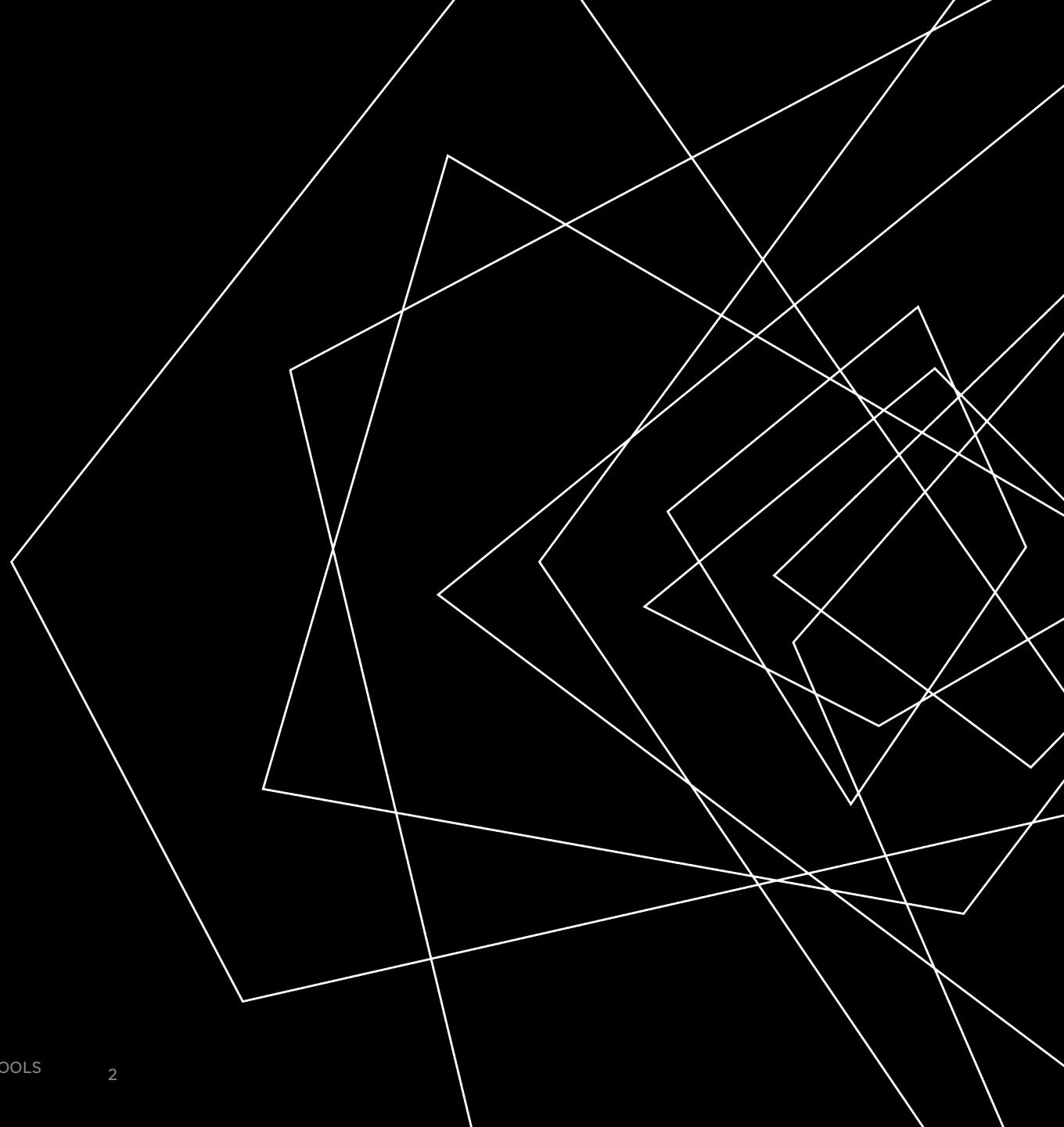


Abstract geometric lines in the top-left corner of the slide, consisting of several thin black lines forming overlapping, irregular polygons and triangles.

EXPANDING COLLABORATION AND INNOVATION IN R&D: LEVERAGING THE POWER OF OPEN-SOURCE TOOLS

Ellis Hughes

THE CONTENT OF THIS
PRESENTATION IS MY
PERSONAL OPINION
AND NOT NECESSARILY
OF GSK



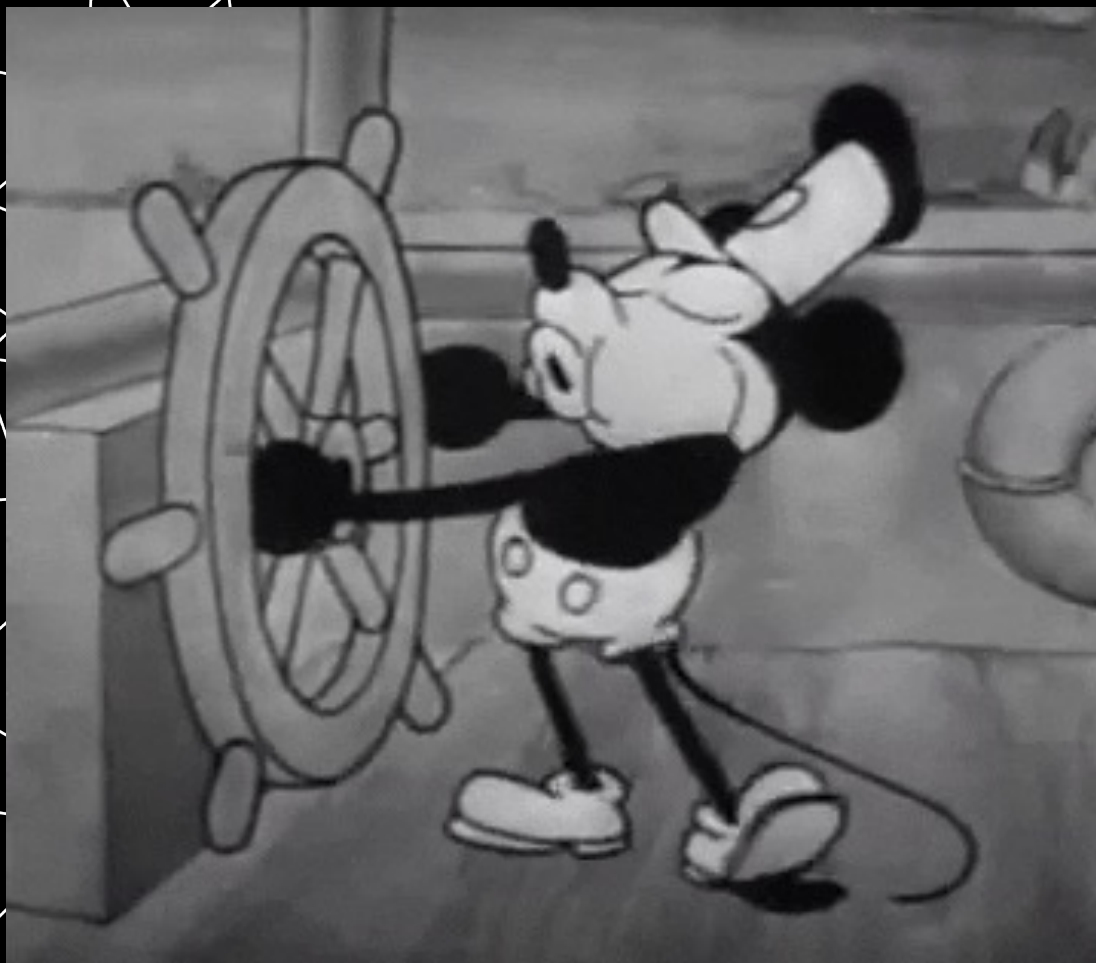


Image Source:

https://media1.giphy.com/media/l2JhLOGpfbvs4Y07K/giphy.gif?cid=ecf05e47mpnvvwmaWytw1n1ugyastpupmn89tqi5smxddcx5&ep=v1_gifs_search&rid=giphy.gif&ct=g

STEAMBOAT WILLIE AND THE NEVER-ENDING COPYRIGHT

1928 – Steamboat
Willie Released

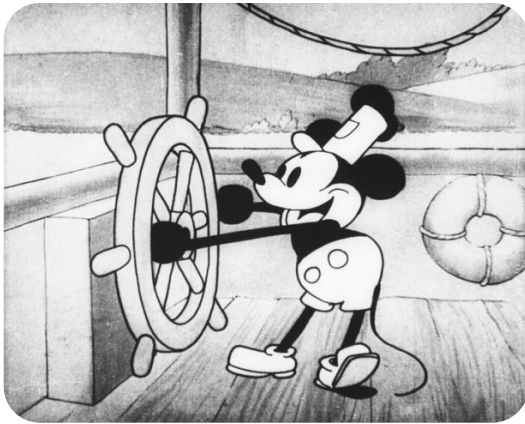


Image Source:
<https://thewaltdisneycompany.com/mickey-mouse-95-anniversary-steamboat-willie-script/>

Copyright Law

- Copyright Act of 1909
- Renewal
- Copyright Act of 1976
- 1998 Sonny Bono
Copyright Term Extension
Act

January 1, 2024 –
The cartoon the
Public Domain



Image Source:
<https://deadline.com/2023/04/john-oliver-tests-disney-lawyers-staking-claim-mickey-mouse-steamboat-willie-version-entering-public-domain-1235316046/>

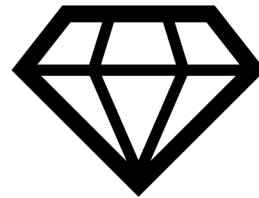
PUBLIC DOMAIN



Available or anyone to use without restriction

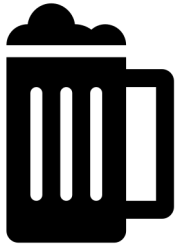


Source of Inspiration for Creators



May have high cultural value

OPEN SOURCE



Free, as in free Beer



Source code can be studied and modified



Rapid development and distribution

OPEN SOURCE IS EVERYWHERE

Phones



Technology



Infrastructure



OPEN SOURCE IS A TRANSFORMATIVE FORCE

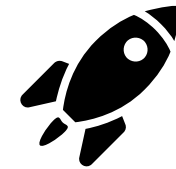
Collaboration

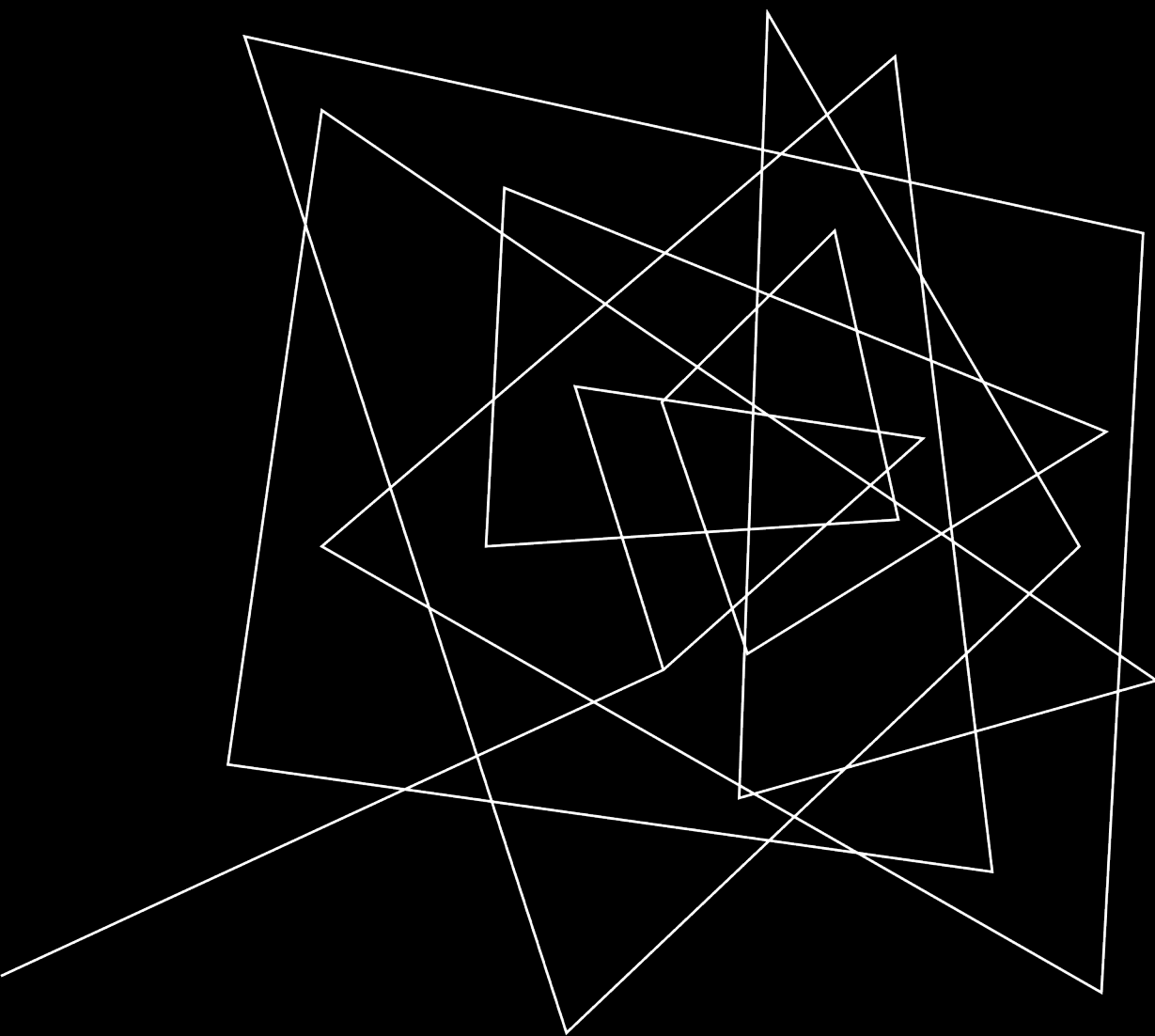


Efficiency



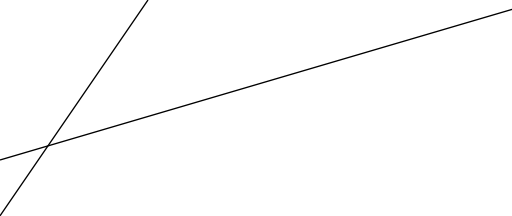
Innovation





COLLABORATION





COMMUNITY

- Open-Source community solves things openly
 - Anyone can request a feature
 - Anyone can contribute code
 - Anyone can share ideas and positions
- Encouraging open source means a wider potential audience
 - Users are not limited by licenses purchased
 - Central solutions or local solutions depending on task
- Cross-pollination of ideas, and prioritization based on organization needs vs team needs

ENGAGEMENT

- Focus on bringing value based on experience and behaviors
- Users from any group may contribute, growth opportunities for anyone
- Incorporating feedback from a wide user group helps with decisions
- Open-Source Mindset proliferates, promoting sharing of ideas

VIRTUOUS CYCLE

Value

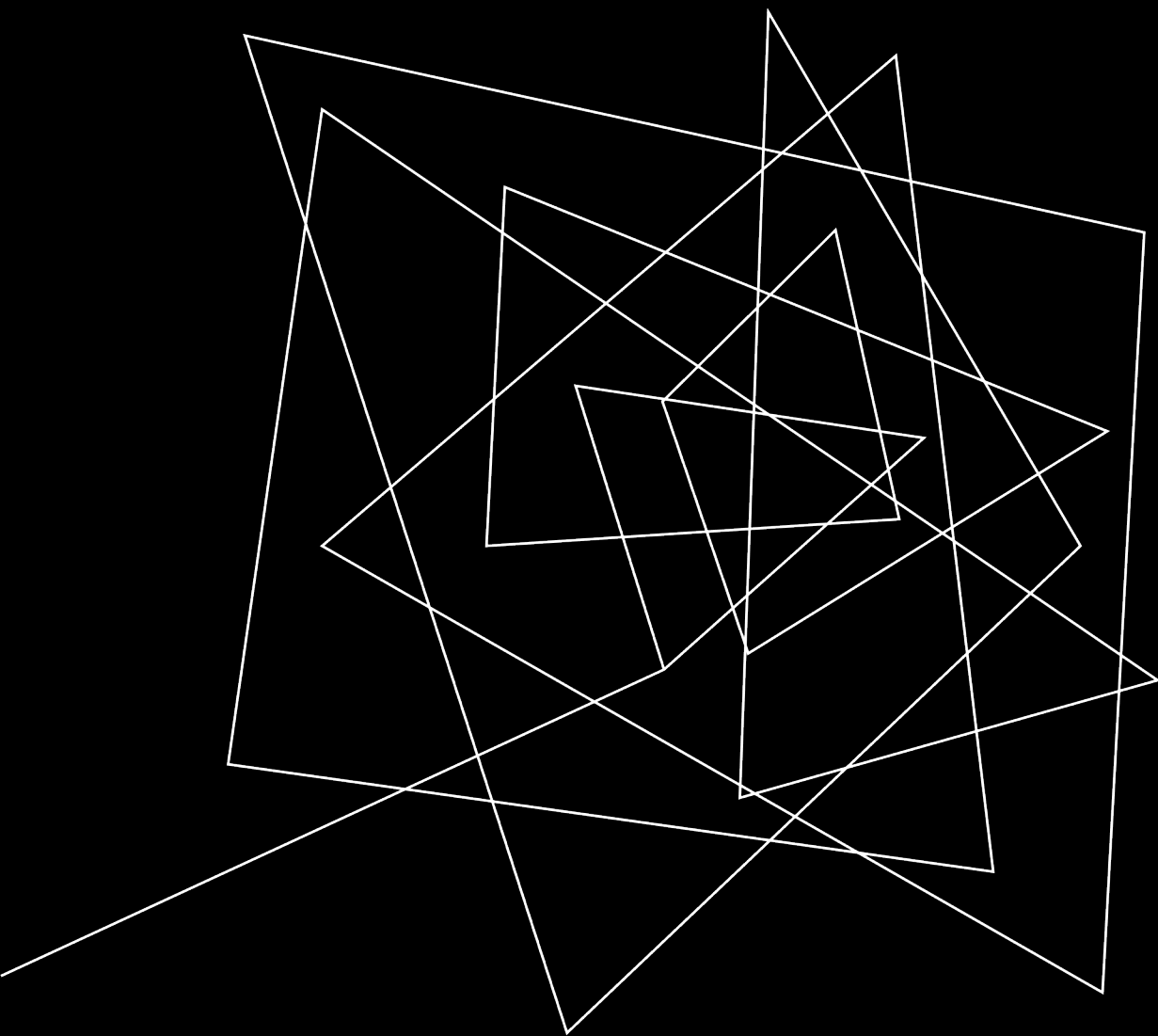


Impact

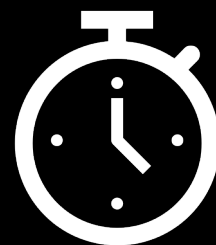


Re-investment





EFFICIENCY



SHARING RESOURCES

Solve problem once,
apply to many



Patch in specific
solutions



Focus on delivery &
value



ACROSS THE ORG

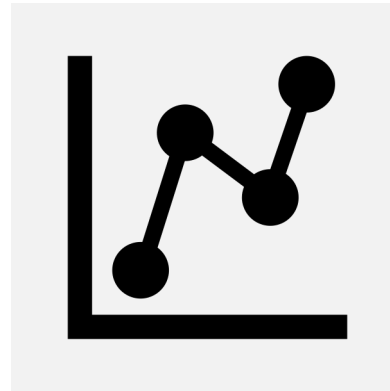


Early Phase Researchers

High throughput Techniques

Non-standard data formats

Large Data



Biostatisticians

Novel Techniques

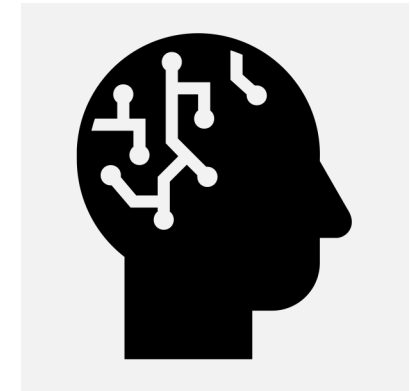
Cutting Edge Tools



Clinical Programmers

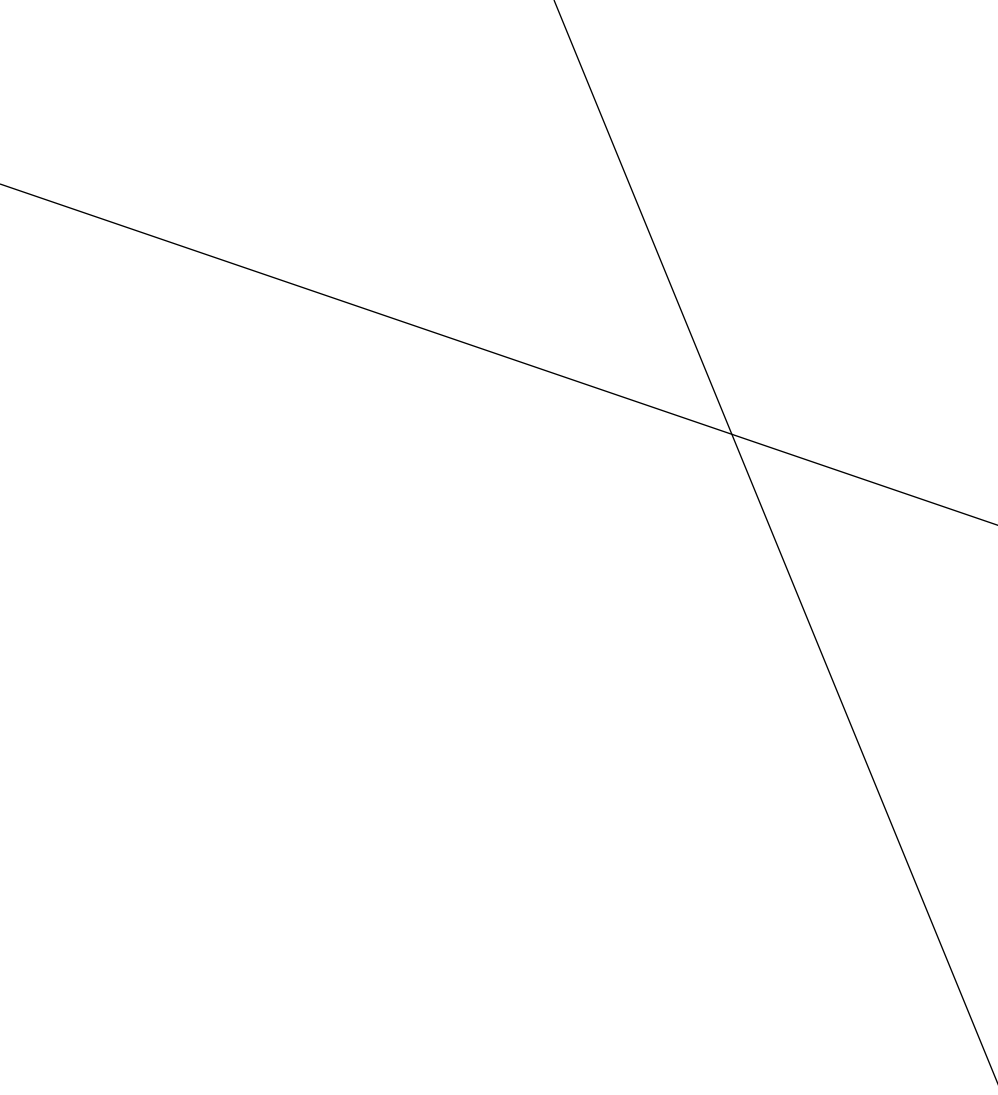
Shared Data
Engineering solutions

Data Standards



Analysts across the Org

Integration of
different systems and
solutions



USE CASE: PHARMAVERSE

Surfacing solutions for Common Pharma Workflows

Connecting individuals interested in similar problems

Sharing knowledge and approaches to improve collaboration

NON-PROGRAMMING STAFF

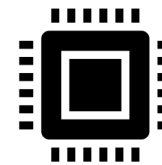
Shiny Applications

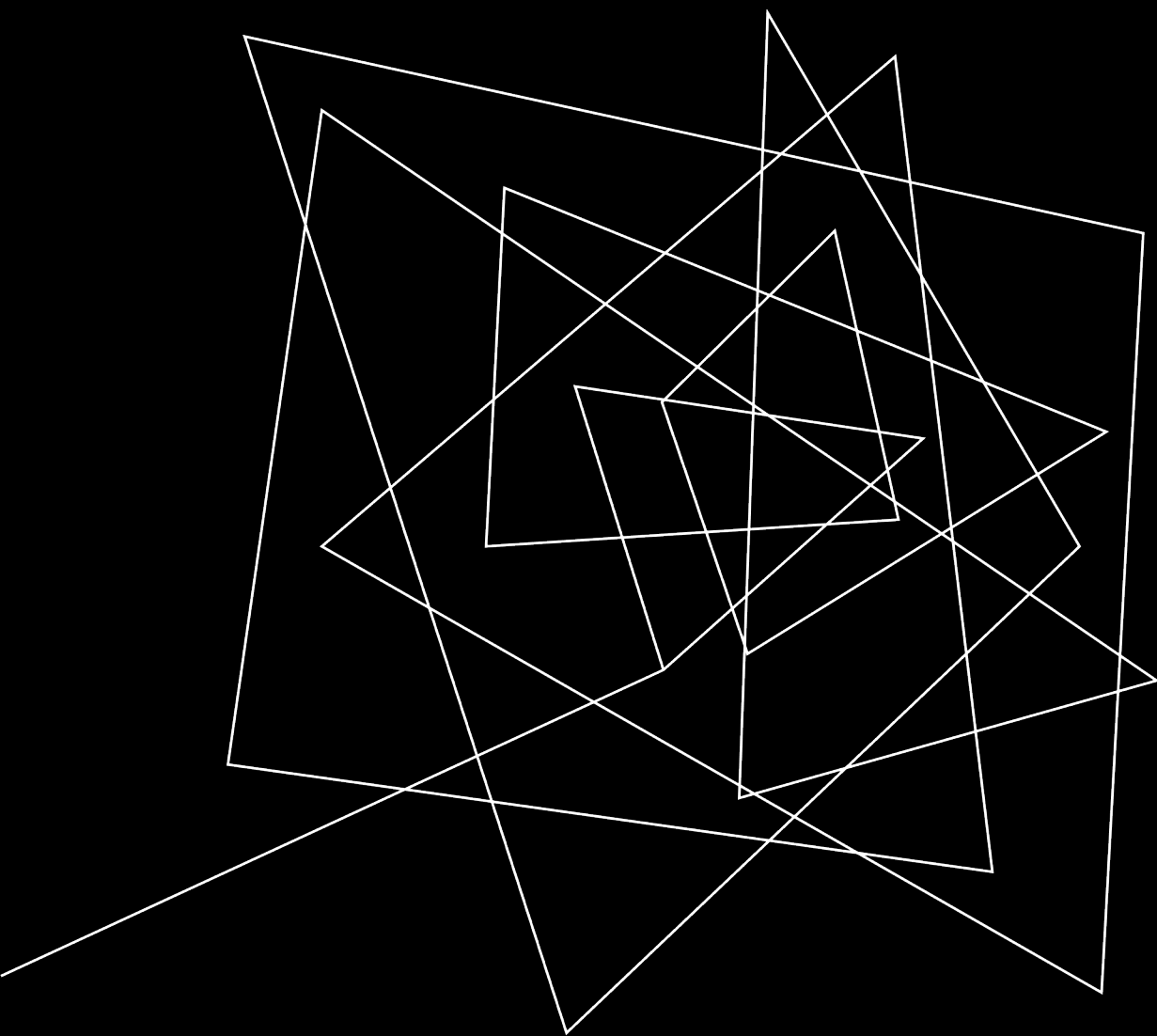


Open-Source
Integrations

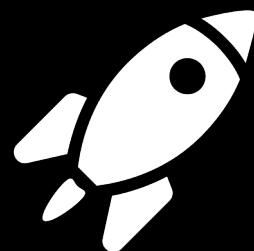


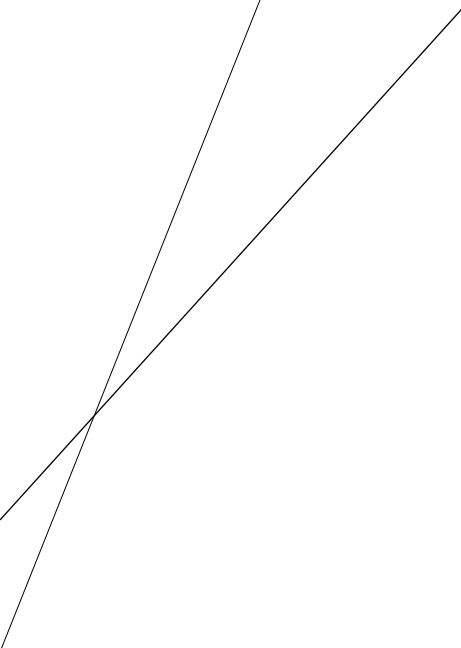
Custom Built
Utilities





INNOVATION





CUTTING EDGE

Novel

New statistical or data analysis techniques published in journals often accompanied with open-source R or Python Package

Techniques can be tried by the community, and new areas to apply tools may be found

Standard

A shared solution supported by the community has been tested and vetted by community

Bring together experts to create general solutions for common Pharma problems

Improvements

Tried and true algorithms receive updates and improvements from the community

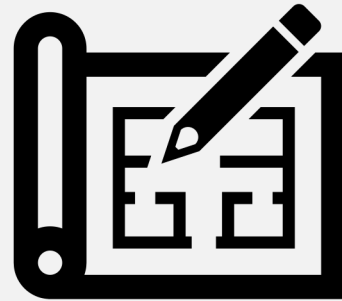
Trial new ideas by using tools from community in pharma workflows

RAPID PROTOTYPING



Idea

New idea

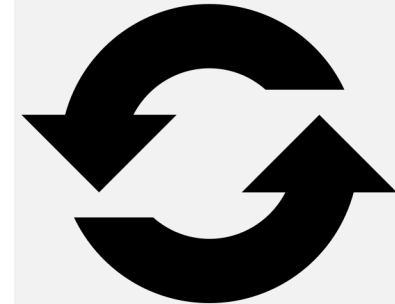


Experiment

investigate



Build



Repeat

HIRING AND GROWTH



Open tools
allow a wide
population
to learn tools

Users come
in with
experience
of tools

Transferable
Knowledge
within the
org

ADOPTING OPEN SOURCE IS AN IMPERATIVE

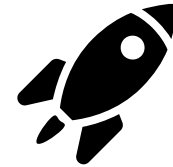
Collaboration



Efficiency



Innovation





THANK YOU

Ellis Hughes

@ellis_hughes