The Alan Turing Institute

# The Turing Way:

## Building a Guide to Reproducible, Ethical and Collaborative Research

Malvika Sharan
Pronouns: she/her

@malvikasharan @turingway, CC-BY 4.0, Zenodo: https://zenodo.org/record/4969380, DOI: 10.5281/zenodo.4969380

# *The Turing Way*

## An Open Source guide on Data Science.

We involve and supports a **diverse community** to make data science **reproducible, ethical, collaborative and inclusive** for everyone.

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The Alan Turing Institute

# The national institute for data science and artificial intelligence

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## Tools, Practices and Systems

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

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# *The Turing Way* Book on Reproducibility

Kirstie Whitaker

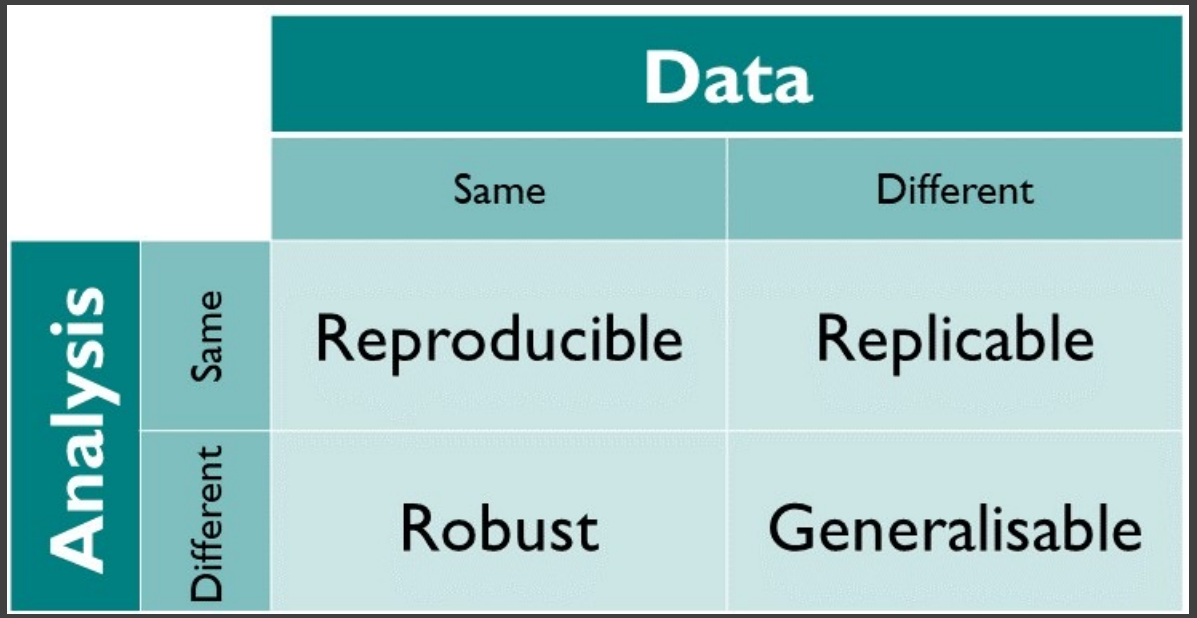
Lead of Tools, Practices & Systems Programme

*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 |

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# Guide for Reproducible Research


Guide for Reproducible Research

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

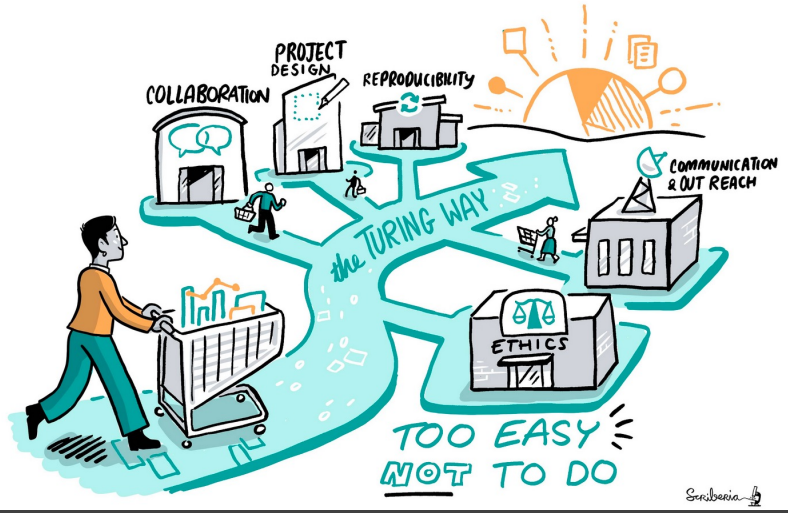

## Welcome

*The Turing Way* is an open source community-driven guide to reproducible, ethical, inclusive and collaborative data science.

Our goal is to provide all the information that data scientists in academia, industry, government and the third sector need at the start of their projects to ensure that they are easy to reproduce and reuse at the end.

The book started as a guide for reproducibility, covering version control, testing, and continuous integration. However, technical skills are just one aspect of making data science research "open for all".

In February 2020, *The Turing Way* expanded to a series of books covering reproducible research, project design, communication, collaboration, and ethical research.




@malvikasharan @turingway, CC-BY 4.0, Book: https://the-turing-way.netlify.app/welcome, DOI: 10.5281/zenodo.4969380

# Reproducibility

| | | Data | |
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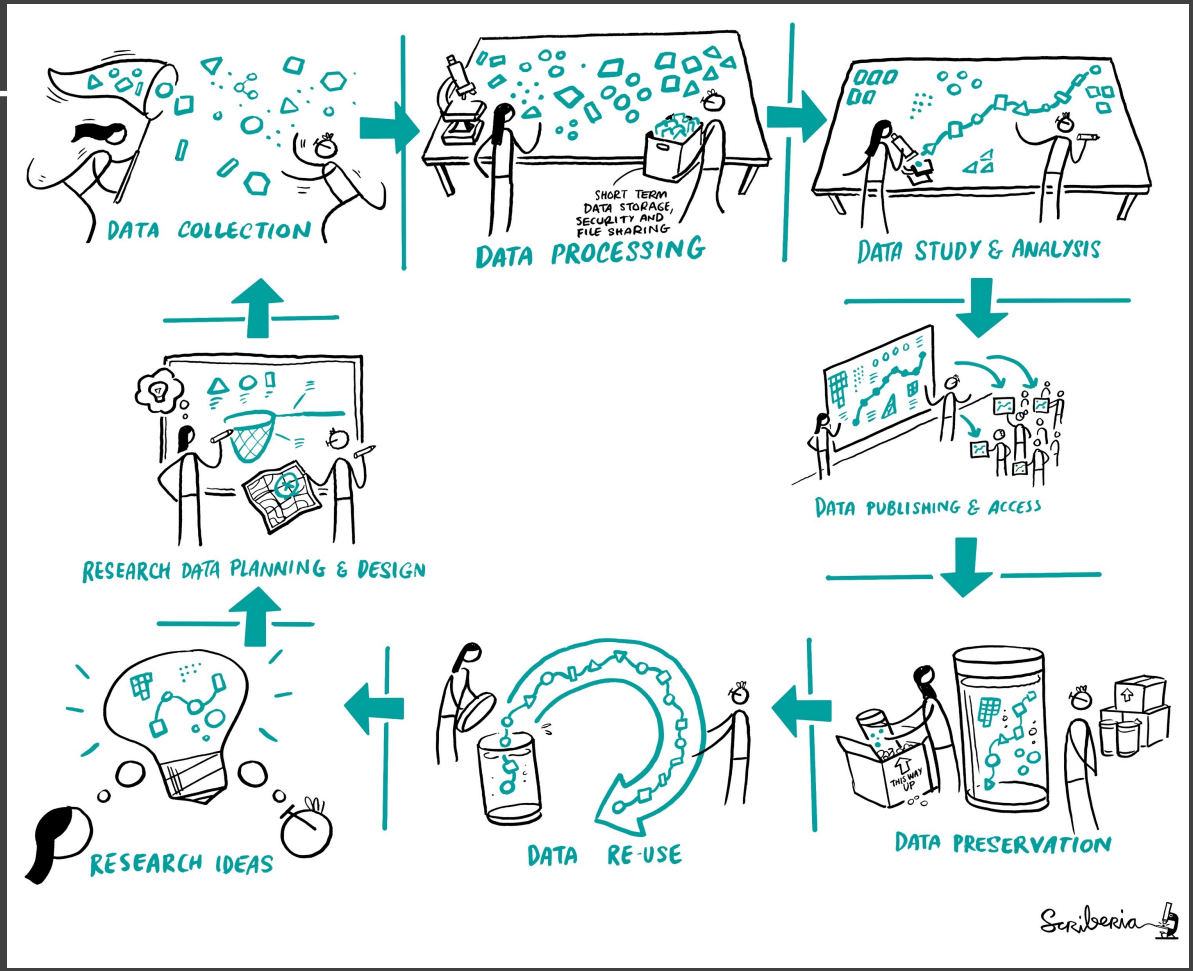
| | | Same | Different |
| Analysis | Same | Reproducible | Replicable |
| | Different | Robust | Generalisable |

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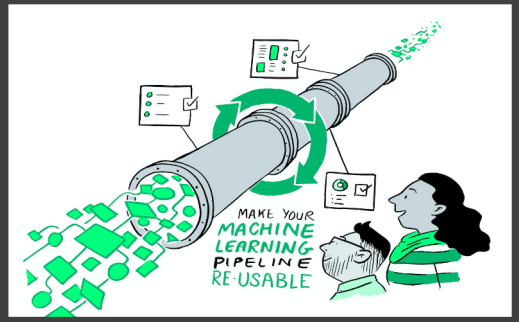
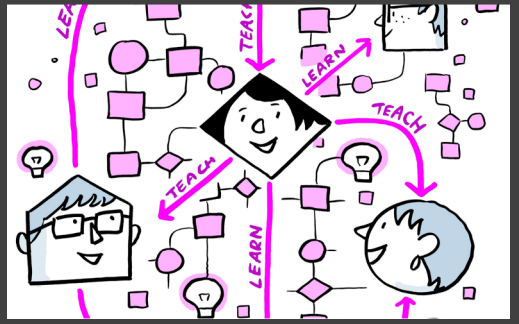
# *The Turing Way* Guides

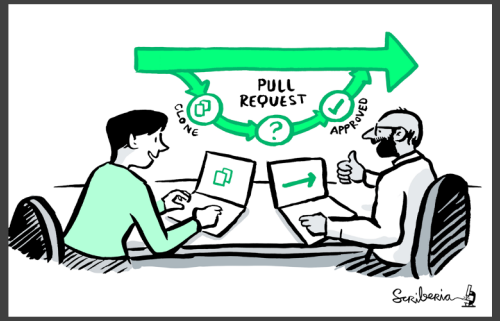



*Reproducibility*

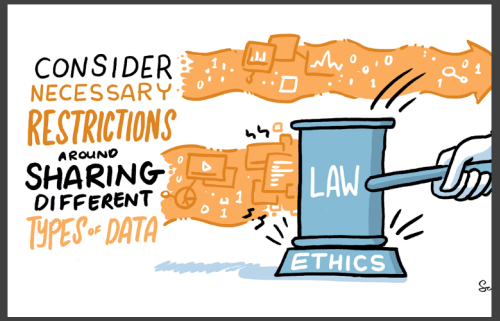
*Project Design*



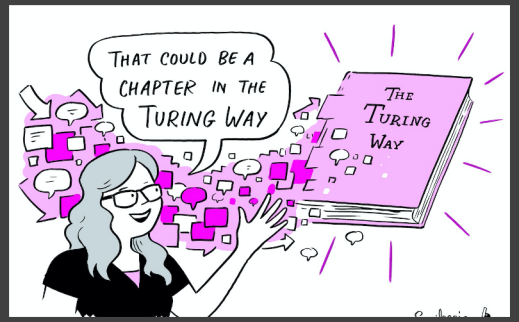

*Communication*




*Collaboration*



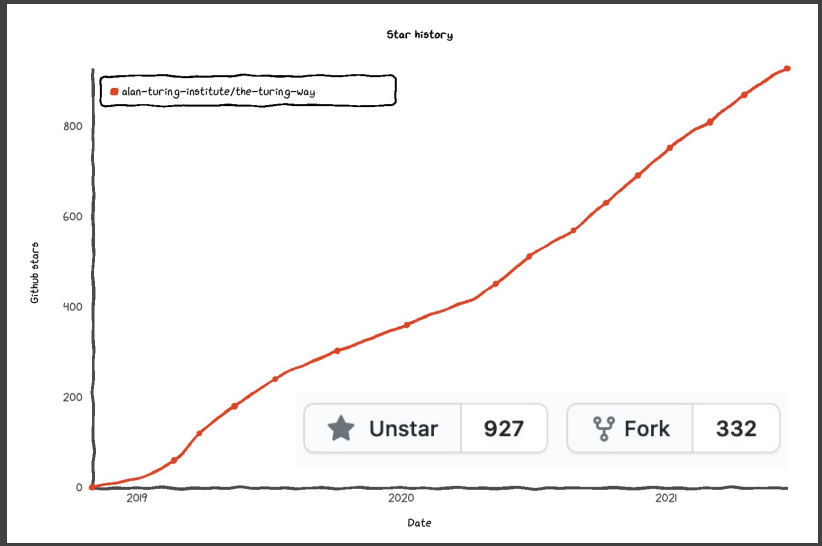

*Ethical Research*




*Community Handbook*

# Project and Community Growth

- 2.5 years, >160 pages
- Community resources, events, guidance, templates, training
- 270 direct GitHub contributors and thousands of users




https://zenodo.org/record/3332807

zenodo

4,711 views

5,683 downloads

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# Ethical Research

*Researchers in data science have an obligation to consider the ethical standards and their impact of people's lives.*

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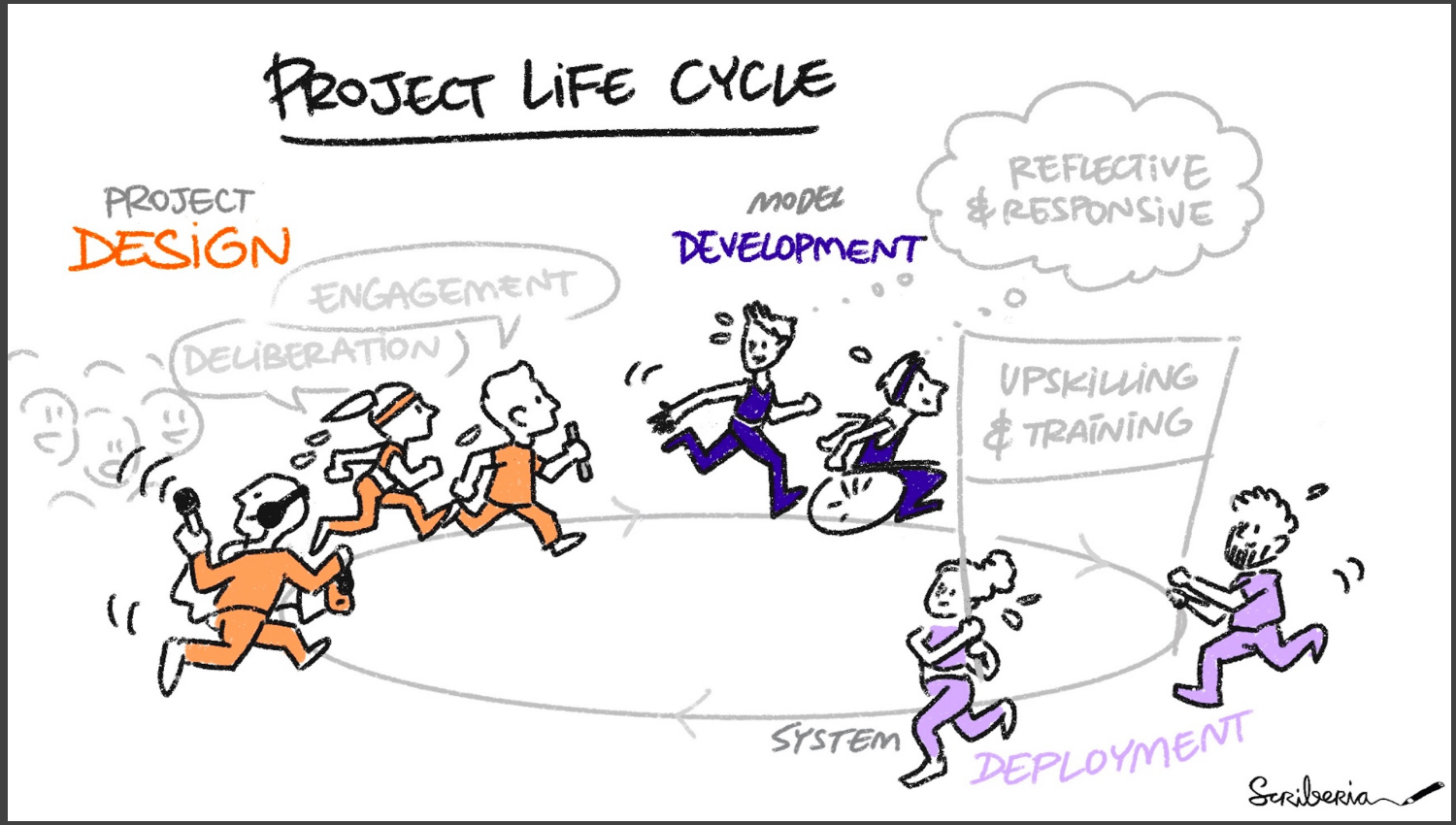
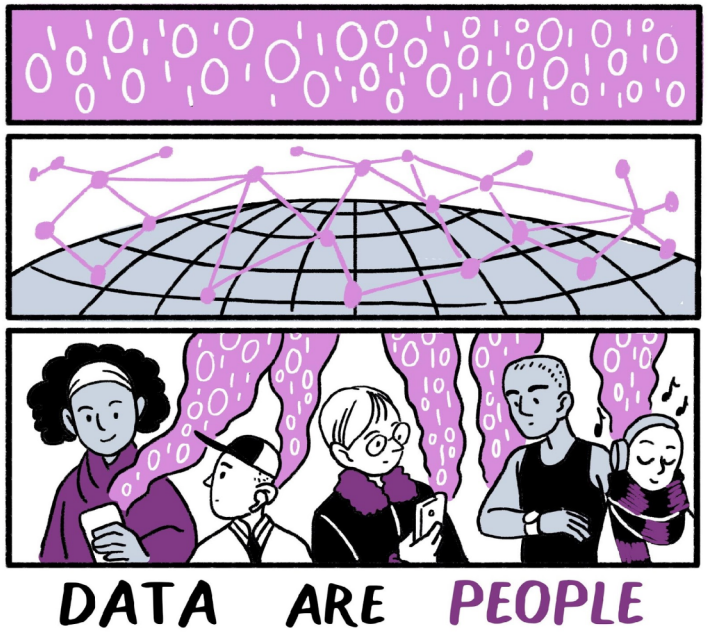



CC-BY 4.0, https://the-turing-way.netlify.app/ethical-research/ethical-research.html, DOI: 10.5281/zenodo.4969380
Christopher Burr | Automating Ethics. (2021, February 19https://chrisdburr.github.io/blog/automating-ethics/automating-ethics/

## Guide for Ethical Research

- Introduction to Research Ethics
- Research Ethics Committees Workflows
- Ethical Decisions in Preclinical Research
- Ethics and Law, Policy and Human Rights
- Activism for Researchers
- **Internal Policy Advocacy**




Core contributors: Laura Carter, Ismael Kherroubi-Garcia, Arielle Bennett, Laura Acion

CC-BY 4.0, https://the-turing-way.netlify.app/ethical-research/ethical-research.html, DOI: 10.5281/zenodo.4969380

# Areas of ethical concerns:

1. Project description
2. Data & Methodology
3. Consent
4. Privacy & Security
5. Further Societal Consequences

CC-BY 4.0, https://the-turing-way.netlify.app/ethical-research/ethics-case-study.html, DOI: 10.5281/zenodo.4969380

Owen, R., & Pansera, M. (2019). Responsible Innovation and Responsible Research and Innovation.

*Researchers and data scientists should ensure that they respect, protect, and fulfil human rights.*

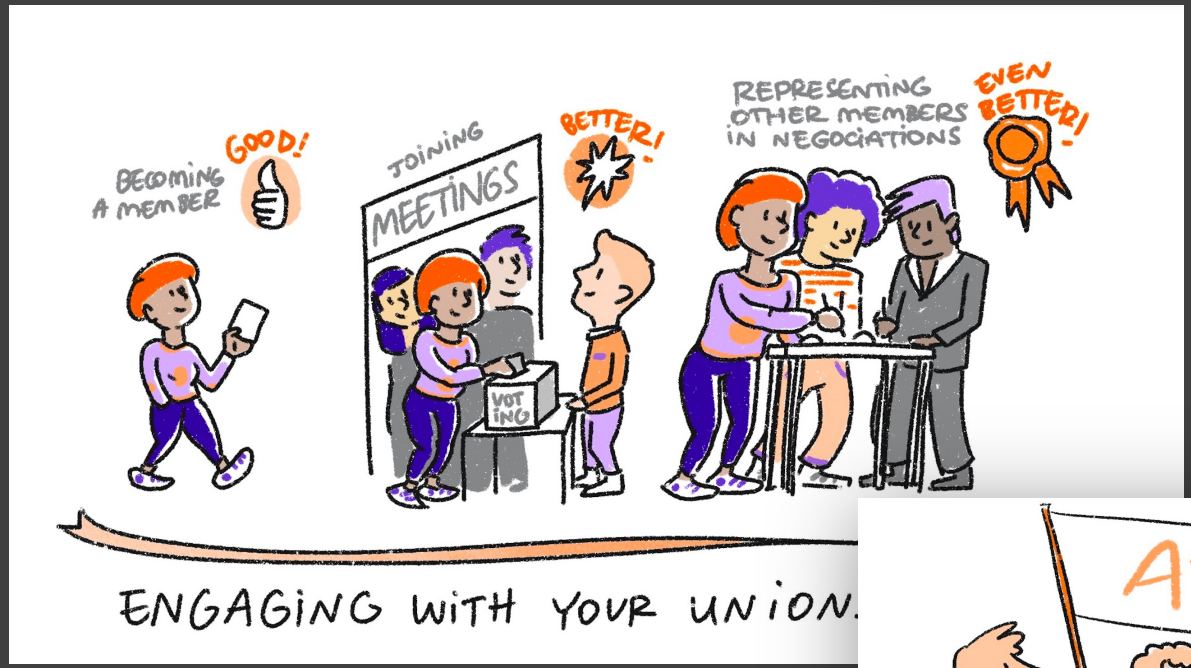
**Attention**

This is not legal advice. Please read for information only!

*Read the legal-disclaimer for why you should not use The Turing Way for legal advice.*

LauraCarter

GitHub Pull Request: https://github.com/alan-turing-institute/the-turing-way/pull/1394, The Universal Declaration of Human Rights at 70: Putting Human Rights at the Heart of the Design, Development and Deployment of Artificial Intelligence - HRBDT. (2019)




Arielle-Bennett

LauraCarter

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*The questions we ask, the analysis we conduct the patterns are heavily influenced by the lenses by which we view the world.*

**Draft** by Nina Di Cara

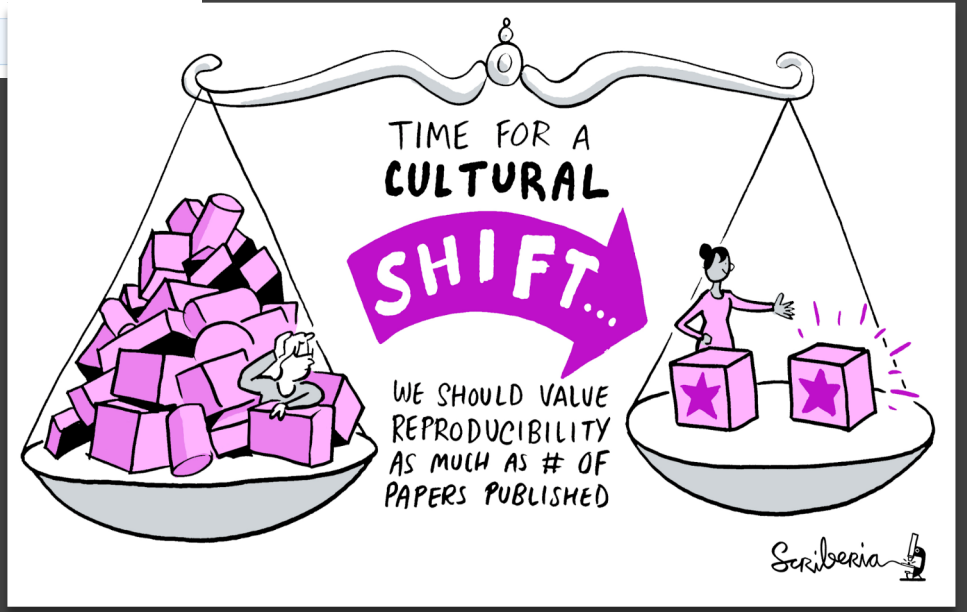
The Turing Way GitHub issue: https://github.com/alan-turing-institute/the-turing-way/issues/1919 ,
Haraway, D. (1988). Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.
Ricker, B. (2017, February 04). Reflexivity, Positionality and Rigor in the Context of Big Data Research.

[INVITATION] Data Feminism meets _The Turing Way_ #1205

Open **malvikasharan** opened this issue on 10 Jun 2020 · 5 comments

**malvikasharan** commented on 10 Jun 2020 • edited

*“Data Feminism" has not only shed light on imbalanced power structures underlying data science but also started a timely discussion around research ethics.*




CC-BY 4.0, https://github.com/alan-turing-institute/the-turing-way/issues/1205, DOI: 10.5281/zenodo.4969380

Catherine D'Ignazio and Lauren Klein. 2019. Data Feminism. MIT Press.

# The Turing Way Community Framework

We avoid individual authorship in favour of establishing shared ownership and agency in this project. The project belongs to the community and is always a ‘work in progress’.

CC-BY 4.0, https://the-turing-way.netlify.app/community-handbook/community-handbook.html, DOI: 10.5281/zenodo.4969380
Kelly, Anthony, "With Head, Heart and Hand: Dimensions of Community Building" (Boolarong Press) ISBN 978-0-86439-076-9

Open leadership is a set of practices and skills people can use and build projects that allows them to collaborate within inclusive communities.

# Design for Collaboration

**Understanding**

Your work is clear, authentic and widely accessible



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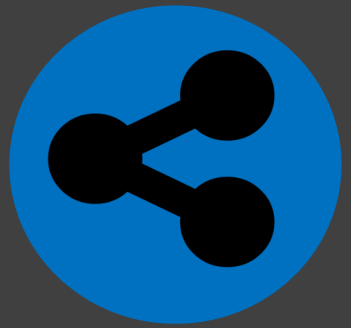
# Design for Collaboration

**Understanding**



**Sharing**

Your work can be adapted, reproduced, and built upon



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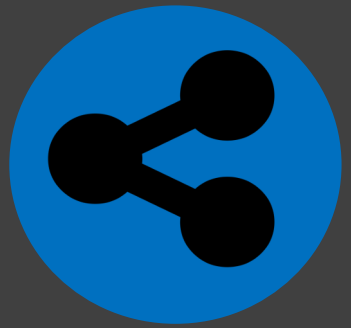
# Design for Collaboration

**Understanding**



**Sharing**

**Participation & Inclusion**

Creates a shared ownership that inspires contributions



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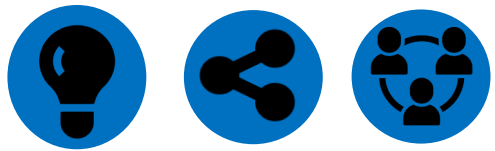
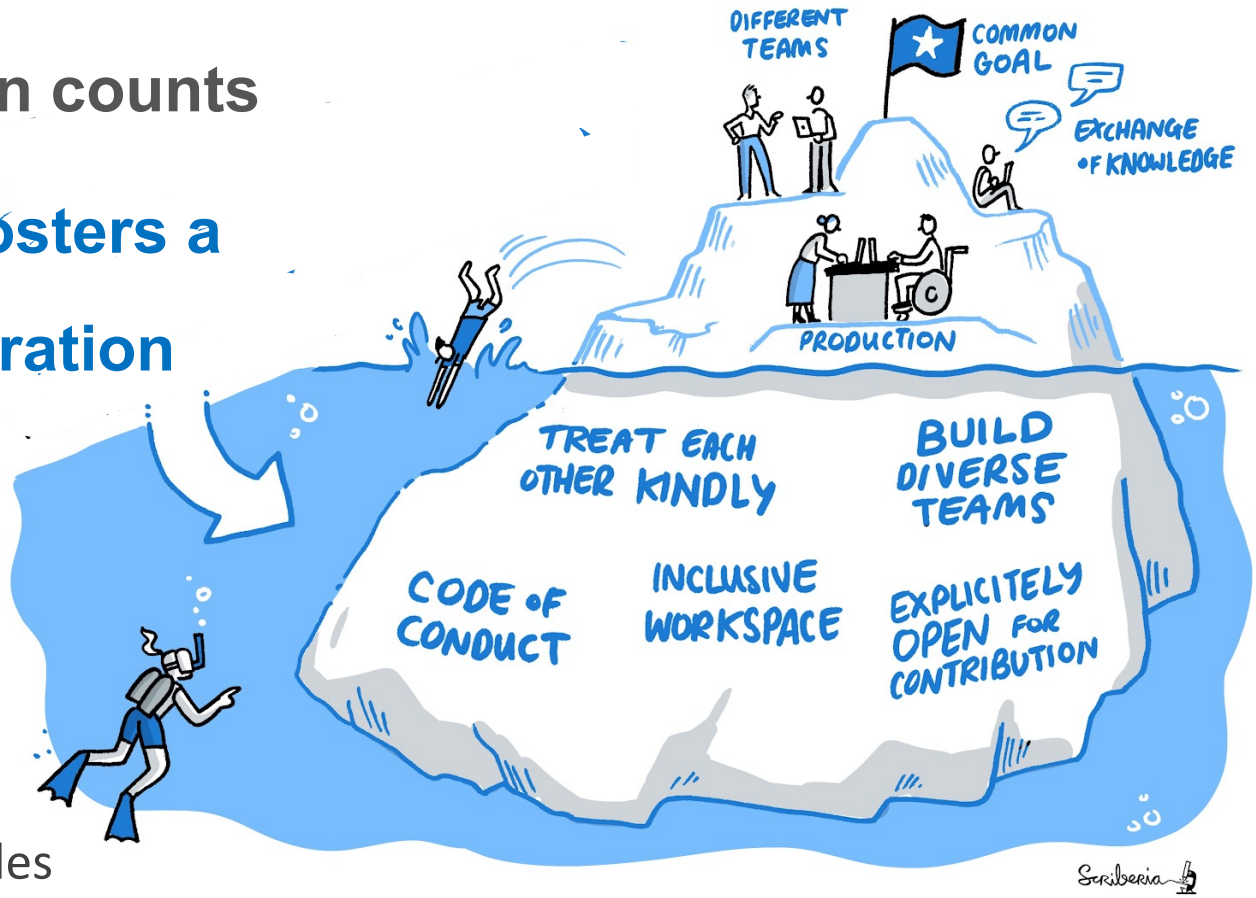
# Every contribution counts

## The Turing Way fosters a culture of collaboration






Open Leadership principles

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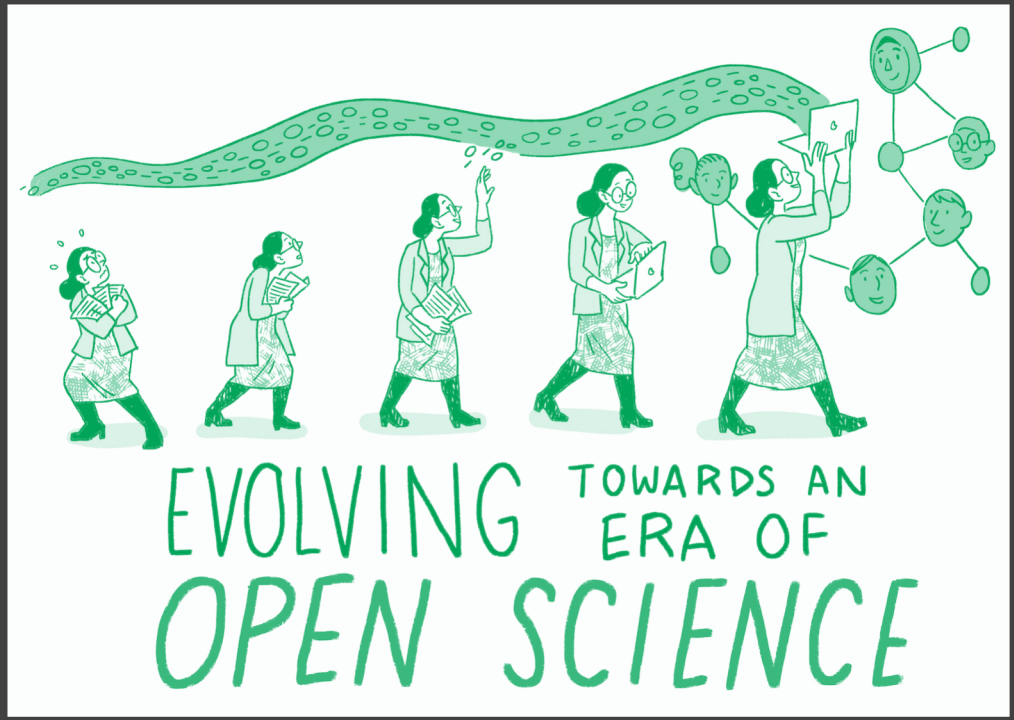
# Building an Open and Collaborative Community

**Open is by default not:**

- Inclusive
- Accessible
- Community-led

**Intentional designing**

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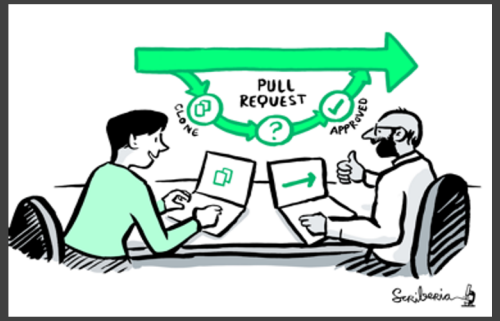
# Pathways for Collaboration

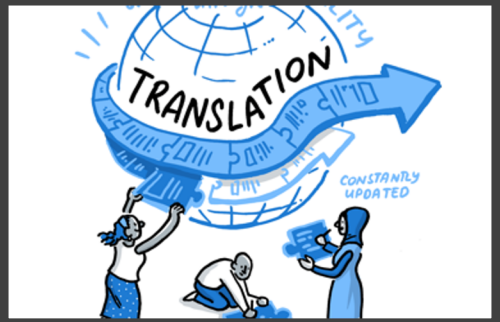
*Develop & share*

*Maintain & improve*

*Share resources*



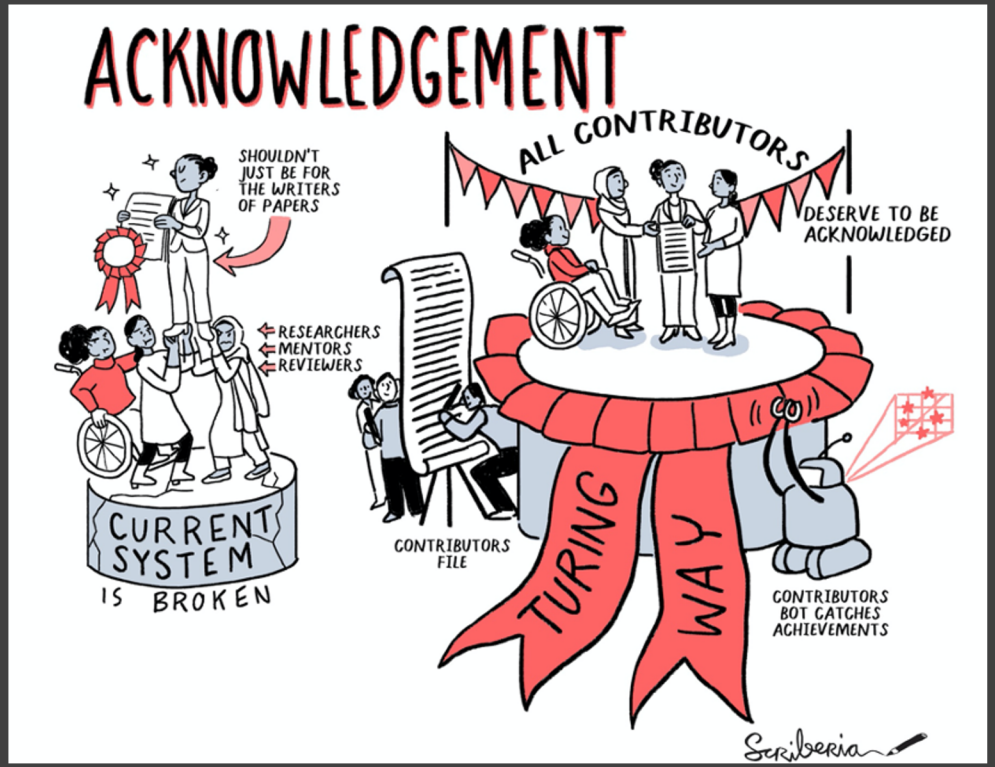

*Review and update*

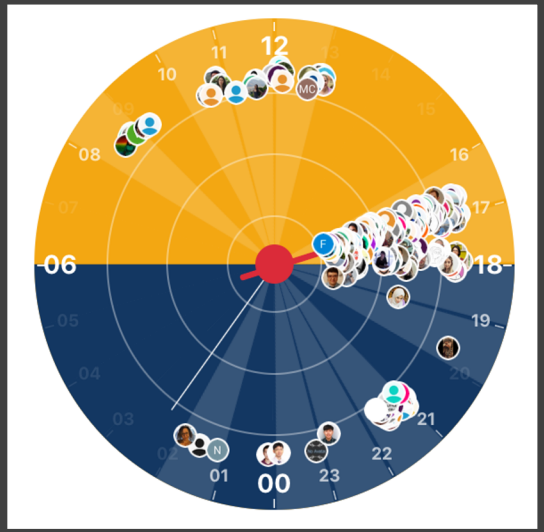



*Make it global*

*Share best practices*

# A community-oriented collaborative book




Community members from Slack in different time zones

Time Zone distribution by https://whena.re, @LauraC_rter, @malvikasharan, DOI: 10.5281/zenodo.4969380

**Book:**
the- turing-way.netlify.app/

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

**Twitter:**
twitter.com/turingway

**Email:**
theturingway@gmail.com

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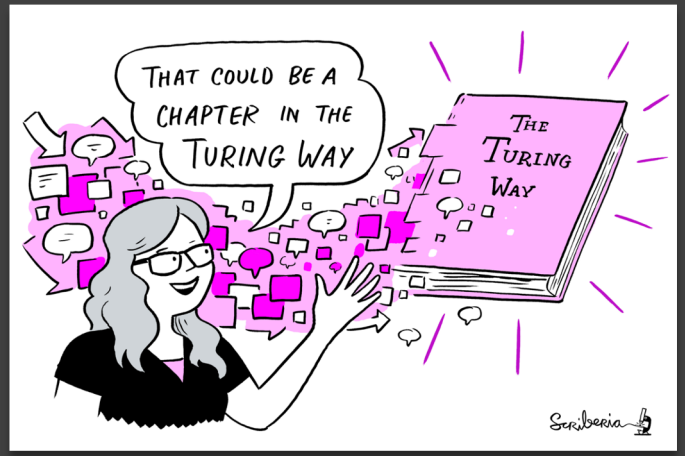
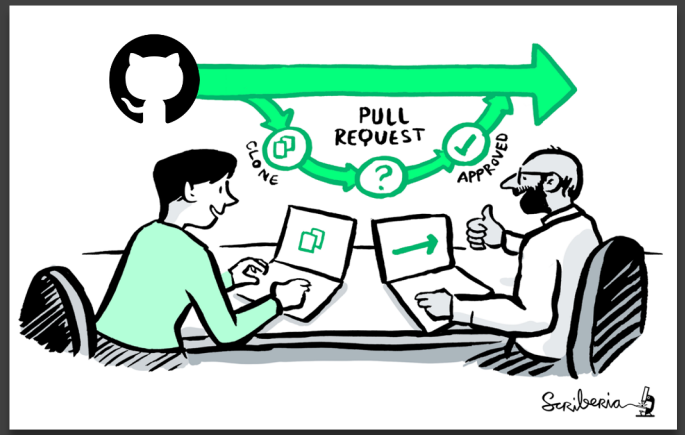
## A Book with Five guides

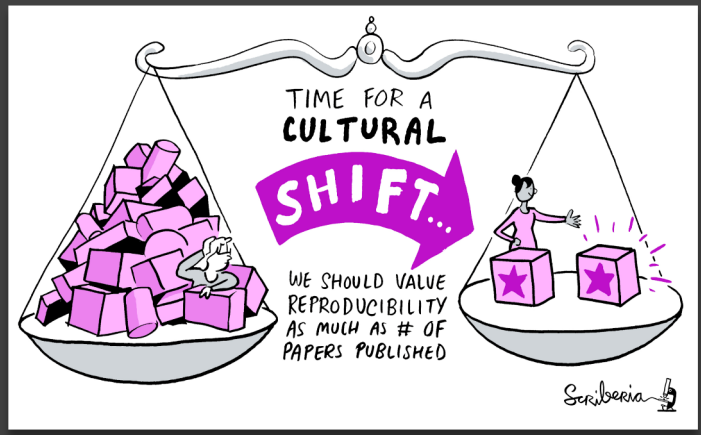



## A Community

## An Open Source Project




## A Culture of Collaboration



# Notable Impacts Beyond the project

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

- Reproducibility of scientific results in the EU 2020 (report)
- An Emerging Technology Charter by Mayor of London (policy)
- Innovation Scholars: UKRI grant 2020 (funding)
- CodeRefinary and Library Carpentries (training materials)
- Projects by data scientists including at the Office for National Statistics
- Cited by 10+ peer-reviewed articles & 10+ open source projects

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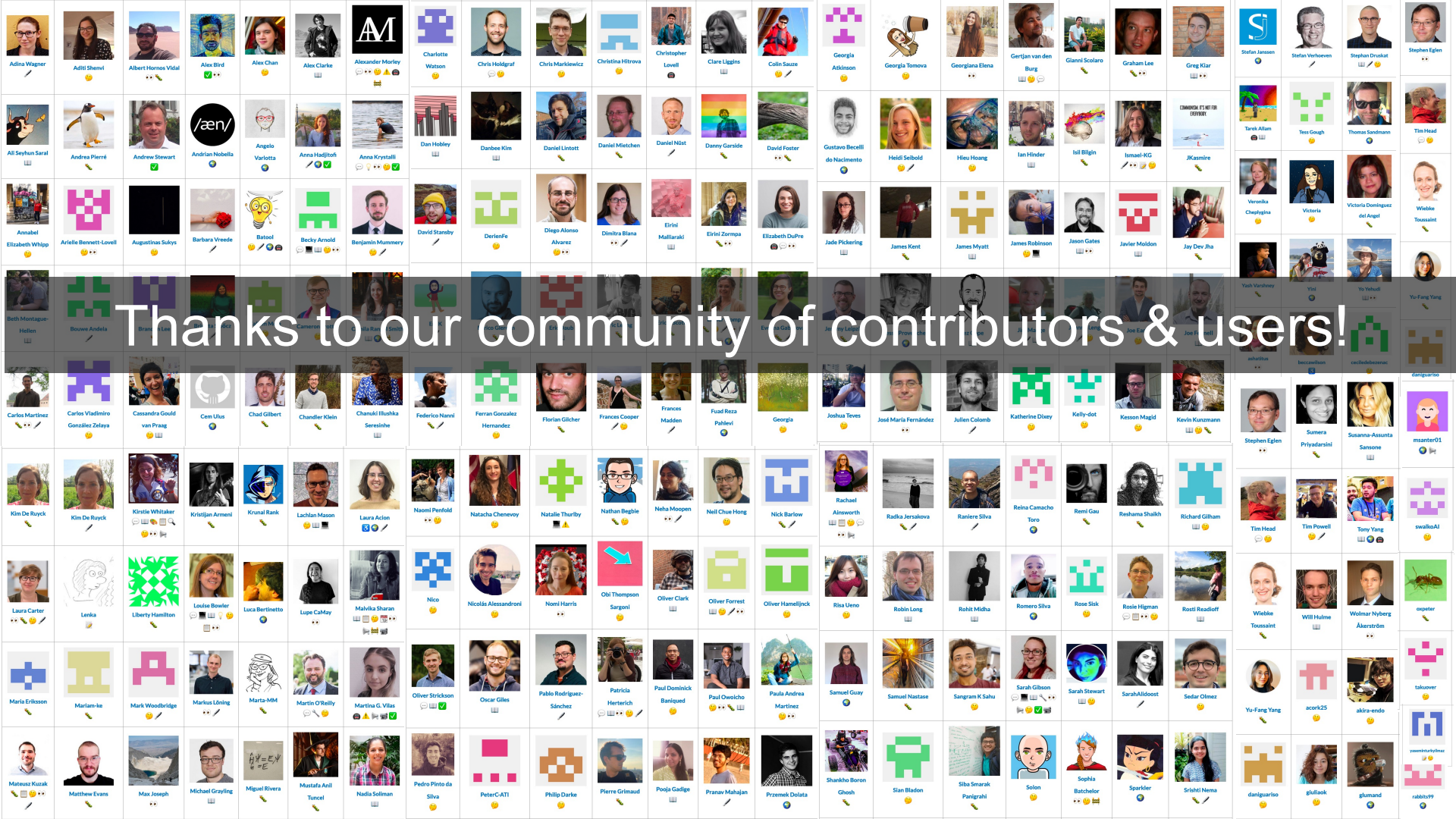
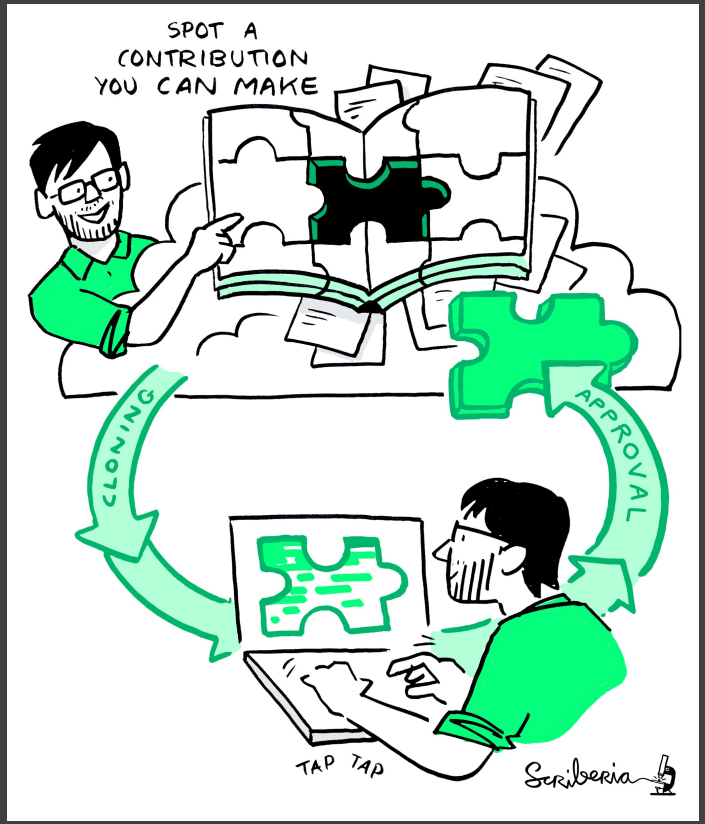

Thanks to our community of contributors & users!

## 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!*

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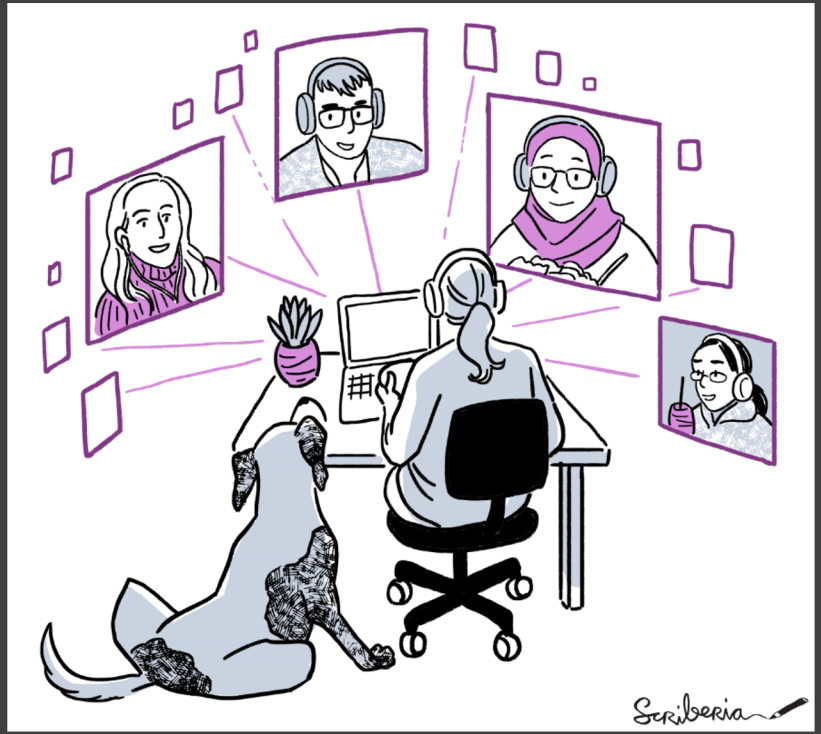
# Join a Community Event

- *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

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Open Life Science

**Sharing**

**Connecting**

**Empowering**

**@openlifesci**
**@turingway**

Email: team@openlifesci.org

# A **mentoring & training** program for **Open Science Ambassadors**

Special call under: **OLS-4 for Turing**

**1:1 mentoring**

**Training calls on Open Science**
Talks from experts
Break out discussions

**Training for mentors**

**OLS-3 period: February to May 2021**

*Apply individually or in team to join the cohort*

**Visit our website: openlifesci.org**

## OLS-4 Timeline

**Application period**
*15 June - 15 July 2021*

**OLS-4 Q&A Webinars**
Week of 5 July *2021*

**Cohort announcement**
*mid-August 2021*

**OLS-4 Cohort begins**
mid-*September 2021*

**OLS-4 Cohort ends**
*January 2022*

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