

# Investing in Research Infrastructure Roles for Culture Change

Malvika Sharan, Pronouns: She/her



https://stateofopencon.com/ #stateofopencon #soocon23 #openuk https://hachyderm.io/@openuk

STATE OF OPEN CON<sup>®</sup> 23

## The Alan Turing Institute

# Investing in Research Infrastructure Roles for Culture Change

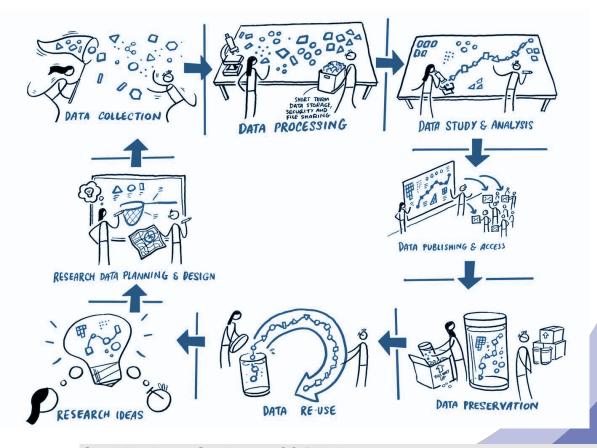
### Malvika Sharan

Senior Researcher - Open Research Tools, Practices and Systems Programme



@malvikasharan @turingway, CC-BY 4.0, Zenodo: https://zenodo.org/record/7258956, DOI: 10.5281/zenodo.7258956

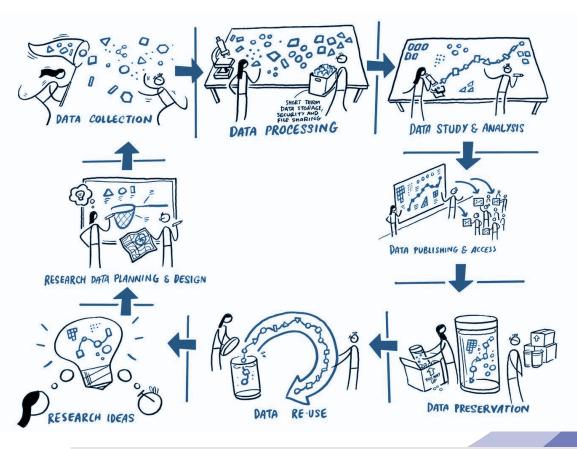
**Research Life Cycle** 



STATE OF OPEN CON<sup>M</sup>23

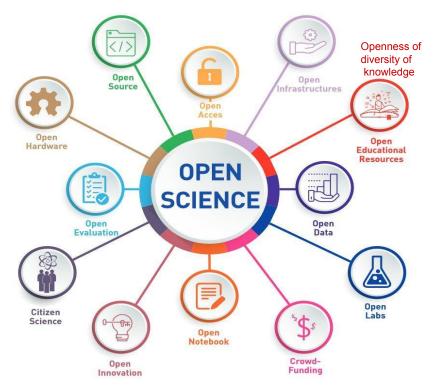
### **Research Life Cycle**

- Researcher(s)
- Project supervisor
- Data Scientist
- Research Engineer
- Peer reviewers
- Data manager
- Project manager
- ...



#### STATE OF OPEN CON<sup>M</sup>23

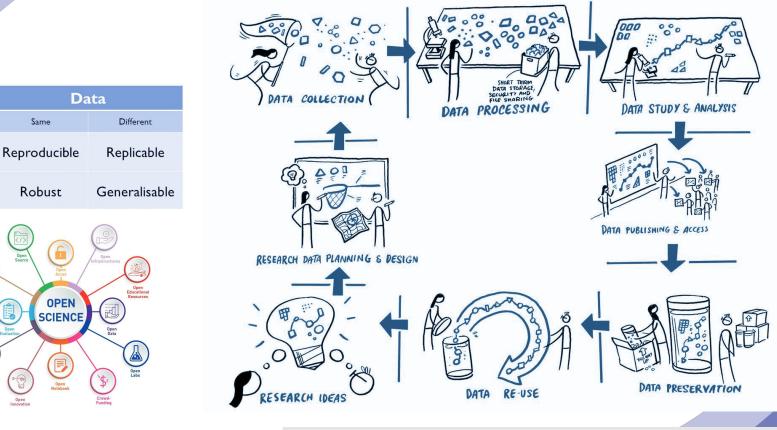
#### **Integrating Open Science and Reproducibility**



		Da	ita
		Same	Different
alysis	Same	Reproducible	Replicable
Ana	Different	Robust	Generalisable

Toward a UNESCO Recommendation on Open Science: **Canadian Commission for UNESCO** By Ella Chan, Dick Bourgeois-Doyle, Michael Donaldson, and Eleanor Haine-Bennett, Ottawa, Canada, April 2020, UNESCO presentation of 17 Feb 2021 @malvikasharan @turingway, CC-BY 4.0, Zenodo: <u>https://doi.org/10.5281/zenodo.3332807</u>. Presentation DOI: 10.5281/zenodo.7620215

#### **Research Life Cycle**



STATEOFOPENC :ON™23

Same

Analysis

Same

Different

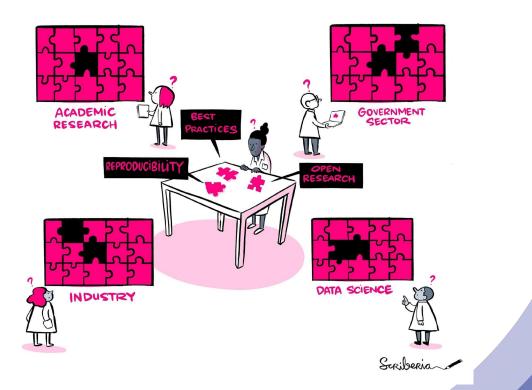
-Open Hardware

Citizen Science

#### **Evolving Research and data Landscape**

Data skills range from programming, data visualisation, analysis and database management, to core skills such as problem solving, project management and communication.

National Data Strategy, 2020



National Data Strategy - 2020. Gov.uk. Department for Digital, Culture, Media and Sport. <u>Skills: Data skills</u> for a data-driven economy and data-rich lives

## **Emergent Research Roles**

- Project scoping
- Funding
- Project management
- Project supervision
- Reporting / publication
- Data & Digital Skills
- Peer review
- Research engineering
- Data management

- Stakeholder engagement
- Collaborative workflow
- Impact assessment
- Policy compliance
- Ethical considerations
- Adoption of outputs
- Govt./Public feedback
- Sharing 'Research Objects'
- Archiving and preservation

- Equitable & inclusive teams
- Maintenance
- Training and upskilling
- Community management
- Event facilitation
- Mentoring & career support
- Documentation
- UX/UI development
- Software auditing

UK Research and Development Roadmap: Attract, retain and develop the talented, diverse people and teams that are essential to delivering our vision.

## **Emergent Research Roles**

#### (Open) Research skills should be incentivised fairly

Project scoping

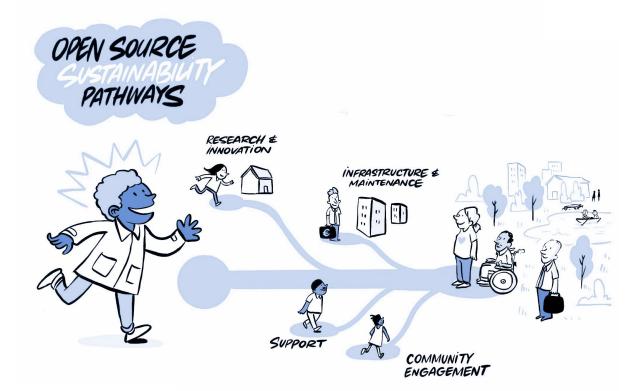
- Funding
- Project management
- Project supervision
- Reporting / publication
- Data & Digital Skills
- Peer review
- Research engineering
- Data management

- Stakeholder engagement
- Collaborative workflow
- Impact assessment
- Policy compliance
- Ethical considerations
- Adoption of outputs
- Govt./Public feedback
- Sharing 'Research Objects'
- Archiving and preservation

- Equitable & inclusive teams
- Maintenance
- Training and upskilling
- Community management
- Event facilitation
- Mentoring & career support
- Documentation
- UX/UI development
- Software auditing

Contributors Roles taxonomy: CRediT, <u>credit.niso.org</u>. Careers in Research - London School of Economics: <u>https://info.lse.ac.uk/current-students/careers/</u>

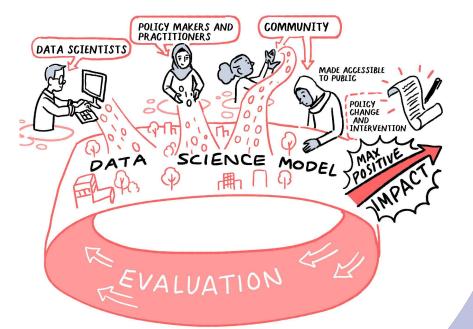
#### **Research Infrastructure Roles**



<u>UK Research and Development Roadmap</u>: Attract, retain and develop the talented, diverse people and teams. Ensure that our science, research and innovation system is responsive to our society

#### **Research Infrastructure Roles**

Research infrastructure roles provide **specialised skills**, **expertise and services** required for effectively carrying out **high-quality research**.

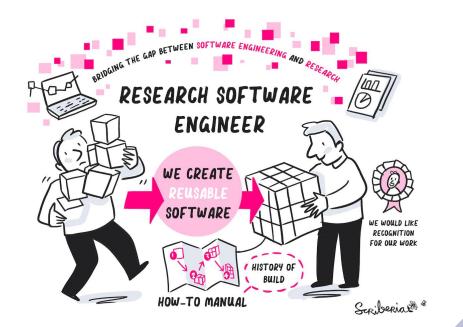


<u>UK Research and Development Roadmap</u>: Attract, retain and develop the talented, diverse people and teams. Ensure that our science, research and innovation system is responsive to our society

**Diversifying Research Roles** 

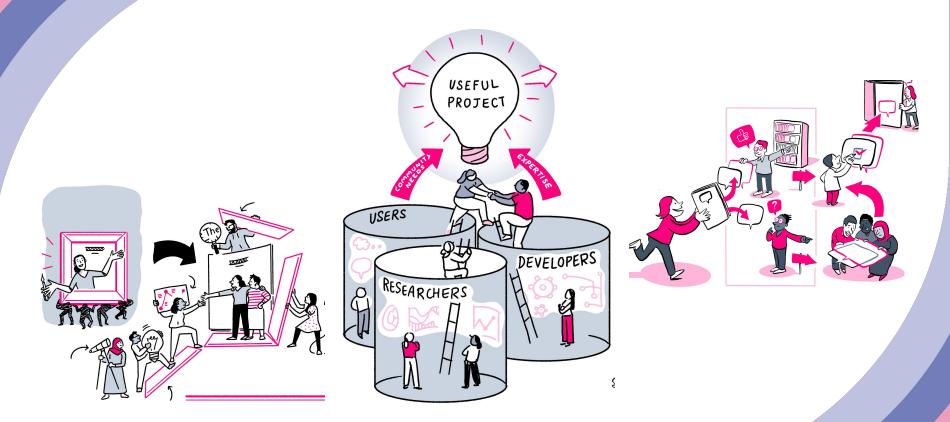


10 Years of the RSE movement



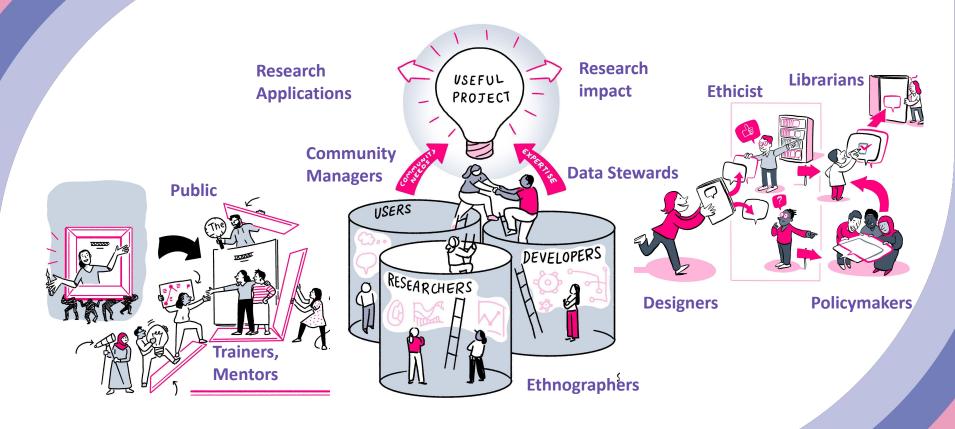
Baxter, R, Chue Hong, N, Gorissen, D, Hetherington, J & Todorov, I 2012, 'The Research Software Engineer', Digital Research 2012

#### **Diversifying Research Roles**



STATE OF OPEN CON<sup>®</sup> 23

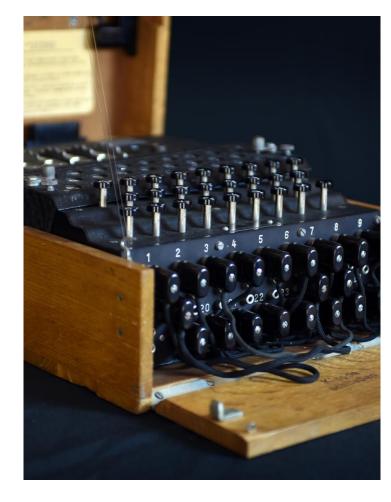
#### **Diversifying Research Roles**



STATE OF OPEN CON<sup>M</sup>23

# The Alan Turing Institute

The national institute for data science and artificial intelligence



The Alan Turing Institute, https://www.turing.ac.uk/, https://www.turing.ac.uk/news/enigma-machine-goes-display-alan-turing-institute

#### **Tools, Practices and Systems**

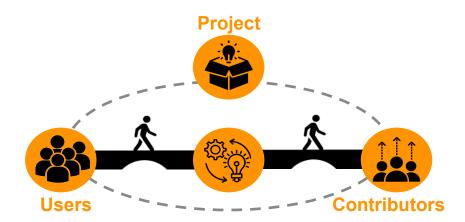
- Trustworthy systems
- Transparent reporting
- Inclusive interoperable design
- Ethical integrity
- Respectful co-creation
- Leadership in open research



https://www.turing.ac.uk/, Zenodo: https://doi.org/10.5281/zenodo.3332807. Presentation DOI: 10.5281/zenodo.7620215

### Tools, practices and systems

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



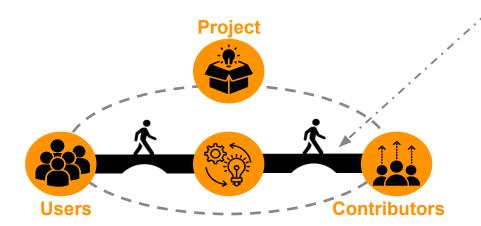
Strategic and technical support for Stakeholder Engagement and Participation

https://www.turing.ac.uk/, Zenodo: https://doi.org/10.5281/zenodo.3332807. Presentation DOI: 10.5281/zenodo.7620215

**Research programmes** Home + Research +

## Tools, practices and systems

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



Strategic and technical support for Stakeholder **Engagement and Participation** 

**Community Management** 



#### **Researchers and collaborators**







Lee



Dr Emma Karoune

**Dr Arron** Anne Lacey

Vicky Hellon







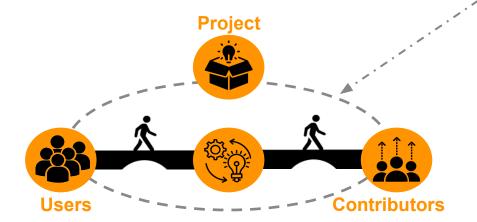
Claudia	Ayesha	Bridget
Fischer	Magill	Nea
		-

https://www.turing.ac.uk/research/research-programmes/tools-practices-and-systems/community-management-and-open-research

**Research programmes** Home + Research +

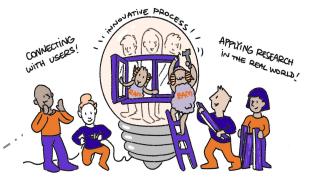
## Tools, practices and systems

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



Strategic and technical support for Stakeholder **Engagement and Participation** 

#### **Research Applications**



Seriberia -

#### **Organisers**







Dr Aida Mehonic



**Dr Alden** Conner

Jennifer Ding



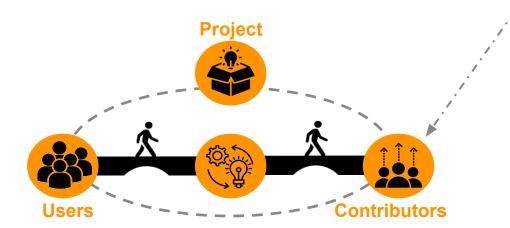
Hari Sood

https://www.turing.ac.uk/research/research-programmes/tools-practices-and-systems/research-application-management

Home + Research + Research programmes

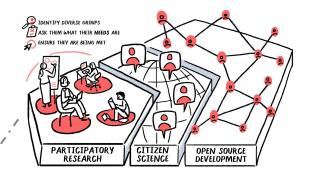
## Tools, practices and systems

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



Strategic and technical support for Stakeholder Engagement and Participation

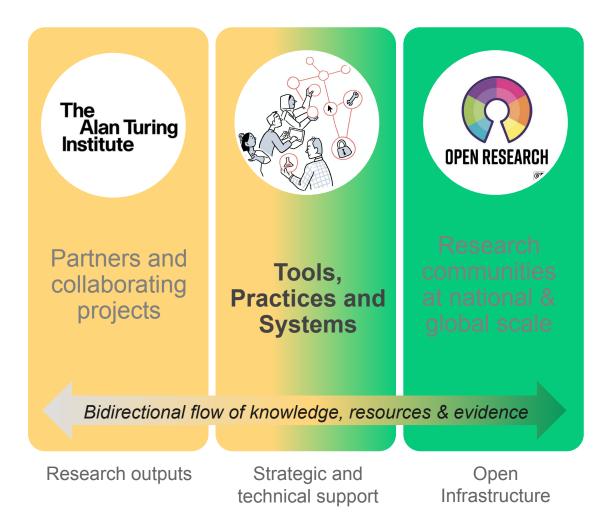
#### **Participatory Citizen Science**





Bastian Greshake-Tzovaras Senior Researcher, Co-lead of Autspaces, Co-director of Open Humans Platform, Co-Pl of Transbiome Project

https://www.turing.ac.uk/research/research-projects/citizen-science-platform-autistica





# 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.



### The Turing Way: Book on Reproducibility

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.

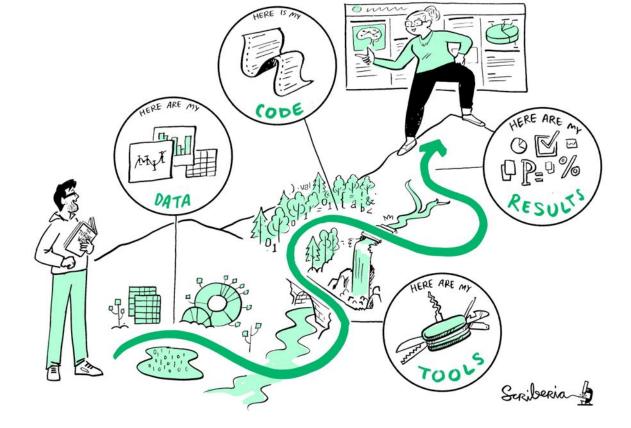
This also means making sure PhD students, postdocs, PIs, and funding teams know which parts of the "responsibility of reproducibility" they can affect, and what they should do to nudge data science to being more efficient, effective, and understandable.



		Da	ata
		Same	Different
Analysis	Same	Reproducible	Replicable
Ana	Different	Robust	Generalisable

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	~





*Fig. 3 The Turing Way* project illustration by Scriberia. Used under a CC-BY 4.0 licence. DOI: 10.5281/zenodo.3332807.

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

# The Turing Way Q Search this book... Welcome Guide for Reproducible Research Guide for Project Design Guide for Communication Guide for Collaboration Guide for Ethical Research Community Handbook

V

V

V

V

V



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

#### Research Infrastructure Roles 🔥

Community Managers Overview

Data Stewards Overview

Data Steward Personal Story

Data Wrangler Overview

Research Software Engineers Overview

Research Software Engineering Personal Story

Research Application Manager Overview

Research Infrastructure

Developer Overview

Remote Collaboration

Shared Ownership in Open Source Projects

Guide for Ethical Research

Community Handbook

#### **Examples of Research Infrastructure Roles**

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

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

V

V

V

V

- Communications manager
- Events manager
- Participatory research manager



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

# **Project Growth & Recognitions**

- **4+ years, >260 Chapters**, community resources
- 425+ contributors, 3000+ monthly users supported by project leads, community manager, 20+ core members (governance)
- **Replication/extension** by 3 Turing & 6+ external projects (e.g. ONS, UCL, Uni Oxford, LIBER: Association of European Research Libraries)





@malvikasharan, https://star-history.t9t.io/#alan-turing-institute/the-turing-way, Presentation DOI: 10.5281/zenodo.7620215

### **Notable Activities & Impact**

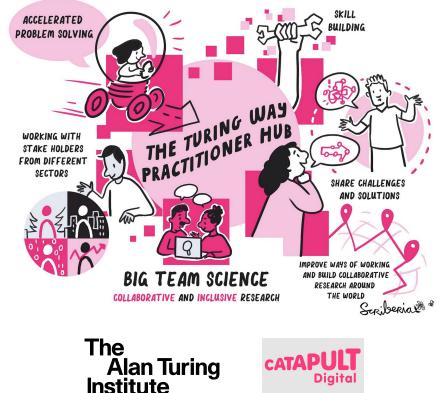
Resources used by organisations, research teams, educators, community builders, policy makers and researchers globally

- NASA Transform to Open Science 5 years Mission for capacity building
- Recommended in **Goldacre Review for modern open working** into health data
- NASA OpenCore, CodeRefinary, Library Carpentries training materials
- Reproducibility of scientific results in the EU 2020 report
- An Emerging Technology Charter by Mayor of London (2021 policy)
- Innovation Scholars: **UKRI grant 2020** (funding call)
- Cited by 30+ peer-reviewed articles & 100+ online publications

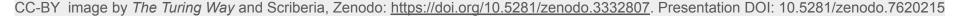
@malvikasharan @turingway, CC-BY 4.0, Zenodo: https://doi.org/10.5281/zenodo.3332807. Presentation DOI: 10.5281/zenodo.7620215

#### **Broader Recognition for Research Infrastructure Roles**

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







Adina Wagner	Aditi Shenvi	Albert Hornos Vidal	Alex Bird ♥ ••	Alex Chan	Alex Clarke	Alexander Mortey	Charlotte Watson	Chris Holdgraf	Chris Markiewicz	Christina Hitrova	Christopher Lovell	Clare Liggins	Colin Saure	Georgia Atkinson	Georgia Tomova	Georgiana Elena	Gertjan van den Burg Lu 😜 💬	Gianni Scolaro	Graham Lee	Greg Klar III ••	Stefan Janssen	Stefan Verboeven	Stephan Druskat	Stephen Eglen
Ali Seyhun Saral	Andrea Pierré	Andrew Stewart	Andrian Nobella	Angelo Varlotta	Anna Hadjitofi Z 🏵 😧	Anna Krystalli © ? • • • • ?	Dan Hobley	Danbee Kim	Danlel Lintott	Daniel Mietchen	Daniel Nüst	Danny Garside	David Foster	Gustavo Becelli do Nacimento	Heidi Seibold	Hieu Hoang	Ian Hinder	Isil Bilgin	Ismael-KG	COMMINIAN ITS NIT FOR DEPYDOIT L JKasmire	Tarek Allam	Tess Gough	Thomas Sandmann	Tia Head © •
Annabel Elizabeth Whipp O	Arielle Bennett-Lovell	Augustinas Sukys	Barbara Vreede	Batool	Becky Arnold	Benjamin Mummery	David Stansby	DerienFe V	Diego Alonso Alvarez 2000	Dimitra Blana	Erini Maliliaraki	Eirii Zornpa	Elizabeth DuPre	Jade Pickering	James Kent	James Myatt	James Robinson	Jason Gates	Javier Moldon	Jay Dev Jha	Veronika Cheptygina C	Victoria	Victoria Dominguez del Angel	Wiebke Toussaint
Beth Montague- Hellen	Bocwe Andela	Brane Lee	an	ks			ur ur	CC	m	ml	J'n	ity	of	<b>C</b> C	ont	rib	uto	ors	8.8		se	rs l	Vo Yehudi	Yu-Fang Yang
Carlos Martinez	Carlos Vladimiro González Zelaya	Cassandra Gould van Prang © III			Chandler Klein	Ser Cal	Federico Nanni	Ferran Gonzalez Hernandez હ	Florian Gilcher	Frances Cooper	Frances Madden	Fuad Reza Pahlevi ©		Joshua Teves		Julien Colomb			the second second second	Kevin Kunzmann	asharites ••	ECCANGENT	eccledeberenae	danguariso
Kim De Ruyck	Kim De Ruyck	Kirstie Whitaker	Kristijan Armeni	Krunal Rank	Lachian Mason	Laura Acion	Naomi Penfold	Natacha Chenevoy		Nathan Begbie				Rachael Ainsworth	Radika Jersakova	Raniere Silva	Reina Camacho Toro	Remi Gau	Reshama Shaikh	Richard Gilham	•• Fim Head	Frydda sin	Santone	
Laura Carter	Lenka	Liberty Hamilton	Louise Bowler	Luca Bertinetto	Lupe CaMay	Malvika Sharan	Nico	Nicolás Alessandroni	Komi Harris	Obi Thompson Sargoni ©	Oliver Clark	Oliver Forrest	Oliver Hamelijnsk	Risa Ueno	Robin Long	Rohit Midha	Romero Silva	Rose Sisk	Rosie Higman	Rosti Readioff	Wiebke	Will Hulme	Wolmar Nyberg	cxpeter
Maria Eriksson	Mariam-ke		Markus Löning	Marta-MM	Martin O'Relly	Hartina G. Vilas	Oliver Strickson	Oscar Giles	Pablo Rodriguez- Sánchez	Patricia Herterich	Paul Dominick Baniqued	Paul Owoicho © • • • •	Paula Andrea Martinez	Samuel Guay	Samuel Nastase	Sangram K Sahu Ya	Sarah Gibson () I III () () () () () () () () () () () () ()	Sarah Stewart	SarahAlidoost	Eder Olmez	Yu-Fang Yang	acork25	akira-endo	takuover
Mateusz Kuzak	MatthewEvans	Max Joseph ••	Michael Grayling	$ \begin{array}{l} H \not= E , H \\ H = E \end{array} $ Miguel Rivera	Mustafa Anil Tuncel	Radia Soliman	Pedro Pinto da Silva O	PeterC-ATI	Philip Darke	Pierre Grimaud	Pooja Gadige	Pranav Mahajan	Przemek Dolata	Shankho Boron Ghosh	Sian Bladon	Siba Smarak Panigrahi	Solon 9	Sophia Batchelor	Sparkler	Srishti Nema	daniguariso V		e Linear Sumand	yseminutrythrag yseminutrythrag rabbitus9

# The Turing Way Community Handbook

#### **Community Handbook**

Code of Conduct

Ways to Enter the Project

Style Guide

Maintaining Consistency

Chapter Templates and Contribution Workflow

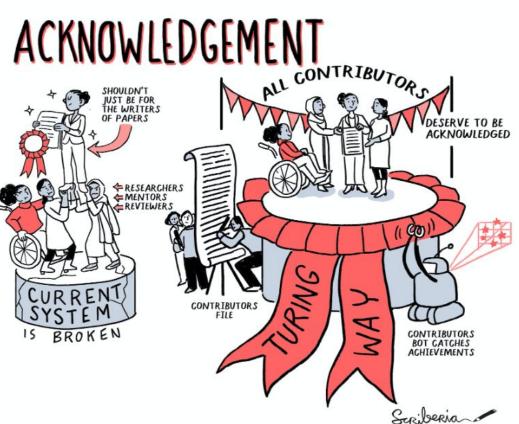
Acknowledging Contributors

Monthly Newsletters

**Book Dash Events** 

Community Coworking Calls

**Template Collection** 



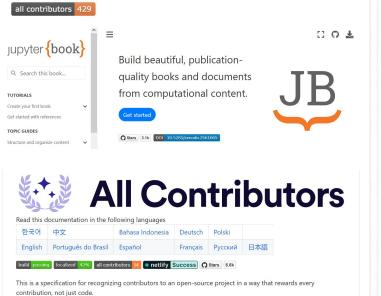
Online book: https://the-turing-way.netlify.app/community-handbook, @malvikasharan @turingway

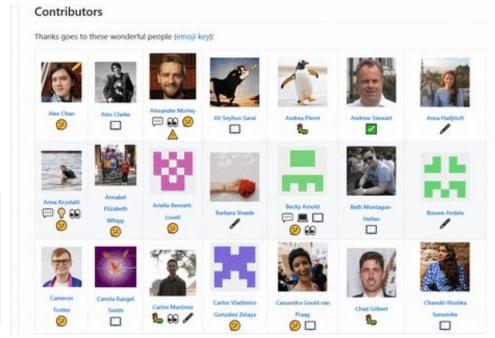
#### The Turing Way

This README.md file in 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:





Online book: https://the-turing-way.netlify.app/community-handbook, @malvikasharan @turingway

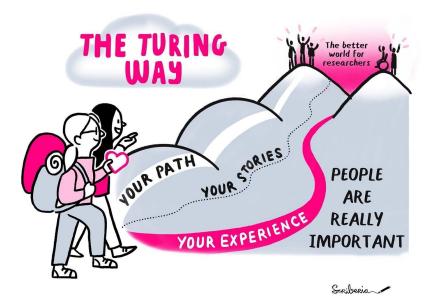
# Join a Community Event

- Collaboration Cafes
  - 1<sup>st</sup> & 3<sup>rd</sup> Wednesdays (14:00 UTC)
- Coworking Calls
  - Mondays (10:00 UTC)
- Book Dash, Fireside Chats
  - Peridiocally
- More ways to connect
  - bit.ly/turingway



#### 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 Team at State of Open Con (3rd Floor)



#### **Anne Lee Steele**

Community Manager - The Turing Way The Alan Turing Institute





#### Emma Karoune

Senior Community Manager -Health Programme The Alan Turing Institute



#### bit.ly/turingway

Adius Wagner	Adii Sharwi	Abert Horsor Vidal	Ave fird	Alex Chan	Alex Carles	Alexander Morley	Charlotte Watton	Christeadgear	Chris Markiewicz	Christian Hitrova	Christopher Lovell	Care Lights	Cein Sace	Georgia Atkinson	Gorgia Tennova	Georgian Elens	Gertjan van den Børg El 🌞 🕞	Glasni Scolaro	Graham Lee	Greg Klar Lint	Sofar Janson	Status Verhauves	Stephan Druker	Stephen Epier
Ali Seyhun Saral	Andrea Pierré	Andrew Stewart	/æn/ Andrian Nobella	Angelo Variotta	Ang Hadjiten	Assa Krystalli	Dan Habiey	Danbee Kim	Daviel Lintort	Daniel Mistches	Daniel NOat	Darray Garside	David Fester	Gustavo Becelli do Nacimento O	Heidl Selboid	Heu Hoang	Lan Hinder	Isil Bilgin	Innael-KG	Condense et un la Internet L	Tarek Allan	Tess Grouph	There is backness	Tie Head
Arnabel Elizabeth Whipp	Ariele Bernett-Lovell	Augustinas Sukys	Barbara Vreede	Batted • / 0 G	Becky Arnold	Berjamin Manusery	David Stansby	Derienfe	Dings Alemo Alema Alema	Dimitra Blana	Erin Mattaraki W	Evisi Zempa	Dizabeth DuPre	Jade Pickering	Aarres Kene	James Myatt	James Robinson	Jason Gates	Javier Moldon	Jay Dev Ba	Veranka Chephysina		Veteria Durringuer del Argel	
Beth Montagen- Hallen Li	Bouwe Andela	Th	an	ks	sto		ur	CC	m	m	Jn	ity	of	CC	ont	rib	uto	ors	8.8		se	rs l		No Face Nove
Carlos Martinez	Carlos Vialimiro González Zelaya	Casandro Gould van Praag	Cem Ulus	Chad Gilbert	Chandler Klein	Chanadi Hushka Seresinite	Federico Nanni	Ferran Gonzalez Hermandez	Fierlan Gildher	Frances Corper	Frances Madden	Fund Reza Pablevi	Georgia	Joshua Teves	José Maria Fernández	Atlen Colomb	Katherine Disey	Keily-dot	Kessen Magid	Kevin Kustonam	stephen Eglen	Summary Summary Prhysical shares	Suma Asunta	dariguarias
Kim De Ruysk	Kin De Raysk	Kinsie Woltaker Processie Processie Processie Rinsie Woltaker Processie Proc	Kristijan Armeni	Krunal Rank	Lachlan Mason	Laura Acian	Naoni Perdak	Ristacha Chenevoy	Natalie Thuriby	Nathan Begble	Neha Moopen	Nell Chue Hong	Nick Barlow	Rachael Ainsworth III III III III • IIII	Ratha Jernalova	Rasiare Sha	Reina Camacho Toro O	Remi Gau	Reshara Shalih	Richard Cilham	Tin Head	Tin Powel	Liiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	
Laura Carter	Lanka	Liberty Hamilton	Louise Bowler	Luca Berlinetto	Lupe CaMay	Matche Shares	Nice •	Necilis Alessandrovi	Koni Haris	Obi Thompson Sargoni ©	Olver Cark	Oliver Forrest	Oliver Hamelijsck	Risa Ueno	Rabin Long	Rokt Midta	Renero Silva	Rose Sisk	Rosis Higman	Rosti Readort	Wieble Toussaint	Will Halme	Wolmar Nyberg Akerström	superior
Maria Friksson	Marian-ie	Hark Weedbridge	Marken Lähler 11/2	Marta-MM	Marcin O'Relly	Martina G. Vilas	Officer Strickson	Oscar Gias	Pablo Rodriguez- Sanchez	Patricia Herierich	Paul Dominick Baniqued	Paul Ownicho	Pada Andrea Martinez	Samuel Gouy	Samuel Nastase	Sargram K Sahu	Sarah Gibson	Sarah Stewart	SarahAldisoset	Sedar Climas	Yu fang Yang	acork25	akizəendo	÷
Material Kurak	Matthew Evans	Max Joseph	Michael Grayling	H¥=E,¥ ⊭ ≈E Miguel Rivera	Munitade Anal Tancel	Rafia Solman	Pedro Pinte da Silva ©	Peter-C-ATI	Rill Darks	Pierre Grimaud	Posja Gadige	Pranav Mahajan	Promek Dolata	Shunkho Boron Ghash	San Bladon	Siba Smarak Parigabi	<b>?</b>	Sopha Batchelor ++ 😜 🛤	Sparkler ©	Sridti Nena	darigantes *		plumand Q	radiotari o

#### Acknowledgements:

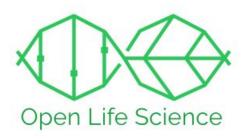
- Kirstie Whitaker, TPS Programme Director, TPS Team Members
- The Turing Way Team, Anne Lee Steele Community Manager
- The Turing Way Community, Collaborators & Contributors

#### Links:

- Book: the-turing-way.netlify.com
- Relevant resources: bit.ly/turingway
- Newsletter: tinyletter.com/TuringWay
- GitHub: github.com/alan-turing-institute/the-turing-way
- Original artwork by Scriberia: https://doi.org/10.5281/zenodo.3332807



#### The Alan Turing Institute



### A mentoring & training program for Open Science Ambassadors in Life Science





Malvika Sharan @malvikasharan





Sharing

Connecting

Empowering

Join the program

openlifesci



#### 1:1 mentoring



Training calls on Open Science Talks from experts Break out discussions



**Training for mentors** 

**OLS-8 applications open in June** Apply individually or in a team to join the cohort

Visit our website: openlifesci.org



National Aeronautics and Space Administration



Dr. Chelle Gentemann, Science Lead Yvonne Ivey, Equity Lead Cyndi Hall, Community Coordinator Isabella Martinez, Content Coordinator Dr. Yaitza Luna-Cruz, CSDO Program Scientist Dr. Paige Martin, TOPS Program Scientist Dr. Sam Gabre, ARS, Science Advisor Dr. Ryan McGranaghan, GSFC, Science Advisor

Kevin Murphy, Chief Science Data Officer SMD Katie Baynes, Deputy Chief Science Data Officer SMD Dr. Steve Crawford, Science Data Officer SMD Amy (Uyen) Truong, Chief Science Data Office Coordinator



#### YEAR OF OPEN SCIENCE

NASA + NSF + NOAA +
DOE + GSA + NEH + NIH +
NIST + USDA + USGS +





https://doi.org/10.5281/zenodo.7554804



Presents



In association with

IEEE SA

#stateofopencon #soocon23 #openuk



Thanks to our sponsors