

The  
Alan Turing  
Institute

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## Introduction to *The Turing Way*

Dr Emma Karoune,  
Research Associate

Pronouns: she/her      CC-BY 4.0



DOI: [10.5281/zenodo.4719847](https://doi.org/10.5281/zenodo.4719847)

@ekaroune, @turingway, #TuringWay

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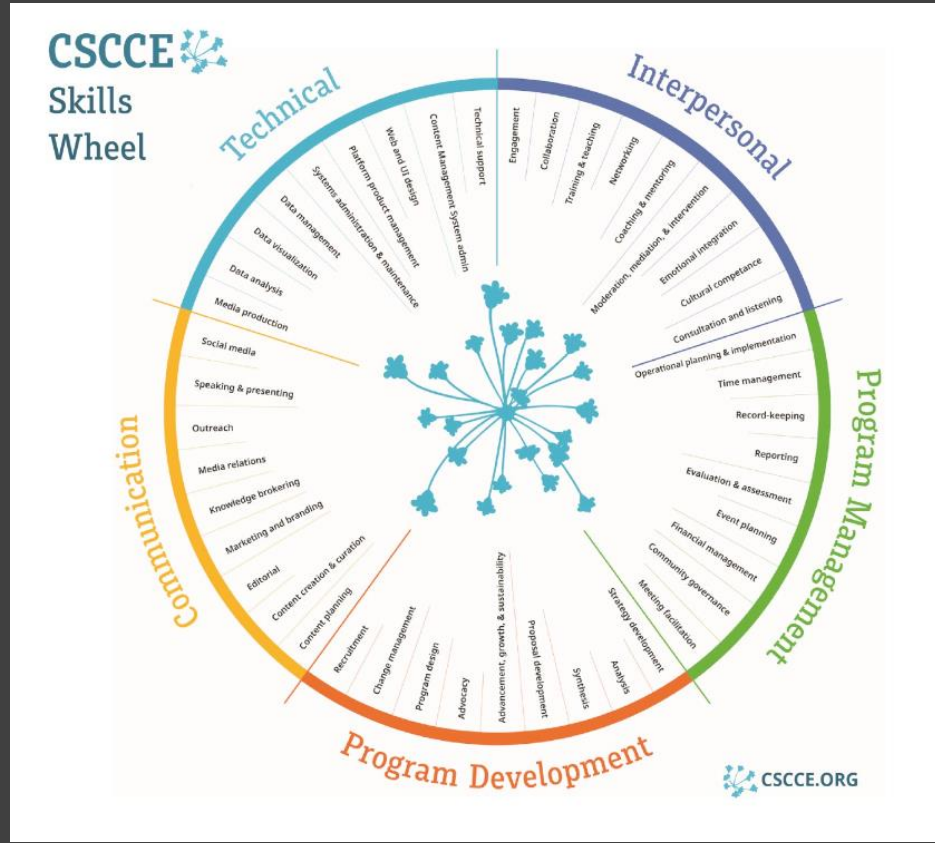
# Who am I?

- Research Associate and Community Manager of DECOVID at The Alan Turing Institute.
- Open Archaeobotanist – striving to increase open science practices in my discipline.
- Core Contributor to *The Turing Way*
- Written ‘Getting started with Github’ and currently working on the Guide to Communication.



# Working as a Community Manager

- People wrangler
- Opening up communications
- Removing barriers
- Documentation – Github
- Reproducibility and ethical research



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# Current work

## British Phytoliths

- Working on a phytolith reference

collection for British plant communities.

Project page:

<https://osf.io/a3evd/>

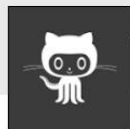


Historic England



Botanical Society  
of Britain & Ireland





# The Open Archaeobotanist

This is a blog about my open archaeobotanical work, open science things I get up to and other peoples open work!

## Open Access Week 2020

Review of Open and Engaged 2020

Posted on October 25, 2020

Open Access Week Review of Open and Engaged Conference



## FAIR Phytoliths

- Open source project
- Github/Zenodo
- License
- Contributing guide

## Reproducible workflow

- Readme file – methods
- Open data
- Open analysis – R
- Binder

## Thanks to the core team!

- Javier Ruiz-Perez
- Carla Lancelotti
- Marco Madella
- Juanjo Garcia-Granero

main 2 branches 0 tags

Go to file Add file Code

open-phytoliths-admin	Delete index.html	8c9bd66 11 days ago	55 commits
CODE_OF_CONDUCT.md	Update CODE_OF_CONDUCT.md		22 days ago
CONTRIBUTING.md	Update CONTRIBUTING.md		19 days ago
LICENSE.md	Update LICENSE.md		last month
README.md	Update README.md		19 days ago
ROADMAP.md	Update ROADMAP.md		19 days ago

README.md

### FAIR Phytoliths: Increasing the FAIRness of phytolith data

*"We want to learn new ideas and new ways to share our work and then explain these ideas to the group of people working with old cells from green stuff"*

This is what we do explained using only the 1000 most common words (produced with UP-GOERS text editor).

#### Welcome!

Thanks for visiting the FAIR Phytoliths project repository! In this document you can find lots of information about this project. You can just scroll down or use the quick links below for each section.

- What is this project about and why is it important?
- What do we want to do?
- What does this project need?
- How can you get involved?
- Who are we?
- Get in touch
- Find out more

#### About

open-phytoliths.github.io/faier\_phyto...

- open-source
- open-science
- archaeology
- palaeoecology
- phytoliths
- fair-data
- archaeobotany

Readme

View license

#### Releases

No releases published  
Create a new release

#### Packages

No packages published  
Publish your first package

#### Contributors 4

- jruijperez Javier
- open-phytoliths-admin ICOPS - Inte...
- cl379
- EKaroune Em K

#### Environments 1

github-pages Active

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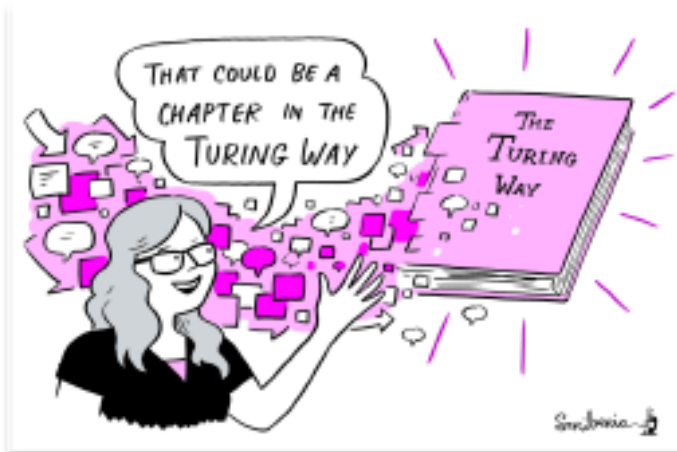
**GitHub:**  
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**Twitter:**  
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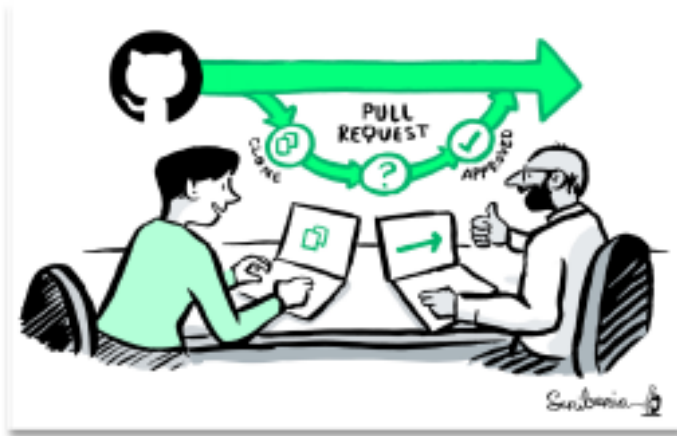
## A Book



## A Community



## An Open Source Project



## A Culture of Collaboration



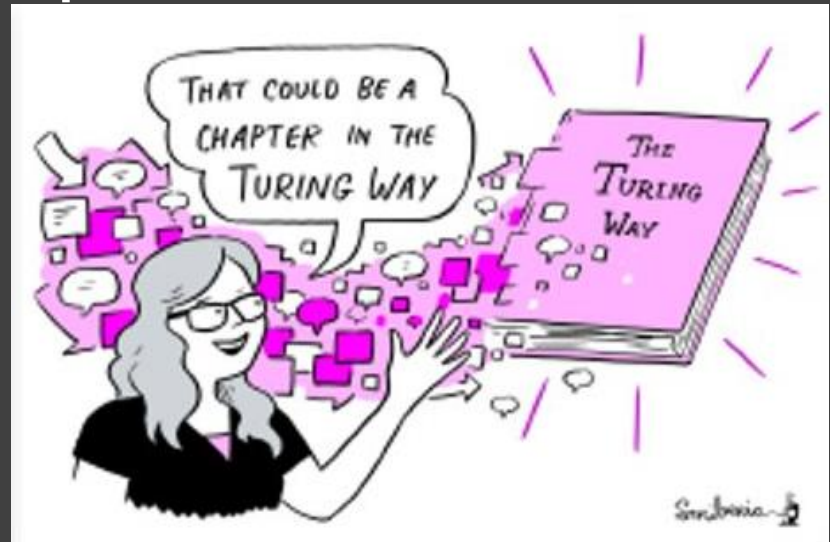
# The Turing Way – The Book



## Kirstie Whitaker


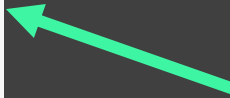
- Project Lead of The Turing Way.
- Programme Lead for Tools, Practices and Systems at The Alan Turing Institute.

Started as a Guide to  
Reproducible Research



# Guide for reproducibility

- 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

Search this book...

Welcome

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

## Guide for Reproducible Research

This guide covers topics related to skills, tools and best practices for research reproducibility.

The Turing Way defines reproducibility in data research as data and code being available to fully rerun the analysis.

There are several definitions of reproducibility in use, and we discuss these in more detail in the [Definitions](#) section of this chapter. While it is absolutely fine for us each to use different words, it will be useful for you to know how *The Turing Way* defines *reproducibility* to avoid misunderstandings when reading the rest of the handbook.




Fig. 2 The Turing Way project illustration by Scriberia. Zenodo. <http://doi.org/10.5281/zenodo.3332807>

The Turing Way started by defining reproducibility in the context of this handbook, laying out its importance for science and scientists, and providing an overview of the common concepts, tools and resources. The first few chapters were on [version control](#), [testing](#), and [reproducible computational environments](#). Since the start of this project in 2019, many additional chapters have been written, edited, reviewed, read and promoted by over 100 contributors.

# Other Guides

## Guide for Collaboration ^

Getting Started With GitHub v

Collaborating on GitHub v

Maintainers and Reviewers  
on GitHub v

Managing a New Community  
and Team v

Leadership in Data Science v

Remote Collaboration v



The Turing Way

Search this book...

Welcome

Guide for Reproducible  
Research v

Guide for Project Design v

Guide for Communication v

Guide for Collaboration ^

Getting Started With GitHub v

Collaborating on GitHub v

Maintainers and Reviewers  
on GitHub v

Managing a New Community  
and Team v

Leadership in Data Science v

Remote Collaboration v

Guide for Ethical Research v

Community Handbook v

Afterword v

Visit our GitHub Repository

This book is powered by Jupyter Book



## Guide for Collaboration

This guide covers topics related to effective and inclusive collaboration.

Data science is defined by its interdisciplinarity. Our work can only reach its greatest potential if there are diverse teams of people involved in designing and delivering the research or product.



Fig. 37 The Turing Way project illustration by Scriberia. Zenodo. <http://doi.org/10.5281/zenodo.3332807>

There are many different skills required to work well in groups with a range of expertise. In this guide, we welcome contributions for developing guidance on following (but not limited to) topics:

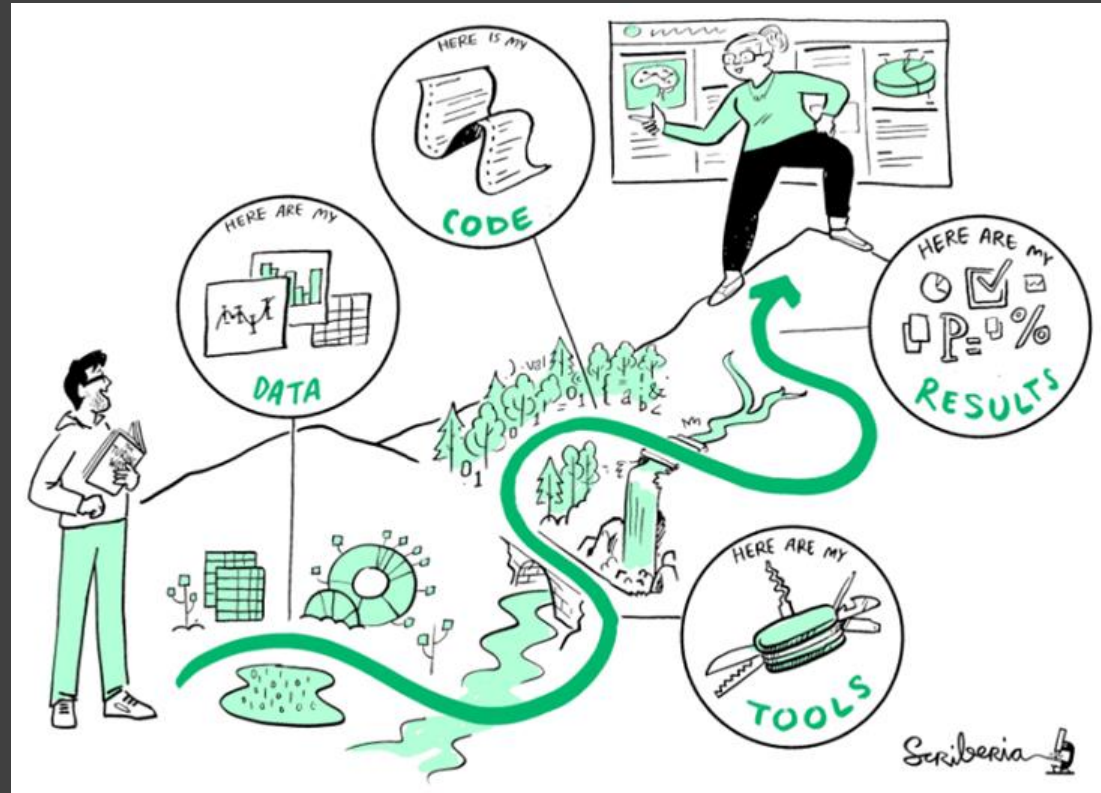
- Designing a project that welcomes contributions
- Distributed collaboration on GitHub
- Reviewing team member's contributions
- Remote working



# What is Reproducible Research?

Definition from  
*The Turing Way*:

‘Work that can be independently recreated from the same data and the same code that the original team used’.



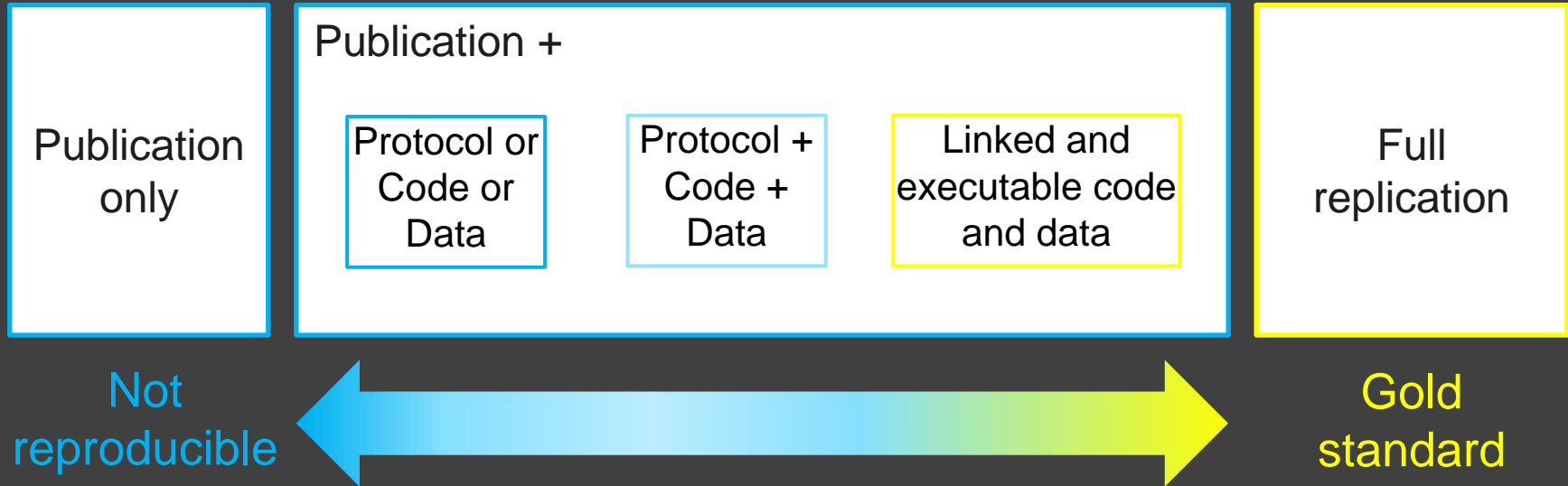
# What is Reproducible Research?

Definitions of reproducibility change depending on your discipline.

		Data	
		Same	Different
Analysis	Same	Reproducible	Replicable
	Different	Robust	Generalisable

How the Turing Way defines reproducible research

# Reproducible Research Spectrum



*Adapted from Peng 2011, DOI: 10.1126/science.1213847*

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# Barriers to Reproducible Research

- Requires additional skills.
- Requires a change of mind set.
- Is not considered for promotion.
- Held to higher standards than others.
- Publication bias towards novel findings.
- Takes time.
- Requires additional infrastructure (and money?).



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# How do you do Reproducible Research?

There are lots of different ways to work reproducibly.

## Transparency

- clear documentation of your workflow so methods, data, code - a working research compendium.

## Collaboration

- open access to work and working with others needs version control.

As open as possible, but as closed as necessary

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## Research compendia

- Set of files that gives all the information about your reproducible project.
- Data
- Analysis
- Methods
- README file

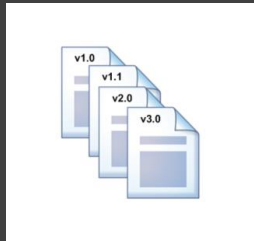
```
compendium/  
├── data  
│   └── my_data.csv  
├── analysis  
│   └── my_script.R  
├── DESCRIPTION  
└── README.md
```

Basic research  
compendium structure

# Version control - records changes made in a file over time.

## Benefits

- Go back to previous versions.
- Store history of changes.
- Collaborate with other.
- Recording contributions of team - fair credit for work done.



## How you can do this:

- Simple file versioning - add v1.0, 1.1, 1.2, etc, to filename.
- Use simple tools - Google drive, Dropbox.
- Advanced tools - Github, subversion.

---

# What is Github?

- Git is an open source, version control tool.
- Github is the online interface that uses Git.

## Why it is useful for reproducible projects

- Storage of all project documentation, data, code and you can create a webpage.
- Web interface for version control
- Working collaboratively - kanban project pages, issues, pull requests.





# Binder

- Turns a Git repo into interactive notebooks.
- Packaging your computational environment for executable research compendia.
- Can use any scripting language – R, python, Julia and others.
- This will soon be in the book.

Here's a blog:

- <https://www.software.ac.uk/top-tips-making-most-out-binder>

# How do we add more content?





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

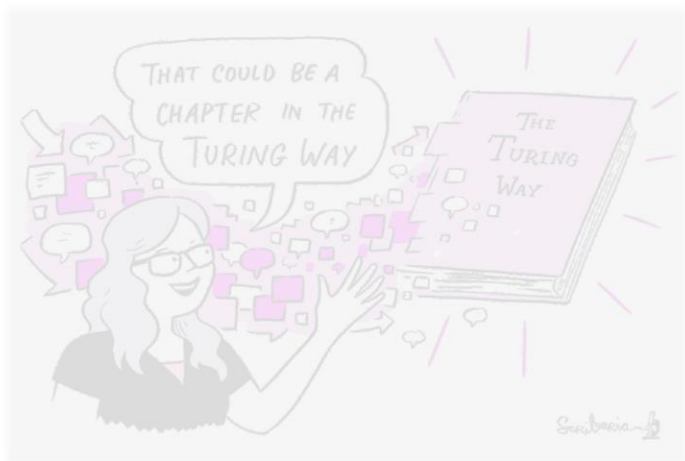
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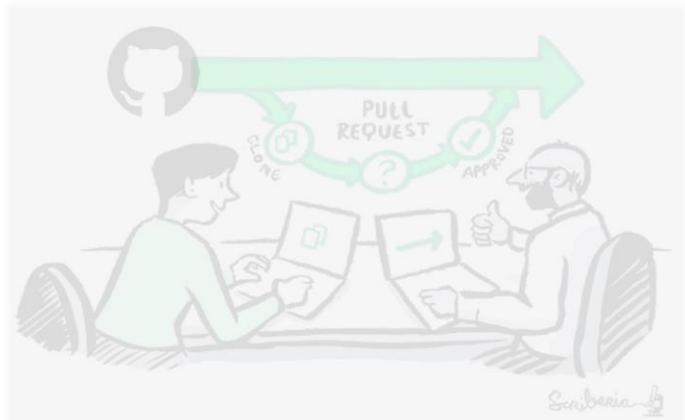
## A Book



## A Community



## An Open Source Project



## A Culture of Collaboration





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# Malvika Sharan

“No one can change research culture on their own. Scaling our community by empowering YOU to participate is how we will change the world.”



<https://doi.org/10.5281/zenodo.4536335>

<https://foss-backstage.de/session/>

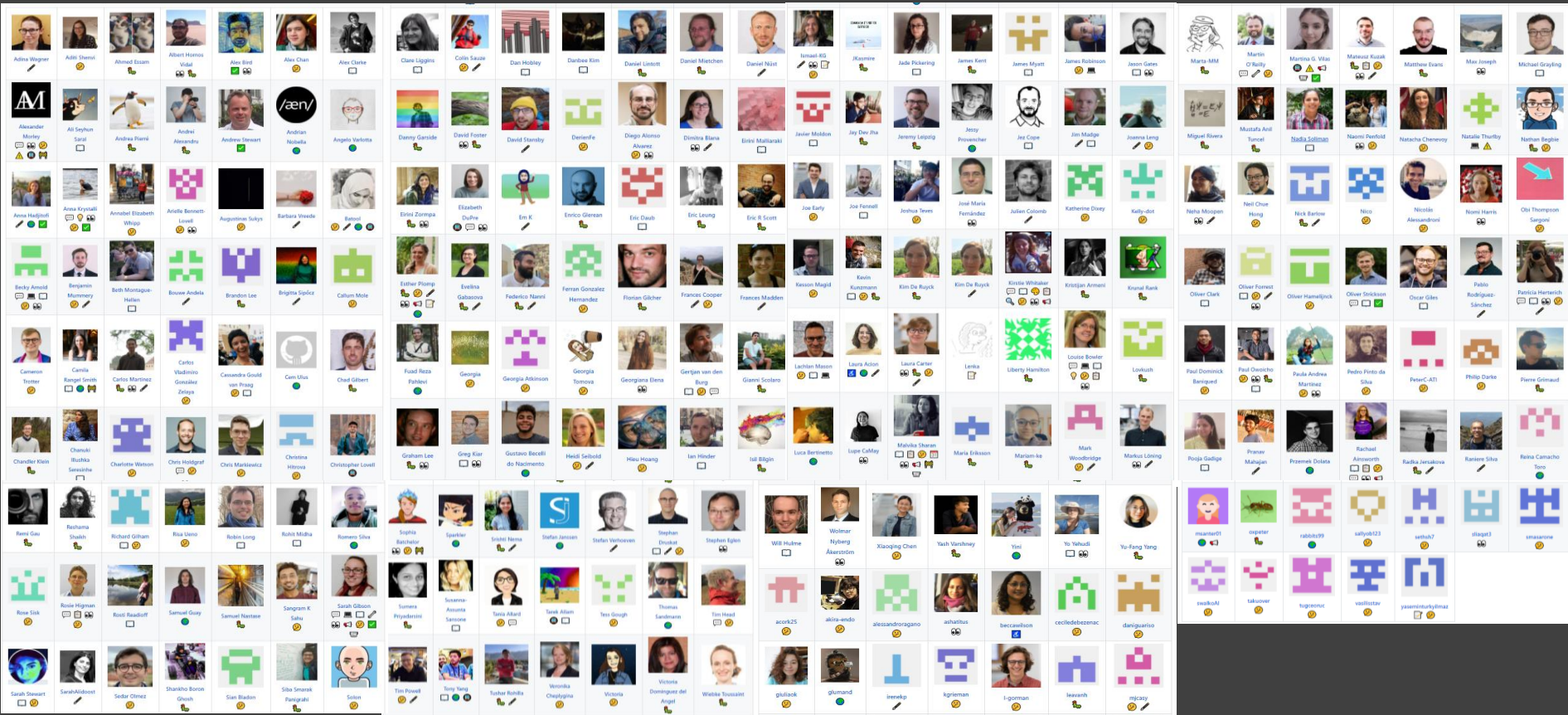
[building-culture-collaboration-open-source-communities-turing-way](https://foss-backstage.de/session/building-culture-collaboration-open-source-communities-turing-way)

@TuringWay @kirstie\_j

<https://doi.org/10.5281/zenodo.4537450>



# Our Community of 200+ contributors!

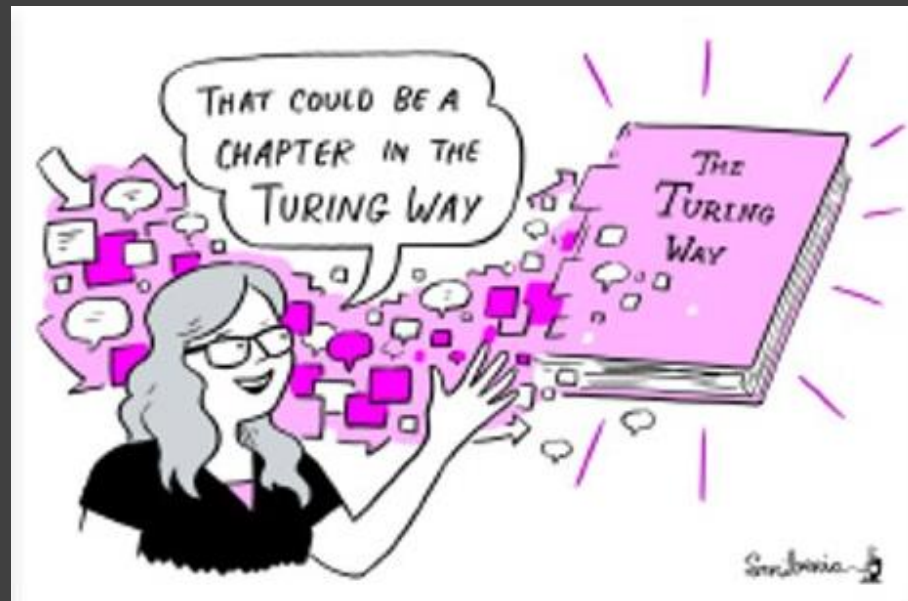


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# Join us!

You can help in so many ways:

- Editing
- Writing
- Linking
- Automating
- Curating
- Translating
- Promoting



# Mentored contributions



Collaboration cafes  
Co-working sessions  
Onboarding sessions



Book Dash

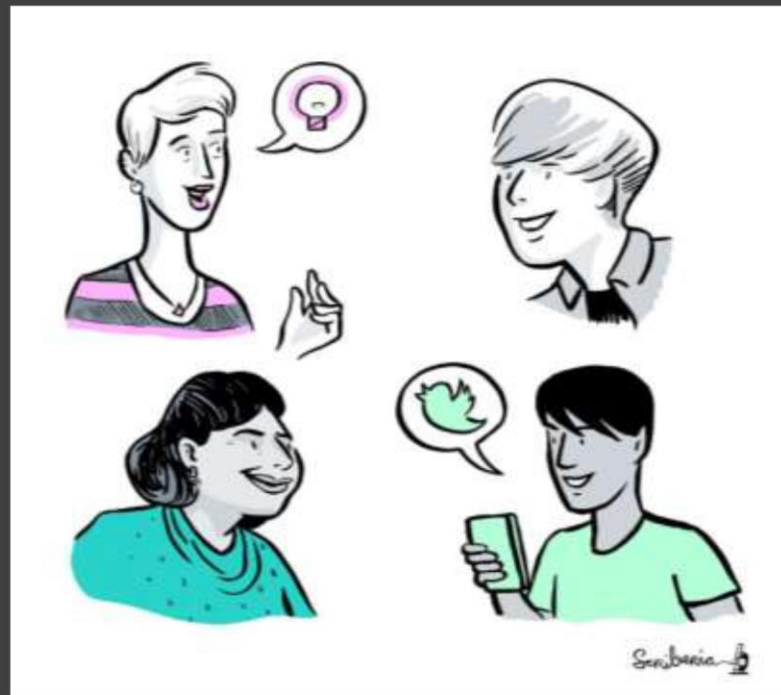
@ekaroune, @turingway, #TuringWay



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# Collaboration cafes

- 1<sup>st</sup> and 3<sup>rd</sup> Wednesdays of each month
- All remote participation
  - Zoom call
  - Pomodoro technique
  - Breakout rooms for mentored contributions
- Everyone welcome



[https://github.com/alan-turing-institute/the-turing-way/blob/master/project\\_management/online-collaboration-cafe.md](https://github.com/alan-turing-institute/the-turing-way/blob/master/project_management/online-collaboration-cafe.md)

@TuringWay @kirstie\_j  
<https://doi.org/10.5281/zenodo.4537450>

@ekaroune, @turingway, #TuringWay

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## Martina Vilas

“The co-working hours are friendly for introverts who might be intimidated working with new people. These personal interactions are also crucial for staying motivated!”



# Onboarding sessions

- Every Friday at 3 – 4pm UTC.
- Informal chat about how to get involved.
- Ideas.
- Technical help.



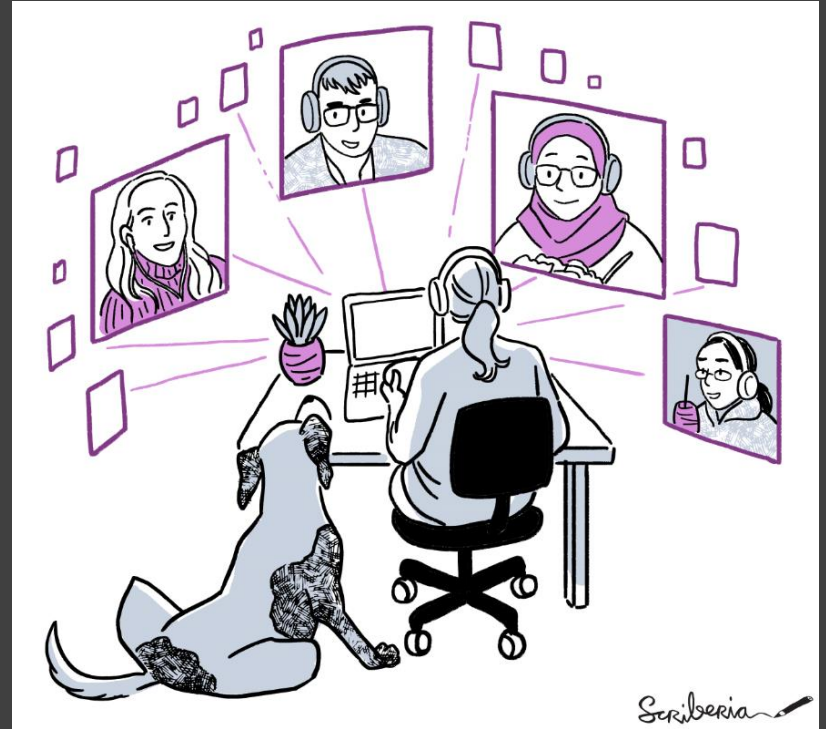
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# Our next Book Dash!

17-21 May 2021

- Fully online
- Intensive week of development of the book

We run these events several times a year and you have to apply to join them.







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

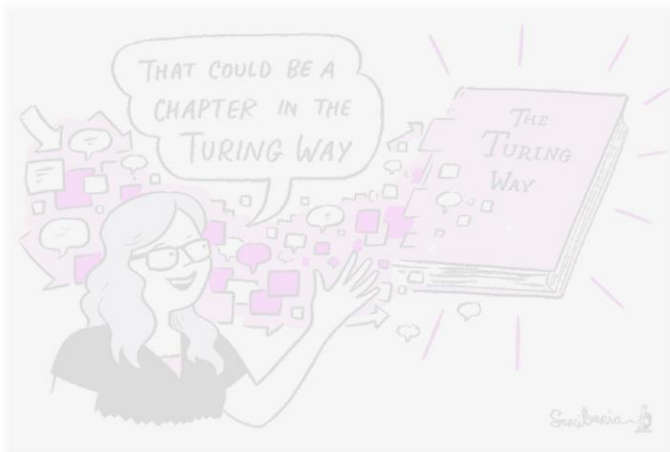
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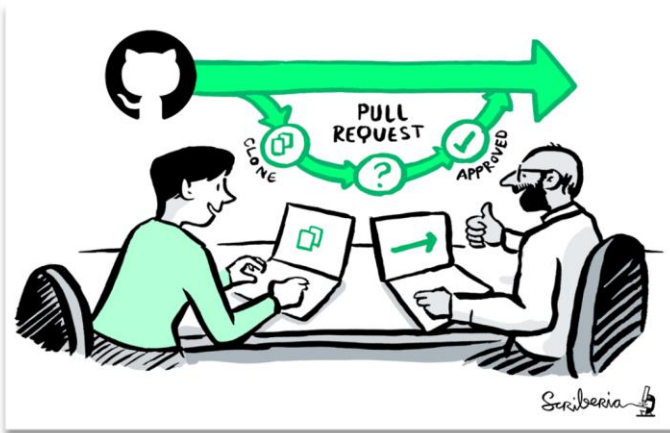
## A Book



## A Community



## An Open Source Project



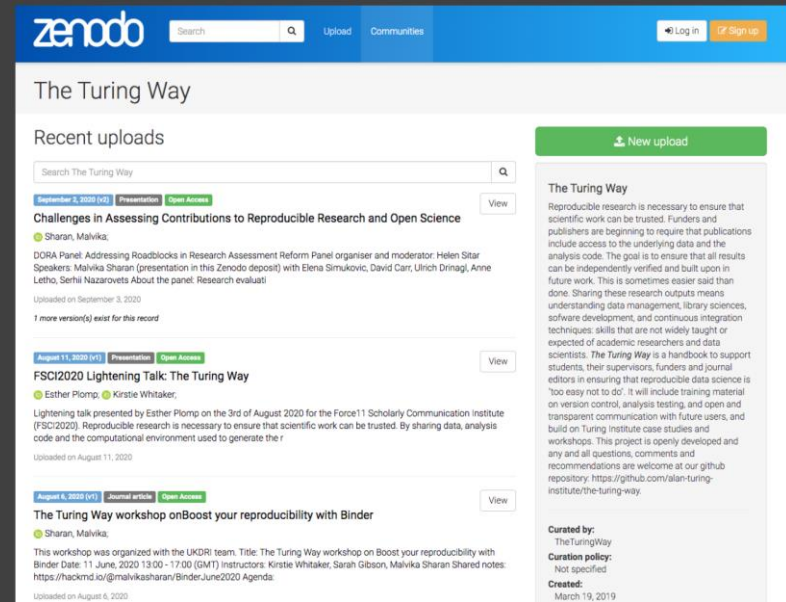
## A Culture of Collaboration





# An open source project

- Everyone can freely read, reuse, distribute, modify and help develop.
- The project belongs to *The Turing Way* community (CC-BY license).



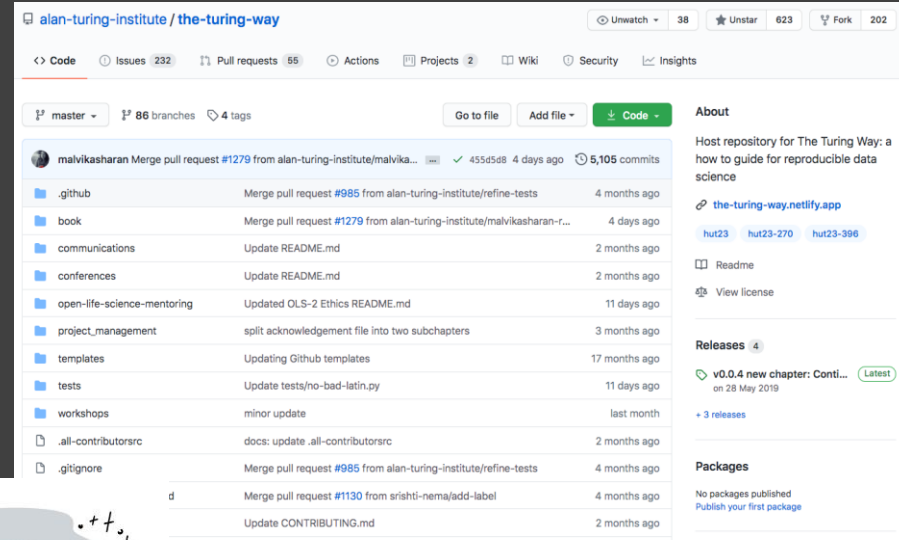
The screenshot shows the Zenodo website interface for the 'The Turing Way' project. The header includes the Zenodo logo, a search bar, and navigation links for 'Upload' and 'Communities'. The main content area is titled 'The Turing Way' and features a 'Recent uploads' section. A search bar is present above the list of uploads. The list includes three items:

- September 2, 2020 (v1)** | Presentation | Open Access | View  
**Challenges in Assessing Contributions to Reproducible Research and Open Science**  
Sharan, Malvika.  
DORA Panel. Addressing Roadblocks in Research Assessment Reform Panel organiser and moderator: Helen Sitar  
Speakers: Malvika Sharan (presentation in this Zenodo deposit) with Elena Simukovic, David Carr, Ulrich Drinagl, Anne Letho, Serhil Nazarovets About the panel: Research evaluati  
Uploaded on September 3, 2020  
1 more version(s) exist for this record
- August 11, 2020 (v1)** | Presentation | Open Access | View  
**FSCI2020 Lightning Talk: The Turing Way**  
Esther Plomp, @ Kirstie Whitaker,  
Lightning talk presented by Esther Plomp on the 3rd of August 2020 for the Force11 Scholarly Communication Institute (FSCI2020). Reproducible research is necessary to ensure that scientific work can be trusted. By sharing data, analysis code and the computational environment used to generate the r  
Uploaded on August 11, 2020
- August 6, 2020 (v1)** | Journal article | Open Access | View  
**The Turing Way workshop onBoost your reproducibility with Binder**  
Sharan, Malvika.  
This workshop was organized with the UKDR1 team. Title: The Turing Way workshop on Boost your reproducibility with Binder Date: 11 June, 2020 13:00 - 17:00 (GMT) Instructors: Kirstie Whitaker, Sarah Gibson, Malvika Sharan Shared notes: <https://hackmd.io/@melvikasharan/Binder.June2020> Agenda.  
Uploaded on August 6, 2020

On the right side, there is a 'New upload' button and a section titled 'The Turing Way' with a detailed description of the project's goals and mission. Below this, it lists 'Curated by: The TuringWay', 'Curation policy: Not specified', and 'Created: March 19, 2019'.

# An open source project

- Hosted on Github.
- And built with other Open Source projects (Git, Jupyter Book, netlify).



alan-turing-institute / the-turing-way

Unwatch 38 Unstar 623 Fork 202

<> Code Issues 232 Pull requests 65 Actions Projects 2 Wiki Security Insights

master 86 branches 4 tags Go to file Add file Code

malvikasharan Merge pull request #1279 from alan-turing-institute/malvika... 455458 4 days ago 5,105 commits

File	Commit	Time
.github	Merge pull request #985 from alan-turing-institute/refine-tests	4 months ago
book	Merge pull request #1279 from alan-turing-institute/malvikasharan-r...	4 days ago
communications	Update README.md	2 months ago
conferences	Update README.md	2 months ago
open-life-science-mentoring	Updated OLS-2 Ethics README.md	11 days ago
project_management	split acknowledgement file into two subchapters	3 months ago
templates	Updating Github templates	17 months ago
tests	Update tests/no-bad-latin.py	11 days ago
workshops	minor update	last month
.all-contributorsrc	docs: update .all-contributorsrc	2 months ago
.gitignore	Merge pull request #985 from alan-turing-institute/refine-tests	4 months ago
	Merge pull request #1130 from srishti-nema/add-label	4 months ago
	Update CONTRIBUTING.md	2 months ago

About

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

the-turing-way.netlify.app

hut23 hut23-270 hut23-396

Readme

View license

Releases 4

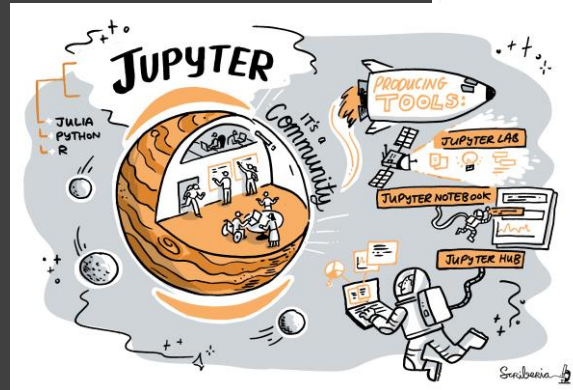
v0.0.4 new chapter: Conti... on 28 May 2019 Latest

+ 3 releases

Packages

No packages published

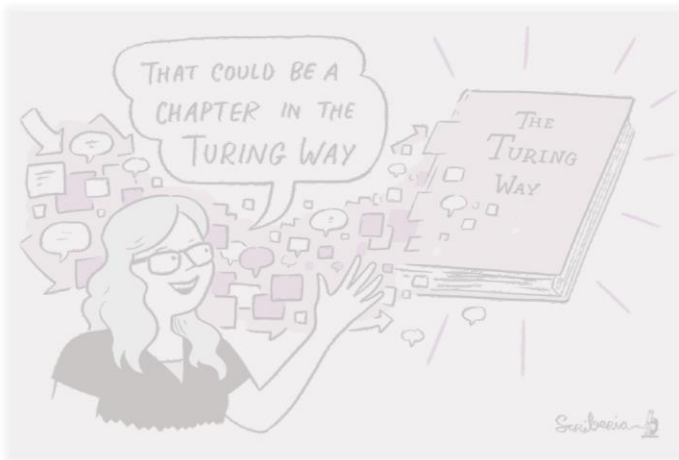
Publish your first package



@ekaroune, @turingway, #TuringWay



## A Book



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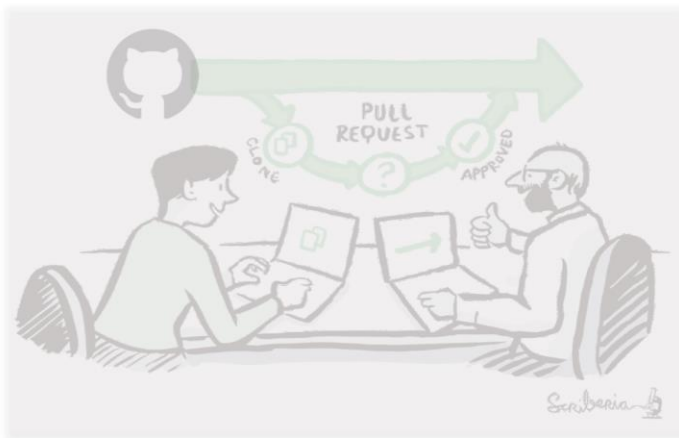
**Email:**  
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## A Community



## An Open Source Project

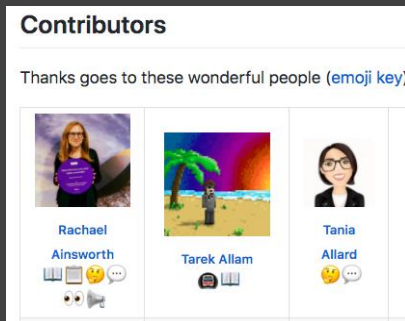


## A Culture of Collaboration



# We collaborate!

- Code of conduct
- All contributions are reviewed.
- Acknowledging all contributors.



└─ .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
└─ CODE_OF_CONDUCT.md	her -> their	6 months ago
└─ CONTRIBUTING.md	Update CONTRIBUTING.md	2 months ago
└─ GOVERNANCE.md	Read through months later	5 months ago
└─ LICENSE.md	Fix typo in licence	2 months ago
└─ README.md	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

## Acknowledgements:

- Kirstie Whitaker ([@kirstie\\_j](#)), Project Lead
- Malvika Sharan ([@malvikasharan](#)), Community Manager
- *The Turing Way* community, friends & collaborators

The  
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Institute



## Useful links:

- Book: [the-turing-way.netlify.com](https://the-turing-way.netlify.com)
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- 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>



@ekaroune, @turingway, #TuringWay