



THE UNIVERSITY
of EDINBURGH



REPHRAIN

National Research Centre on
Privacy, Harm Reduction and
Adversarial Influence Online

Professor Awais Rashid – Director
University of Bristol

bristol.ac.uk

@REPHRAIN1





Online Harms White Paper

Presented to Parliament
by the Secretary of State for Digital, Culture, Media & Sport
and the Secretary of State for the Home Department
by Command of Her Majesty

April 2019

The Context

Digital sector worth more than £400 million a day to UK economy

New statistics show growth of UK tech sector

Published 5 February 2020

From: [Department for Digital, Culture, Media & Sport](#) and [Matt Warman MP](#)



- Digital sector contributed £149 billion to the UK economy in 2018
- Sector accounts for 7.7 per cent of the UK economy as a whole
- Growth in the sector is nearly six times larger than growth across the economy as a whole



Protecting privacy in practice

The current use, development
and limits of Privacy Enhancing
Technologies in data analysis



THE
ROYAL
SOCIETY

The Observer
Smart homes

How to stop your smart home spying on you

Everything in your smart home, from the lightbulbs to the thermostat, could be recording you or collecting data about you. What can you do to curb this intrusion?

Davey Winder

Sun 8 Mar 2020 13:00 GMT



Illustration and animation by James McLaughlin

NYT App Articles



Your Apps Know Where You Were Last Night, and They're Not Keeping It Secret

@jenvalentino

jennifer.valentino@nytimes.com

BBC BBC Account

NEWS

Home Coronavirus US Election UK World Business Politics Tech Science Health Family & Education

Technology

Amazon's Ring logs every doorbell press and app action

By Leo Kelion
Technology desk editor

4 March

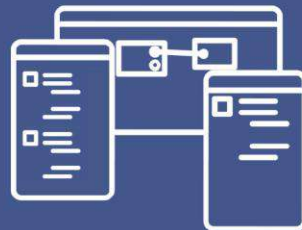


The Ring doorbells use both cameras and motion sensors to detect when someone approaches

Amazon keeps records of every motion detected by its Ring doorbells, as well as the exact time they are logged down to the millisecond.

April 16, 2018

Hard Questions: What Data Does Facebook Collect When I'm Not Using Facebook, and Why?



Hard Questions is a series from Facebook that addresses the impact of our products on society.

By David Baser, Product Management Director

We Read 150 Privacy Policies. They Were an Incomprehensible Disaster.

By Kevin Litman-Navarro

In the background here are several privacy policies from major tech and media platforms. Like most privacy policies, they're verbose and full of legal gargon — and opaquely establish companies' justifications for collecting and selling your data. The data market has become the engine of the internet, and these privacy policies we agree to but don't fully understand help fuel it.

The Observer Apps

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

to deliver our services, we use your information to improve our services, and we use your information to improve our services. We use your information to improve our services, and we use your information to improve our services.

Internet privacy: the apps that protect you from your apps

Worried about the data collected about you? A new generation of startups is making apps to put your privacy settings straight

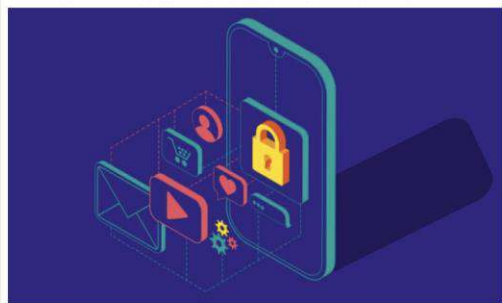


Illustration: James Melough/The Observer

Privacy settings

Please manage your cookie choices by switching the consent toggles on or off under the Purposes listed below. You can also choose to click:

Reject all Accept all

Purposes Features Site Vendors

Purposes

User Consent

Legitimate Interest

Purposes

We have a need to use your data for this processing purpose that is required for us to deliver services to you.

Personalised ads and content, ad and content measurement, audience insights and product development

Status: Accepted All

Off

On

Special Purposes

We use your data for these purposes so we

Link different devices

Vendors can:

- Deterministically determine that two or more devices belong to the same user or household
- Probabilistically determine that two or more devices belong to the same user or household
- Actively scan device characteristics for identification for probabilistic identification if users have allowed vendors to actively scan device characteristics for identification (Special Feature 2)

VEXPPO TECHNOLOGIES LTD	PROXISTORE
Permado GmbH	Blue
EASYMEDIA GmbH	IPONWEB GmbH
Signals (Next14 Group)	Bliss Media Limited
xAd, Inc. dba GroundTruth	Unruly Group Ltd
Ad Alliance GmbH	Inspired Mobile Limited
INFIMA MOBILE S.L.	AdTheorent, Inc
: Tapix	Dugout Limited
Codewise VL Sp. z o.o. Sp. k	comScore, Inc.
Free Stream Media Corp. dba Samba TV	Yieldlab AG
Sizmek by Amazon	InMobi Pte Ltd
Targetspot Belgium SPRL	Mediasmart Mobile S.L.
travel audience GmbH	Telaria SAS
Fifty Technology Limited	LiveRamp, Inc.

Match and combine online data sources

Vendors can:

- Combine data obtained offline with data collected online in support of one or more Purposes or Special Purposes.

VEXPPO TECHNOLOGIES LTD	Permado GmbH
BeeswaxIO Corporation	Bombora Inc.
Publicis Media GmbH	Digiseg ApS
IPONWEB GmbH	Signals (Next14 Group)
Bliss Media Limited	xAd, Inc. dba GroundTruth
Unruly Group Ltd	BIDSWITCH GmbH
Inspired Mobile Limited	Near Pte Ltd
AdTheorent, Inc	Deutsche Post AG
Location Sciences AI Ltd	StackAdapt
TabMo SAS	Codewise VL Sp. z o.o. Sp. k
Free Stream Media Corp. dba Samba TV	Yieldlab AG
Sizmek by Amazon	InMobi Pte Ltd
Targetspot Belgium SPRL	

Receive and use automatically-sent device characteristics for identification

Vendors can:

- Create an identifier using data collected automatically from a device for specific characteristics, e.g. IP address, user-agent string
- Use such an identifier to attempt to re-identify a device.

Vendors cannot:

- Create an identifier using data collected via actively scanning a device for specific characteristics, e.g. installed font or screen resolution without users' separate opt-in to actively scanning device characteristics for identification.
- Use such an identifier to re-identify a device.

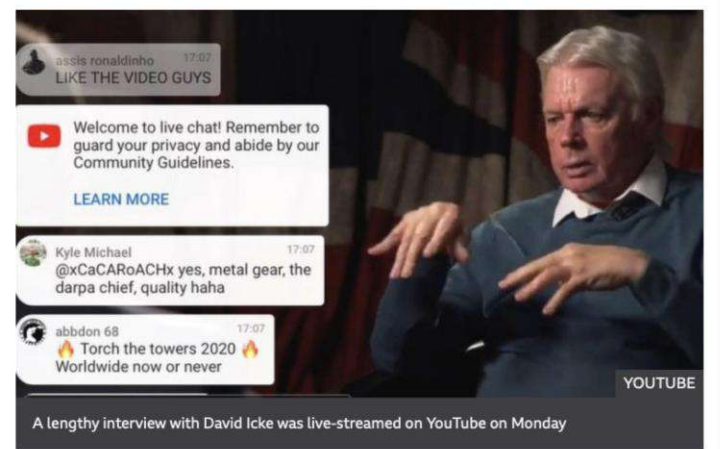
VEXPPO TECHNOLOGIES LTD	BeeswaxIO Corporation
Bombora Inc.	Blue
IPONWEB GmbH	Signals (Next14 Group)
Bliss Media Limited	xAd, Inc. dba GroundTruth
Market Resource Partners LLC	Unruly Group Ltd
BIDSWITCH GmbH	GumGum, Inc.
INFIMA MOBILE S.L.	AdTheorent, Inc
Adobe Advertising Cloud	Index Exchange, Inc.
Smart Adserver	Effimotion
Axel Springer Teaser Ad GmbH	TabMo SAS
Venatus Media Limited	Codewise VL Sp. z o.o. Sp. k

Coronavirus: YouTube tightens rules after David Icke 5G interview

By Leo Kelion
Technology desk editor

7 April

Coronavirus pandemic



YouTube has banned all conspiracy theory videos falsely linking coronavirus symptoms to 5G networks.

Coronavirus: 100 days that changed the world

Coronavirus

Julia Carrie Wong

Tech giants struggle to stem 'infodemic' of false coronavirus claims



Flat Earth: How did YouTube help spread a conspiracy theory?

research reveals vast

REPHRAIN Missions



**Address the fundamental tensions and imbalances
pertaining to protecting citizens online**

Privacy at
Scale



Mission 1



Misuse of Privacy
Technologies

Maximise Socio-
economic benefits

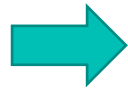


Mission 2

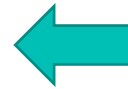


Minimise Harms
from Sharing

Individual Agency



Mission 3



Social Good



Center for the
Cultivation of
Technology



GENIES



THE
HEALTH DATA
EXCHANGE
Share your data for faster cures

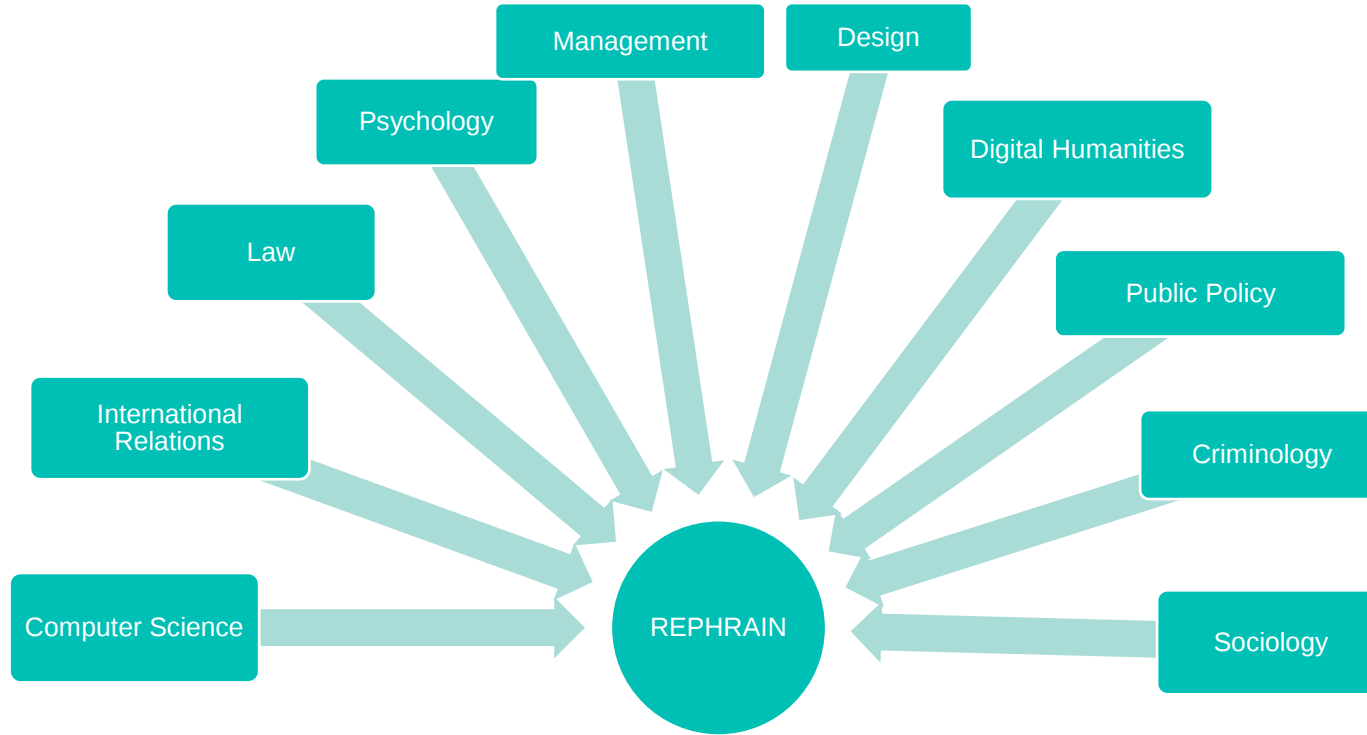
KU LEUVEN



UKAuthority

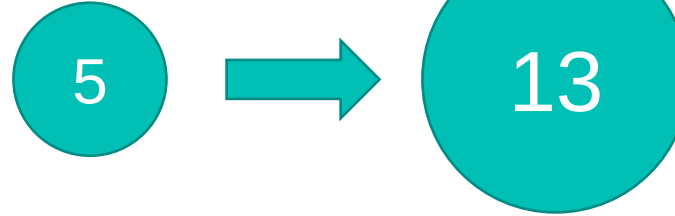


Building National Capability

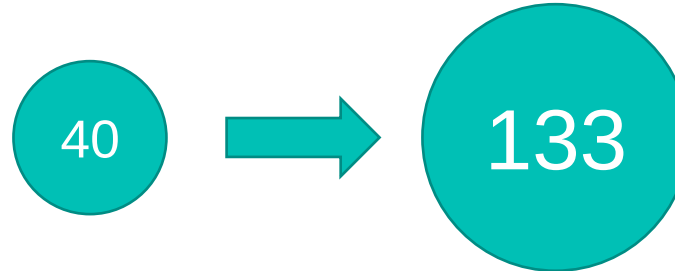


Building National Capability

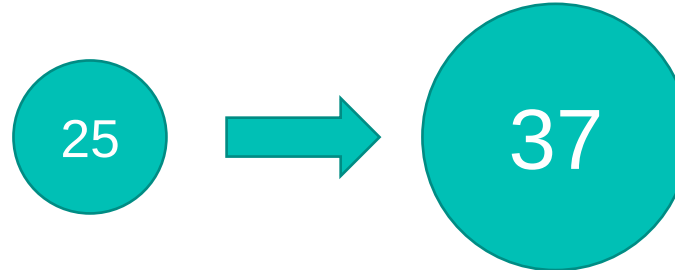
Academic Partners



Researchers



Projects



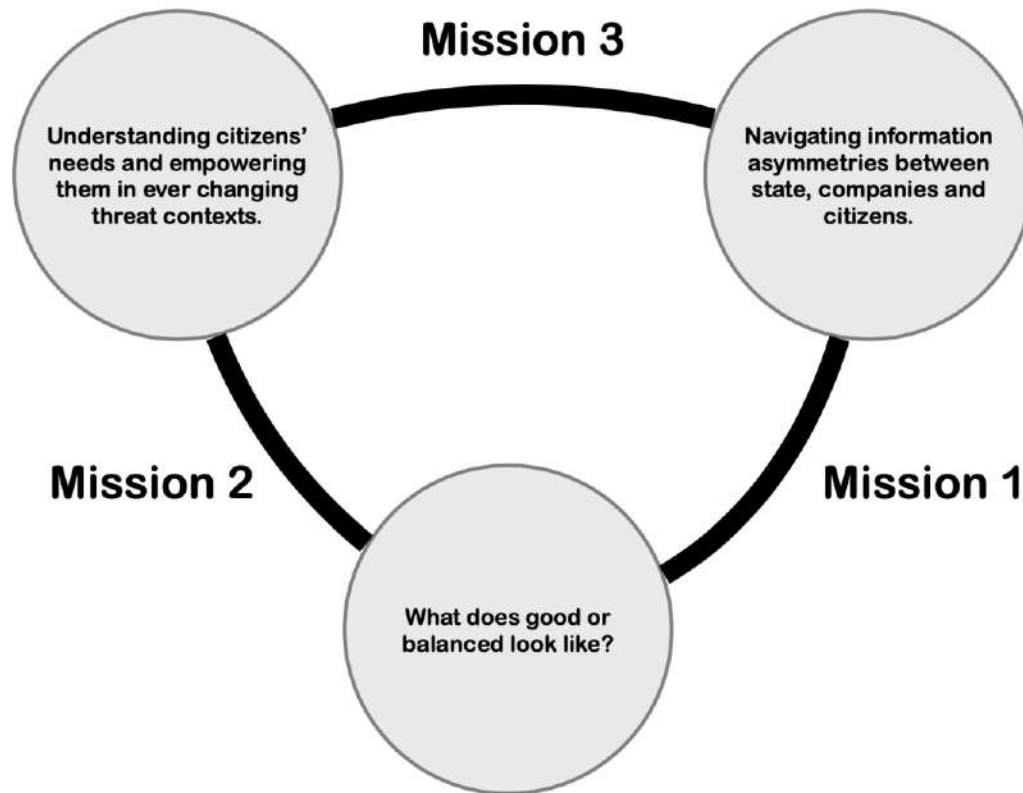
*£900K new
projects*

Building National Capability

REPHRAIN
Protecting citizens online



Scoping work to
inform the £11M
UKRI call on
complementary
node projects as
part of the
Protecting Citizens
Online Strategic
Priority Fund



Building National Capability

REPHRAIN
Protecting citizens online



AP4L

Protecting online privacy for people going through serious life events

3PO

Protecting public-facing professionals and their dependants online

PRIME

Addresses concerns that the digitalisation of key government services may lead to existing inequalities being reproduced or exacerbated

AGENCY

Addresses harms that arise from a complex interaction of societal processes driven by diverse stakeholders

CLARITI – MuMiN: A Large-Scale Multilingual Multimodal Fact-Checked Misinformation Social Network Dataset

PI – Ryan McConville, RA – Dan Saattrup Nielsen

A multimodal machine learning based study of misinformation on social networks in the form of text, videos and rich structural connectivity

MuMiN Dataset

21 million tweets belonging to 26K threads

Linked to 13K fact-checked claims

in 41 languages

Publicly Available:

<https://mumin-dataset.github.io/>

The applicability of the UK Computer Misuse Act 1990 for cases of technology-enabled domestic violence and abuse (Tech Abuse)

PI – Leonie Tanczer, RA – Francesca Stevens

Court cases in England and Wales where either tech-abuse was involved or was suspected in an intimate partner violence (IPV) context

Tech abuse continues to be **prevalent and common** within the analysed domestic abuse court cases

CMA 1990 applicable to unauthorised access to mobile phone messages and social media accounts, and manipulation of partner's social media account

FAIRCROWD - Fair Private and Distributed Evaluation of Crowd-sourced user data

PI – Rik Sakar and Tariq Elahi, RA – Hao Tsung Yang

Modern businesses depend on personal data to improve machine learning and data driven decision making

Contributors knowing value of their data can enable better data markets and reduce privacy risks

Shapley Values algorithm developed for privacy-preserving data valuation – uses substantially less data and is differentially private

Query - Efficiently Querying User Sequences While Preventing Their Reconstruction

PI – Grigorios Loukides, RA – Huiping Chen

Strings (sequences of elements) can model location or genetic information, purchases of products online, or natural language.

A popular type of queries: Is a given length- k string part of the string S we indexed? However, such queries allow an attacker to (reconstruct) S .

Construct a data structure to prevent the reconstruction attack with high probability while storing as many answers to useful queries as possible.

Fundamental Research

Defining harm, mapping tech interactions associated with harm and understanding/auditing mitigation strategies

PI – Adam Joinson, Laura Smith, Danae Stanton Fraser, David Elli, RA – Alicia Cork, Othman Esoul

Developed psychological model of contextual vulnerability online

Studies with Genies users to assess the risks of digital fashions NFTs

Ecological momentary assessment study on everyday experiences of harm

Studies on simulated social media platform for assessing how sociopsychological context impacts vulnerability to radical ideas

Co-Producing Artefacts



Design & Engagement



Adoption & Adoptability



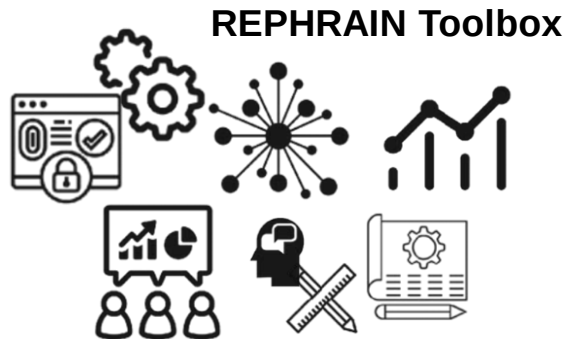
**Responsible, Inclusive
& Ethical Innovation**



Policy & Regulation

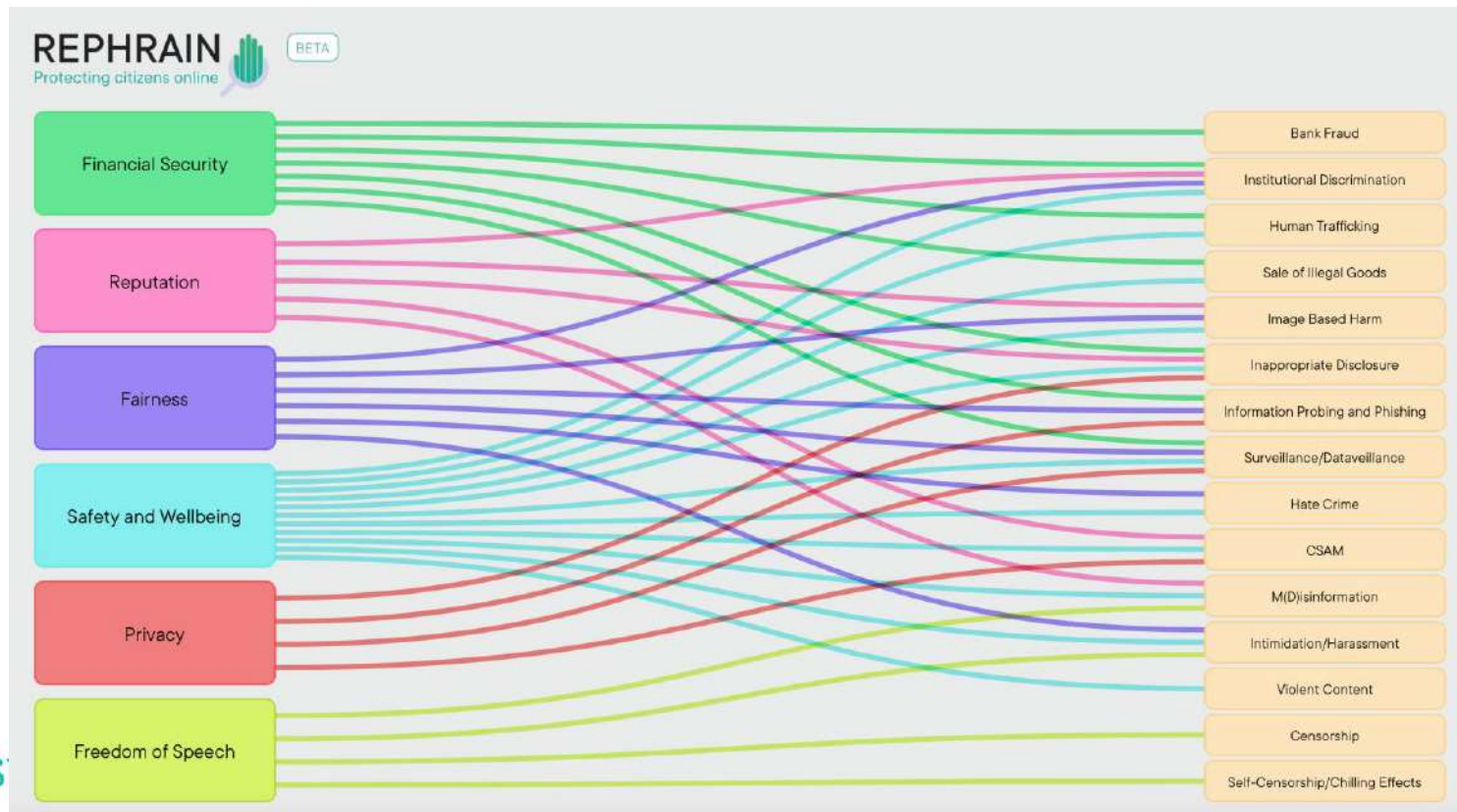


REPHRAIN Map



REPHRAIN Toolbox

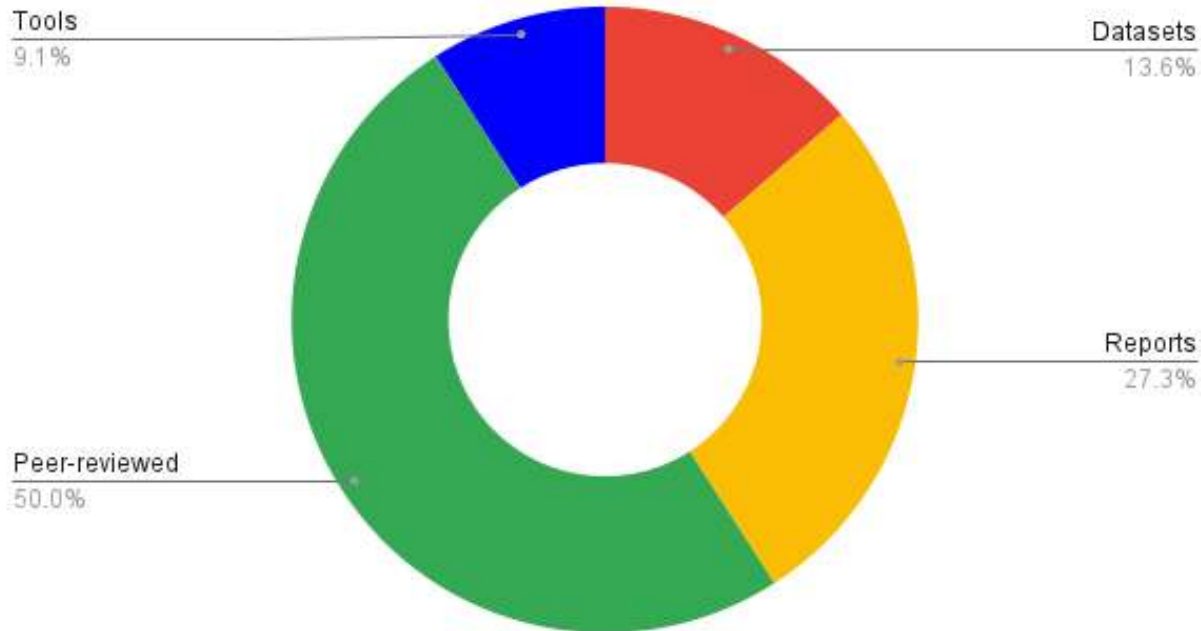
REPHRAIN Map



REPHRAIN Toolbox



Projects Output

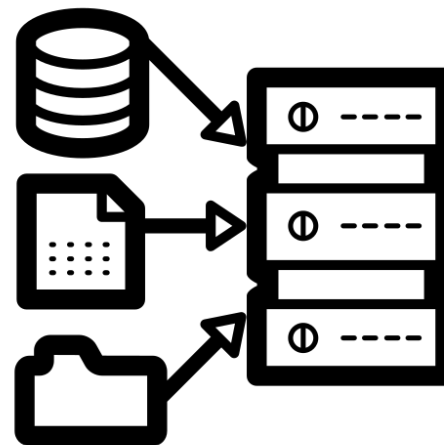


Building Evidence Base



PETS Testbed

bristol.ac.uk



*REPHRAIN Data
Archive*

Sharing Best Practice



Best practices for data collection, as well as mechanisms for describing, checking, fixing and improving datasets; data storage; data sharing

Building rigorous research artefacts

Ethics review practices with a core ethos of protecting citizens online and responsible innovation

Safeguarding researchers and vulnerable users

Masterclasses on REPHRAIN research

90 Engagement Activities

16 inputs into policy and regulatory initiatives

Safety Tech Challenge Fund – Independent Evaluation

REPHRAIN invited by DCMS to provide an independent evaluation of Proof-of-Concept tools for preventing and detecting child sexual abuse media (CSAM) within end-to-end encryption (E2EE) environments within five different projects funded by the [Safety Tech Challenge Fund](#).

The team is headed by ***Dr Claudia Peersman (University of Bristol)*** and joined by:

- Professor Corinne May-Chahal (Lancaster University)
- Professor Emiliano De Cristofaro (UCL)
- Dr Ryan McConville (University of Bristol)
- Dr Partha Das Chowdhury (University of Bristol)
- Dr Jose Tomas Llanos (UCL)

Shaping Policy and Practice

DCMS App Security and Privacy Consultation Invited to and attended DCMS special invitation meeting to discuss	DCMS Connected tech: smart or sinister - call for evidence
Ofcom Online Harm consultation Follow up meeting with Ofcom to introduce REPHRAIN researchers with internal seminar to be given by Ofcom in November 2022	DCMS Misinformation and trusted voices inquiry
Home Office Unauthorised access consultation	UK Parliament (Science and Technology Select Committee) The Right to Privacy: Digital Data – call for evidence
UK Government Data: A New Direction consultation (joint response with CGLI)	

Shaping Policy and Practice

Invited to attend the All-Party Parliamentary Group meeting on the Metaverse and Web 3.0.

Attended by Ola Michalec (REPHRAIN
Policy and Regulation Strand) plus
members of REPHRAIN looking at the
online harms of VR and AR technologies.

Presented to over 60 people (including MPs
and members of the House of Lords) and
involved in in-depth discussion.



SoBigData – Research Infrastructure PPP

A 3-year ESFRI funded consortium to build on work undertaken as part of H2020 funding to create, implement and operate a research infrastructure.

Involves 31 partners from 13 European countries.

Project Preparation Phase (PPP) will focus on building:

- Legal and financial stability
- Sustainability
- Technical and governance maturity

Citizens at the Core



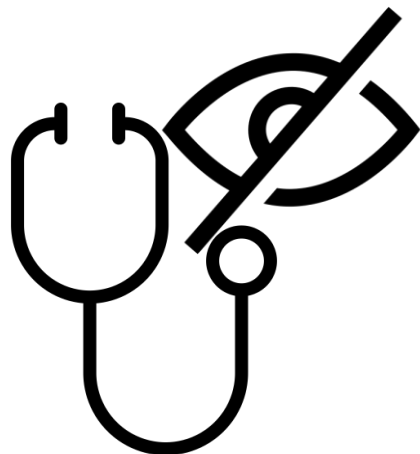
A paradigm shift from *Utility* to *Capability*

A Manifesto to empower users

- Policy makers should assess deliberate influences to freedom
- Approaching capability through ethos
- Capability approach to assess the circumstances of the marginalised and non-participants
- Democratic participation to evolve a list of basic minimum online protections
- A reasoned understanding of winners and losers
- Individuals should value participating in the online community

Citizens at the Core

Supporting vulnerable user groups



Privacy Clinics



*Tackling violence
against women and
girls online*

REPHRAIN Sandpit

Transforming REPHRAIN research into actionable impacts for
protecting citizens online

And finally



Proceedings on Privacy Enhancing Technologies Symposium

PoPETs

Go to PETS

[Home](#) [CFPs ↓](#) [Authors ↓](#) [Reviews ↓](#) [Proceedings](#) [Awards ↓](#) [Sponsorship](#) [Code of conduct](#)

To be hosted by REPHRAIN in July 2024 at University of Bristol

bristol.ac.uk