

**The  
Alan Turing  
Institute**



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**What role can public-private  
partnerships play in strengthening  
research in health?**

***The Turing-Roche partnership  
experience***

Vicky Hellon, Research Community Manager



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# Context of Public-Private Partnerships within Health

- Public-private partnerships can take many forms
- They are increasing in number: amount of these collaborations more than doubled between 2012 and 2016 (Nature Index, 2017)
- Barriers to healthcare research:
  - *Health data accessibility and integration*
  - *Uneven funding*
  - *Siloed efforts across the ecosystem and limited deployment in healthcare systems*
  - *Regulation*



# Advantages of Public-Private Partnerships

- Access to and leveraging resources on both sides; such as funding, research expertise, skills and real-world data
- Combining foundational research (often the academic focus) and applied research (often the industry focus)
- Accelerating innovation and societal impact through working together on a shared research problem
- Experience and increased career opportunities for students and researchers working as part of the collaboration



# The Roche Group

## A leading healthcare company dedicated to sustainable innovation

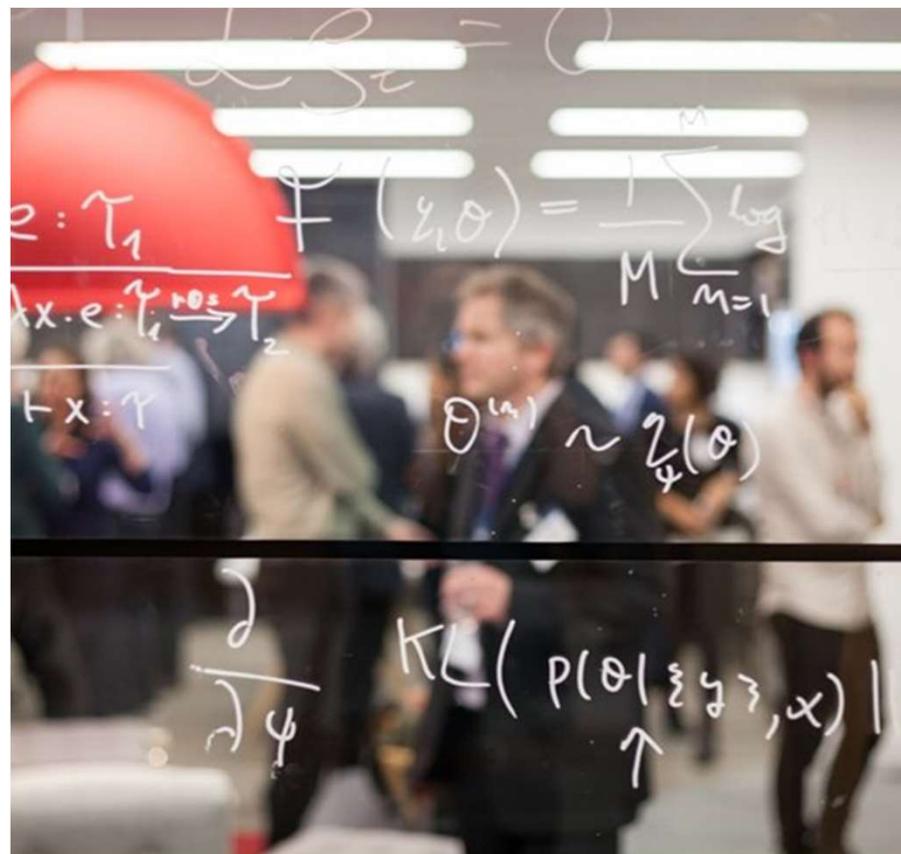
Focus on revolutionising Personalised Healthcare: *meaning better health, at a lower cost, for people and society. It means shifting from a one-size-fits-all approach to the best care for each person*

- Roche partnership team members from Product Development Data Sciences and Genentech
- Looking at Data and Advanced Analytics as key enablers to transform healthcare



# The Alan Turing Institute

- Established in 2015 as the UK's National Institute for Data Science and AI
- 3 main goals:
  - *Advance world-class research and apply it to national and global challenges*
  - *Build skills for the future*
  - *Drive an informed public conversation*
- Moving towards 'Turing 2.0'- focusing our research efforts in 3 grand challenges of **Environment and Sustainability, Defence and Security** and **Health**: *to transform health and enable better outcomes for all*



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# Turing's Place in the Ecosystem



Independent,  
impartial and trusted  
advice for  
government, industry  
and civil society



National leadership,  
providing focus on  
national priorities for  
the public good

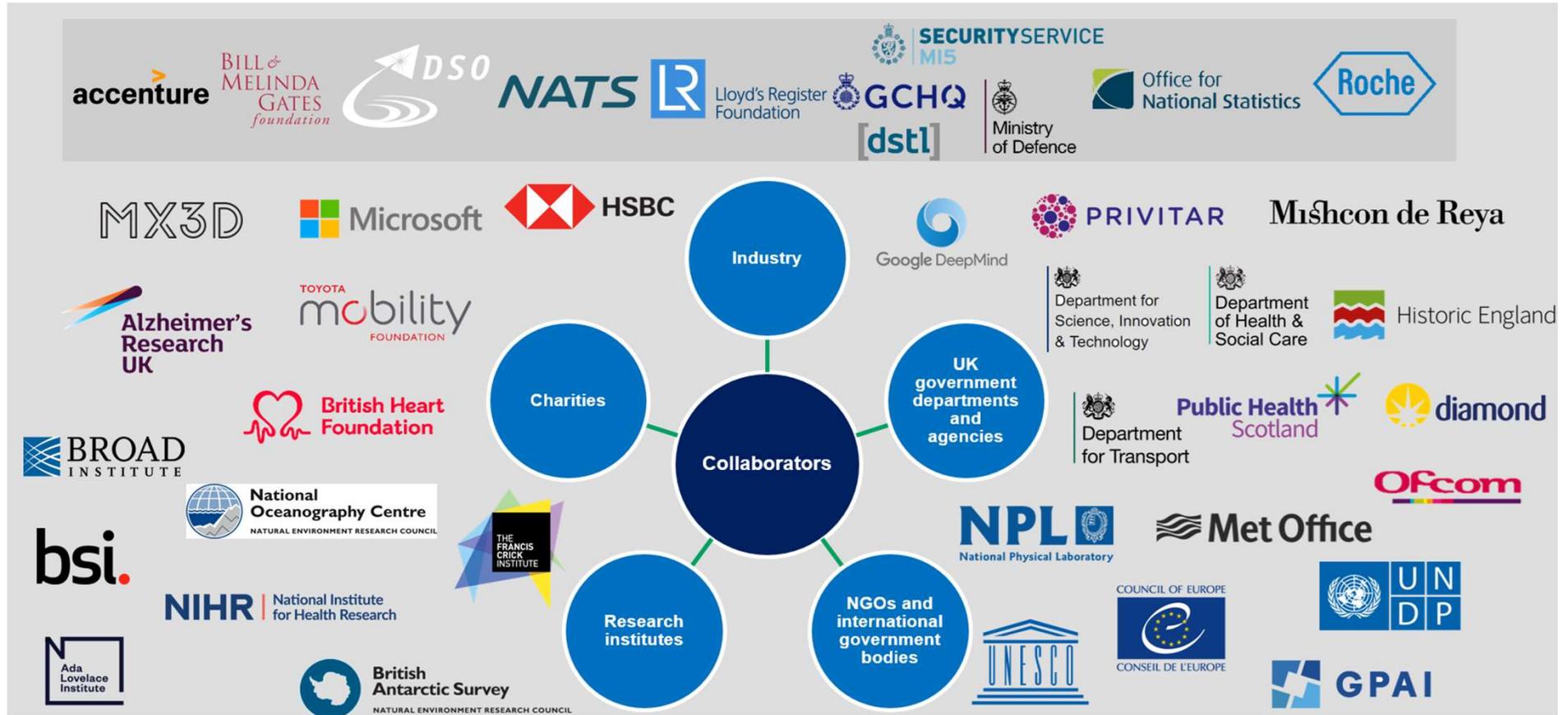


Broker and convene  
cross-sector and  
interdisciplinary  
research and  
innovation capability at  
scale



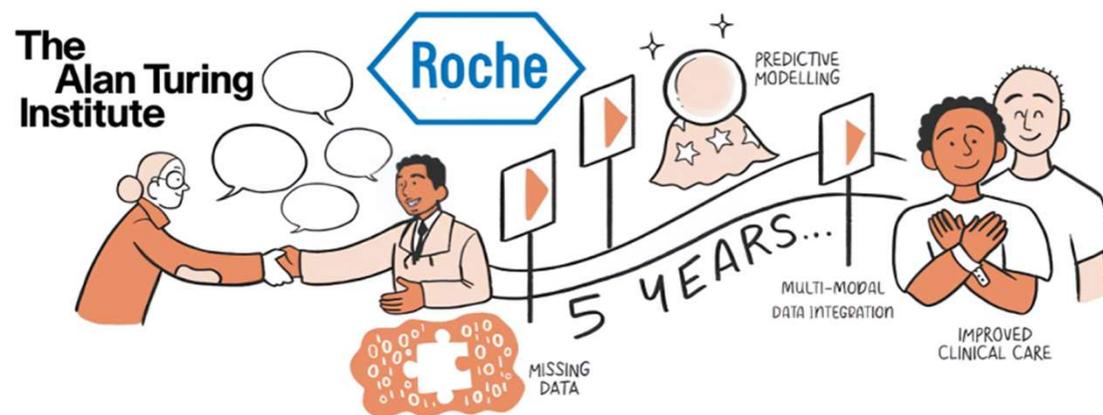
Key asset to the UK  
internationally

# Turing's Strategic Partners and Collaborators



# Establishing the Turing-Roche Partnership

- Initial collaboration through a hackathon on lung cancer
- 5-year partnership established in June 2021
- Strong strategic alignment on research and values from both sides
- Roche providing the resource investment of funding, people and data
- Turing providing convening power and research capabilities



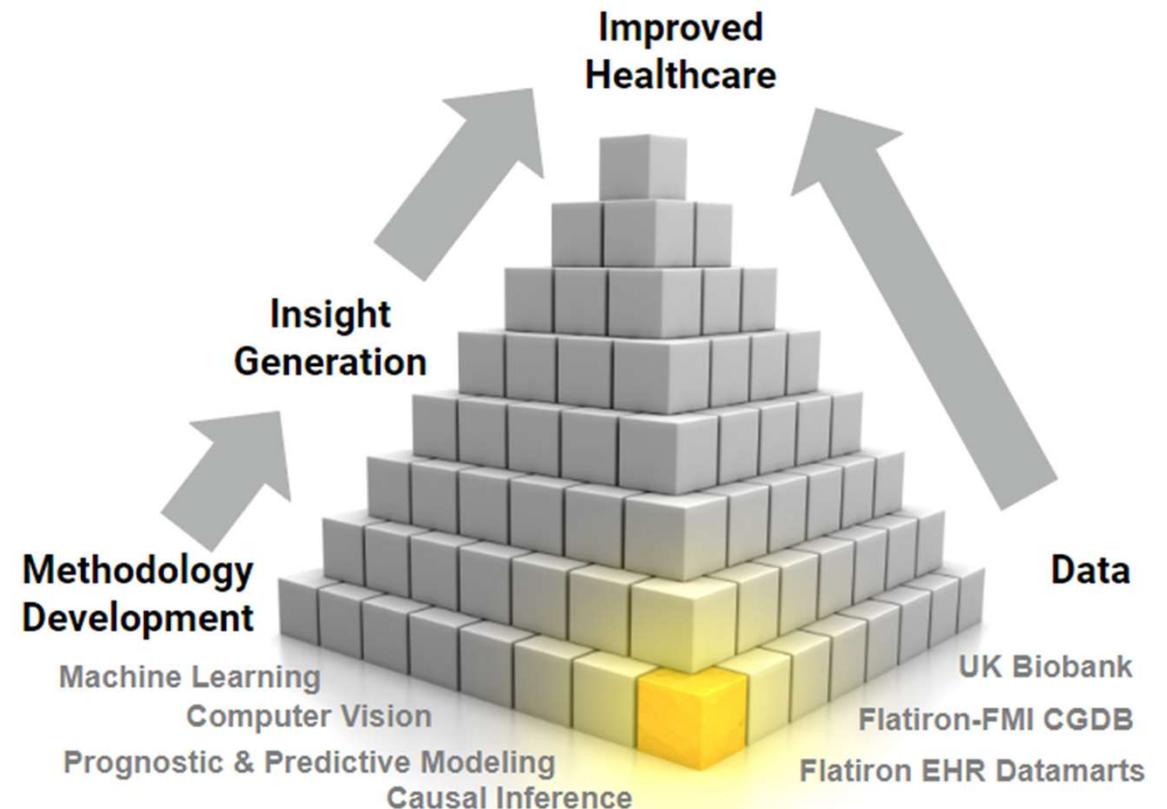
BETTER UNDERSTANDING PATIENT AND DISEASE HETEROGENEITY

Scriberia

# Research Aims of the Partnership

*Tackling our North Star in an iterative, stepwise way*

*“To enable the generation of insights to better understand patient and disease heterogeneity and its relevance to clinical outcomes at an unprecedented level of precision in order to improve clinical care”*



# Research Aims of the Partnership



## Structured Missingness

**As we combine multiple datasets for machine learning models- how do we deal with missing data, particularly data that is 'structured' in some way?**



## Predictive Modelling

**How do we develop robust and fair predictive models in the face of uncertainty and heterogeneity in biomedical data?**



## Multi-Modal Data Integration

**How do we most effectively combine different modalities of data to improve clinical care?**

# Partnership in Practice

- We are truly collaborative in nature: Roche and Turing colleagues equivalently represented in the partnership
- Researchers based at Turing, collaborate with wider Roche scientists as needed
- Commitment to wider ecosystem and ensuring our work is impactful and sustainable: expert panel, convening workshops

## Organisers



**Professor Ben MacArthur**  
Programme Lead for Turing-Roche Partnership



**Ryan Copping**  
Vice President, Computational Catalysts in the gRED Computational, Roche



**Chris Harbron**  
Expert Statistical Scientist and Advanced Analytics Lead, Roche



**Dr Sarah McGough**  
Head of Technical Innovation & Shared Platforms, Computational Catalysts, gRED Computational...



**Maria Anagnostopoulou**  
Programme Manager, Health and Medical Sciences



**Vicky Hellon**  
Research Community Manager, Turing-Roche Partnership | Tools, Practices and Systems



**Ali Marsh**  
Senior Programme Manager, Health and Medical Sciences



**Dr Chris Banerji**  
Theme Lead, Turing-Roche Partnership



**Dr Tapabrata (Rohan) Chakraborty**  
Theme Lead, Turing-Roche Partnership

## Researchers and collaborators



**Dr Ariane Marandon-Carlhian**  
Research Associate, Turing-Roche Partnership



**Dr Fiona Young**  
Research Associate, Turing-Roche Partnership



**Dr Enrico Parisini**  
Research Associate, Turing-Roche Partnership



**Dr Ioanna Thoma**  
Research Associate, Turing-Roche Partnership



**Dr Viktor Račinskij**  
Research Associate, Turing-Roche Partnership



**Dr Robin Mitra**  
Research Theme Lead in Structured Missingness, Turing-Roche Partnership



**Dr Eleni-Rosalina Andrinopoulou**  
Assistant Professor at the Department of Biostatistics, Erasmus MC Rotterdam



**Professor Ana Basiri**  
Turing Network Development Award Lead, University of Glasgow



**Professor Ginestra Bianconi**  
Turing Fellow



**Dr Ruben Sanchez Garcia**  
Turing Fellow



**Dr Anthony Baptista**  
Postdoctoral Research Assistant, Queen Mary University of London



**Dr Brieuc Lehmann**  
Assistant Professor (University College London) and member of the Turing-RSS Lab



**Professor Ricardo Silva**  
Turing Fellow



**Dr Karla Diaz-Ordaz**  
London School of Hygiene & Tropical Medicine



**Dr Matthew Sperrin**  
Senior Lecturer in Health Data Science, University of Manchester



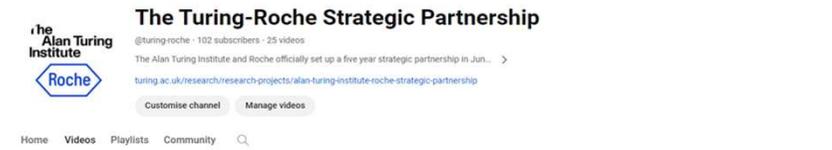
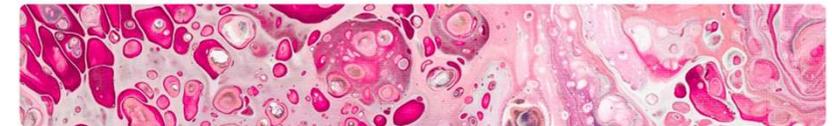
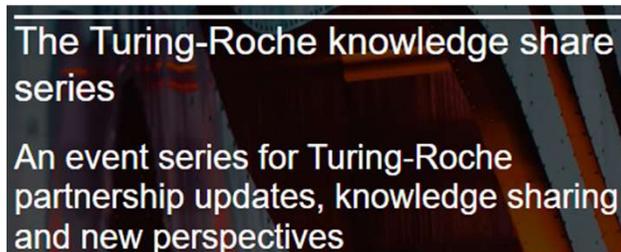
**Luis Santos**  
Senior Data Wrangler, Turing



**Mahwish Mohammad**  
Data Wrangler

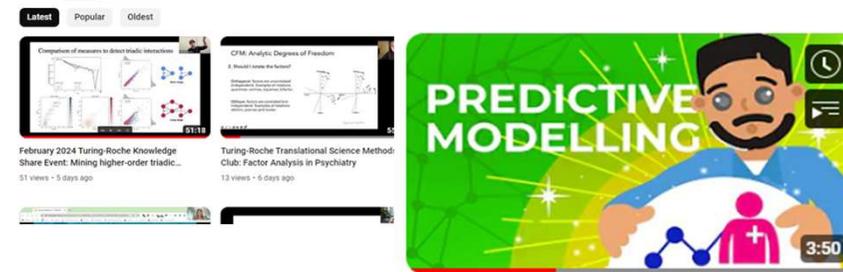
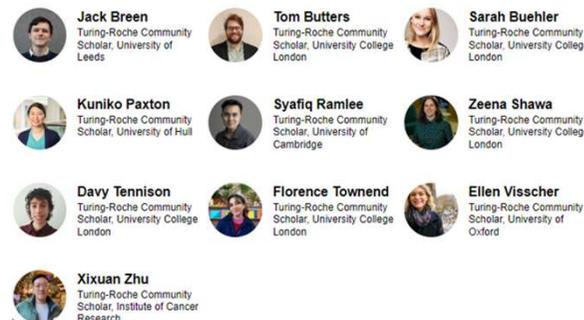
# Partnership in Practice: Community

*Community Management: collaboration tools and activities (Slack Workspace, YouTube Channel, Monthly Knowledge Share Series), convening workshops and early career development through Community Scholar Scheme*



'Clinicians in the AI loop: exploring decision support tools' workshop

## Turing-Roche Community Scholars



#ExplainToMe: Why Predicting the Future Can Be Tricky

The Alan Turing Institute-Roche Strategic Partnership



# Partnership Publications

## Learning from data with structured missingness

Robin Mitra<sup>1,2,\*</sup>, Sarah F. McGough<sup>3,\*</sup>, Tapabrata Chakraborti<sup>1</sup>, Chris Holmes<sup>1,4</sup>, Ryan Copping<sup>3</sup>, Niels Hagenbuch<sup>5</sup>, Stefanie Biedermann<sup>6</sup>, Jack Noonan<sup>7</sup>, Brieuc Lehmann<sup>2</sup>, Aditi Shenvi<sup>8</sup>, Xuan Vinh Doan<sup>9</sup>, David Leslie<sup>1</sup>, Ginestra Bianconi<sup>1,10</sup>, Ruben Sanchez-Garcia<sup>1,11</sup>, Alisha Davies<sup>1,12,13</sup>, Maxine Macintosh<sup>1,14</sup>, Eleni-Rosalina Andrinopoulou<sup>15</sup>, Anahid Basiri<sup>1,16</sup>, Chris Harbron<sup>17,\*</sup>, and Ben D. MacArthur<sup>1,11,18,\*</sup>

nature  
machine  
intelligence

## Clinical AI tools must convey predictive uncertainty for each individual patient

nature  
medicine

Christopher R. S. Banerji, Tapabrata Chakraborti, Chris Harbron & Ben D. MacArthur

Article | [Open access](#) | Published: 13 March 2024

## Charting cellular differentiation trajectories with Ricci flow

[Anthony Baptista](#) , [Ben D. MacArthur](#) & [Christopher R. S. Banerji](#) 

[Nature Communications](#) **15**, Article number: 2258 (2024) | [Cite this article](#)

1747 Accesses | 1 Altmetric | [Metrics](#)

*J. Phys. Complex.* **4** (2023) 042001

<https://doi.org/10.1088/2632-072X/adb2c23>

*Journal of Physics: Complexity*

TOPICAL REVIEW

Zoo guide to network embedding

A Baptista<sup>1,2,\*</sup>, R J Sánchez-García<sup>3,4</sup>, A Baudot<sup>5,6,7</sup> and G Bianconi<sup>1,2,\*</sup>

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Keywords: network embedding, representation learning, network analysis, higher-order network



Winner Of Strategic  
Partnership Of The Year  
2023 at Praxis Auril  
Knowledge Exchange  
Awards

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# Conclusion

- Public-private partnerships can be extremely impactful, particularly in the health space
- Pipeline of research to industry test bed can accelerate deployment
- Bringing together strengths of both organisations can be highly effective
- Consider impact beyond research and incorporating aspects such as skills, career development and overall community building



# Thanks!



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<https://zenodo.org/records/13380414>

