book / Enable collaborative annotation in the book #1561

BatoolMM merged 12 commits into `master` from `hypothesis` on 20 Nov 2020

Discussion 8 Commits 12 Checks 8 Files changed 3



BatoolMM commented on 10 Nov 2020 • edited

Collaborator 🗨️ ⋮

Reviewers

yochannah

malvikasharan

After a discussion in slack regarding the book-layout, @lauracion and @SamGuay suggested implementing [hypothes.is](#). I gave it a try and made changes in `_config.yml`. After that, I tried to build up the Jupyter book locally and it worked. It became easy to highlight any text and to add any notes in the book.



martinagvilas commented on 12 Nov 2020

Collaborator 🗨️ ⋮

Thanks @yochannah ! I created a `_static` folder with a file that contains your suggestion, and it seems to work in local deployment. I will make a commit soon to show.

And thanks for noticing about the footer in the sidebar, it seems that we need to change the `_config` file.



BatoolMM commented on 13 Nov 2020

Collaborator Author 🗨️ ⋮

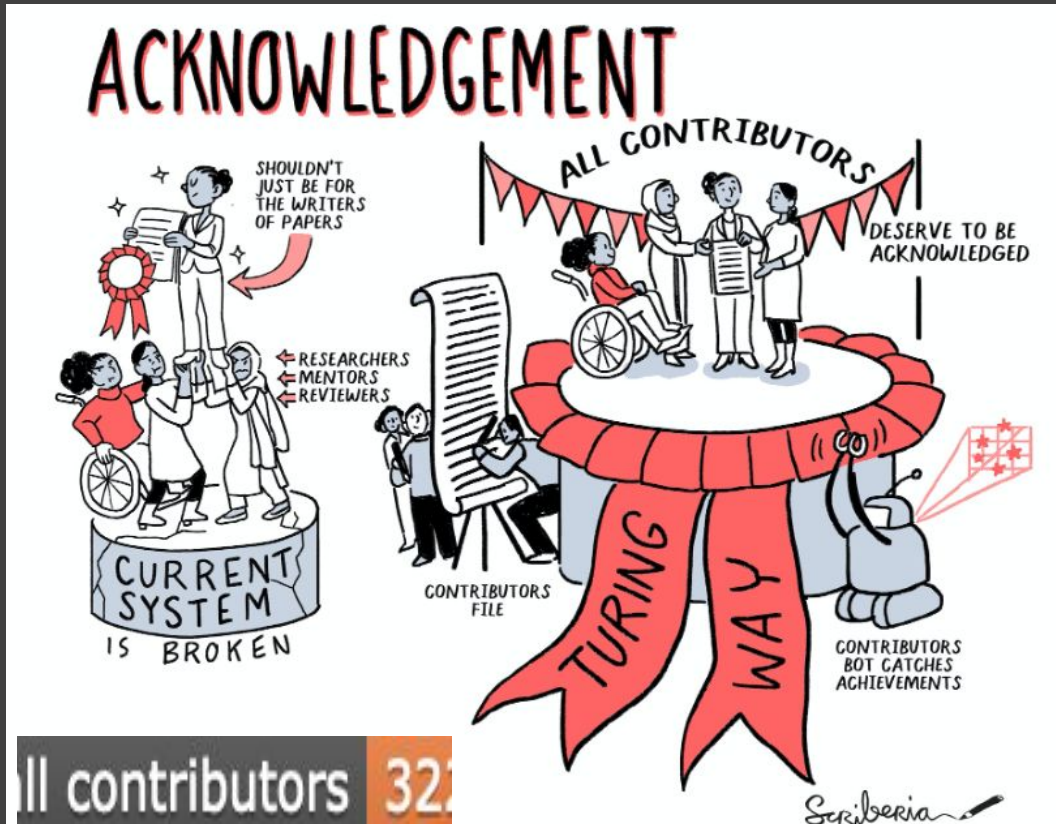
Thank you so much @yochannah for the detailed explanation 🙌 . I didn't realise that @martinagvilas fixed it until she mentioned it in shareout/presentation. You are awesome Martina ❤️

👍 2

❤️ 1

🚀 1

Recognition for all Contributors



All contributors 32

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>

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The Alan Turing Institute

Kirstie Whitaker (@KirstieJane)	PI, The Alan Turing Institute	-
Malvika Sharan (@malvikasharan)	Co-lead investigator, The Alan Turing Institute	-
Anne Lee Steele (@aleesteele)	The Turing Way Community Manager, The Alan Turing Institute	100%
Emma Karoune (@EKaroune)	Senior Community Manager, The Alan Turing Institute	5%
Arron Lacey (@arronlacey)	Senior Community Manager, The Alan Turing Institute	10%
Achintya Rao (@RaoOfPhysics)	Community Manager, The Alan Turing Institute	10%
Vicky Hellon (@vhellon)	Community Manager, The Alan Turing Institute	10%
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Arielle Bennett (@Arielle-Bennett)	Project Manager, The Alan Turing Institute	10%
Jennifer Ding (@dingaaling)	Research Application Manager, The Alan Turing Institute	10%

Tools, practices and systems

Building open source infrastructure to empower a global, decentralised network of people who connect data with domain experts

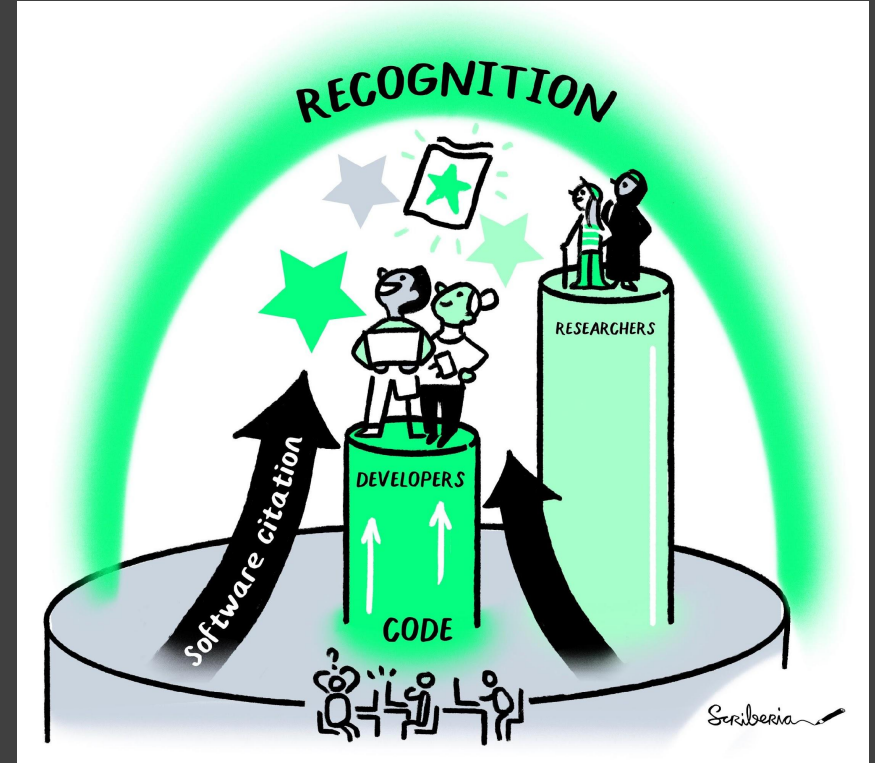
- Leadership
- Core team members in paid positions

Participation in Open Science Projects

Open is by default not:

- Inclusive
- Accessible
- Community-led

Intentional designing



Ensuring Recognition & Credit

Creating equitable opportunities for community leadership without trying to fit The Turing Way into a traditional credit system.

