PGC AFRICA

AfSHG African Society of Human Genetics

PGC Psychiatric Genomics Consortium

African Society of Human Genetics 2025

Artificial Intelligence and Machine Learning Workshop

UGANDA

Friday 7th February 2025

African Society of Human Genetics 2025

Artificial Intelligence and Machine Learning Workshop

UGANDA

Dr Conrad Iyegbe,
Co-Chair PGC Africa
Mount Sinai Hospital, New York

7th February 2025

PGC AFRICA

- Established in September 2022
- 240+ active members
- 24 African countries
- *Developmental agenda for psychiatric genomics in Africa*

@PGC_Africa

pgc4africa@gmail.com

PGC Africa membership in 2025

Algeria
Botswana
Cameroon
Congo
Egypt
Ethiopia
Gambia
Ghana
Kenya
Liberia
Madagascar
Malawi
Mali
Morocco
Mozambique
Niger
Nigeria
Rwanda
Senegal
South Africa
Sudan
Tanzania,,
Tunisia
Uganda

Total membership: 240

Caribbean countries include: Trinidad and Barbados

Goals of the PGC Africa Working Group

- Maximise opportunities to incorporate the rich genetic diversity of the continent in our research
- Facilitate the training and integration of African analysts into global scientific eco-systems
- Implement unifying strategies to allow the integration and analysis of pan-African data

Scientific Advisory Board

Scientific Advisor:
Psychiatry

Scientific Advisor:
Epidemiology,
Data Harmonization

Scientific Advisor:
Clinical Genetics

Scientific Advisor:
Psychiatry

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Leadership Committee

Disorder Lead:
ADHD

Disorder Lead:
Autism

Disorder Lead:
PTSD

Disorder Lead:
Schizophrenia

Disorder lead:
Bipolar Disorder

Disorder lead:
Depression

Disorder co-Lead:
Substance Use

Disorder co-lead:
Suicide

Disorder co-lead:
Suicide

Ethics Lead

Communications Lead

Diaspora Lead

Disorder co-Lead:
Substance Use

Disorder co-Lead:
Substance Use

Translational Science
co-Lead:
Pharmacogenomics

Translational Science
co-Lead:
Prediction modelling

Translational Science
co-Lead: Molecular
Neuroscience

Disorder lead:
Anxiety

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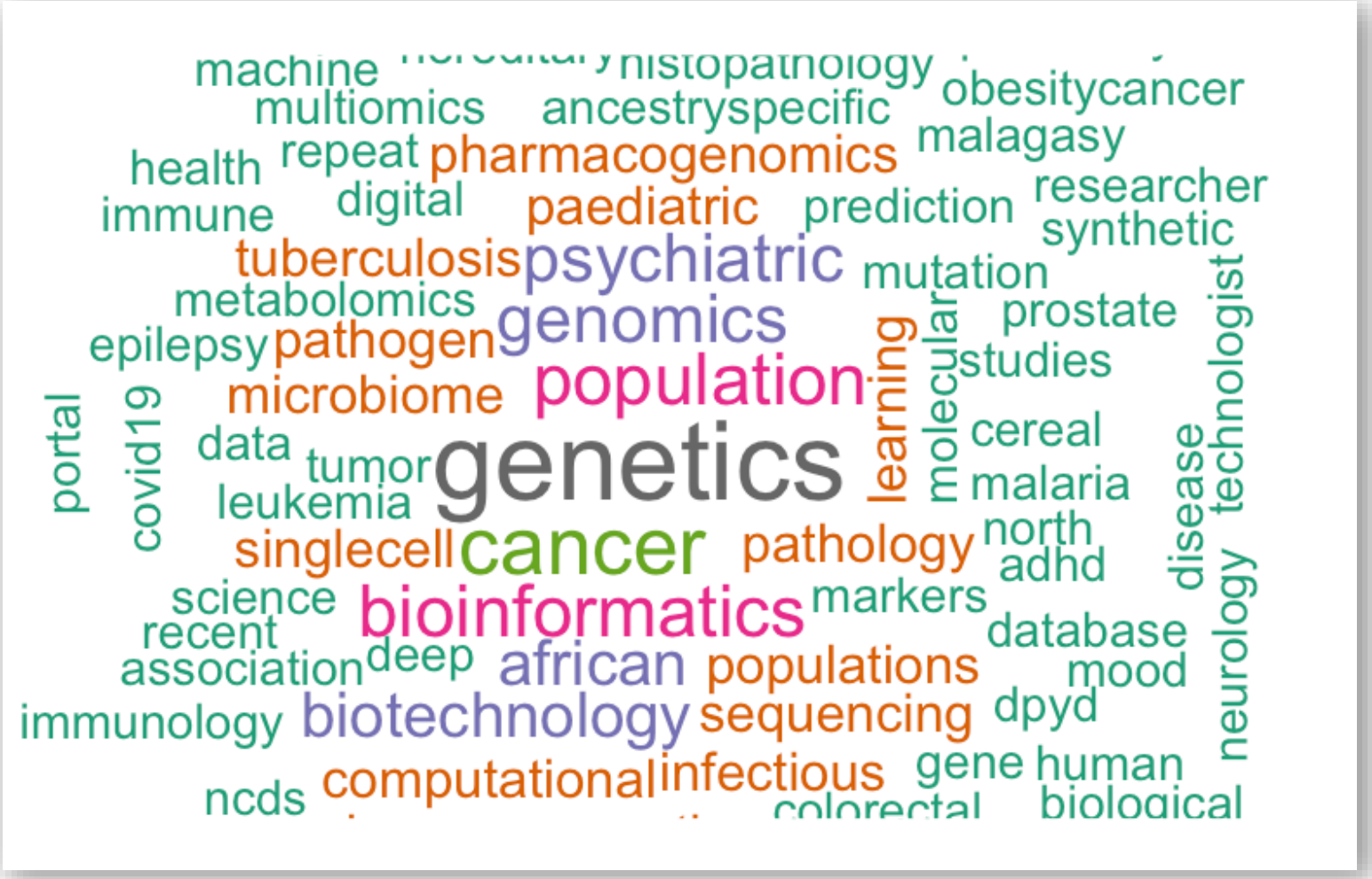
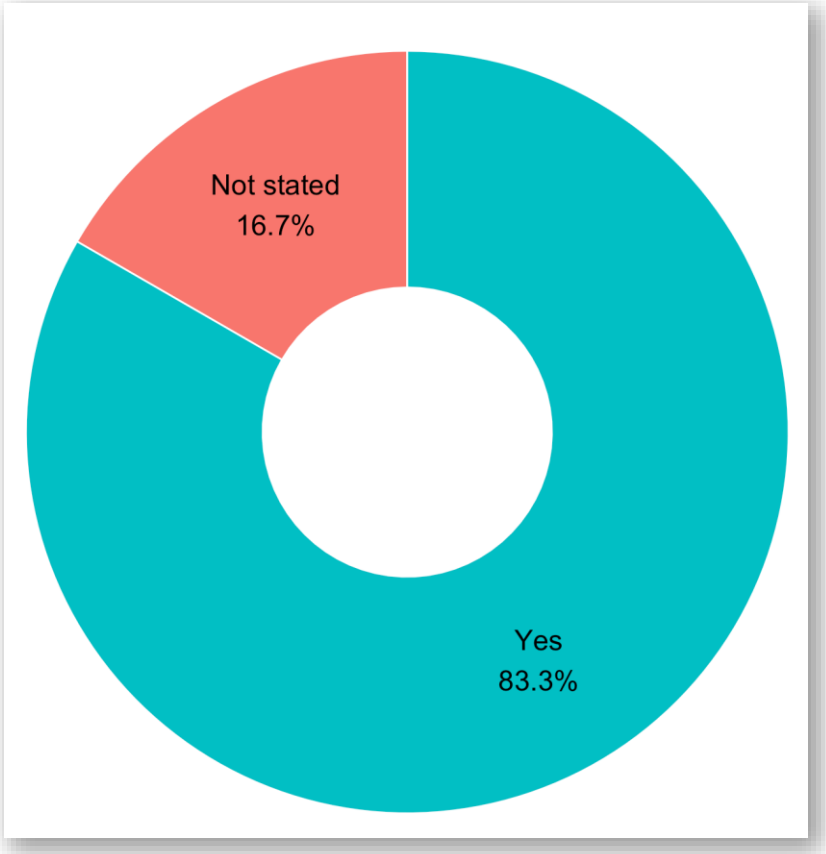
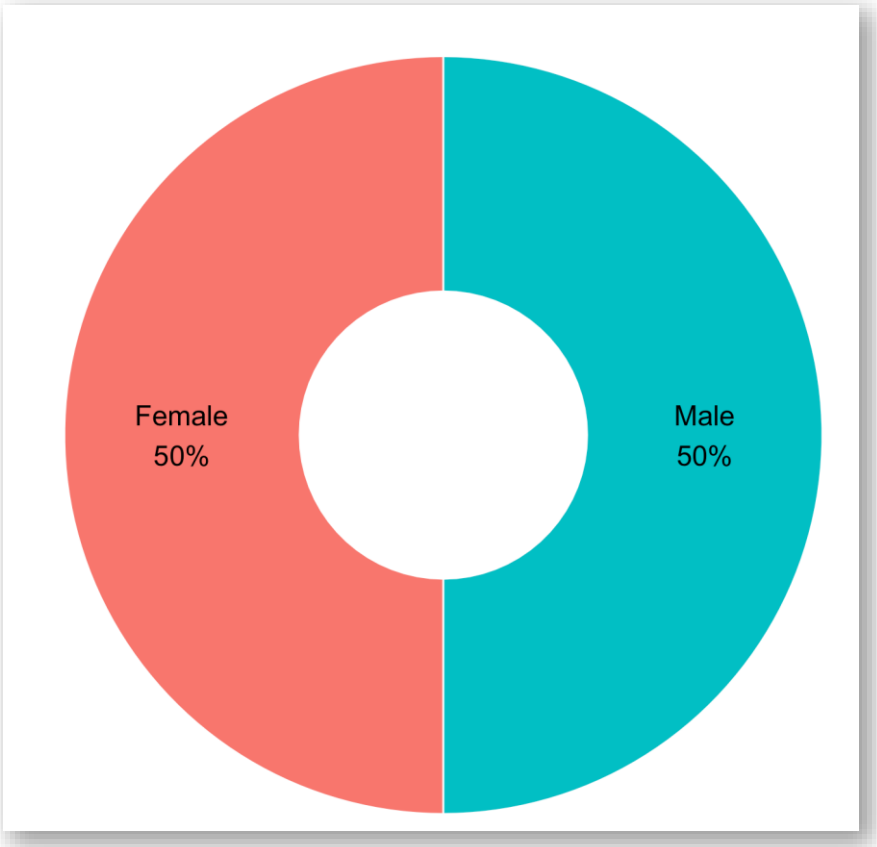
Participant Backgrounds using self-defined key words



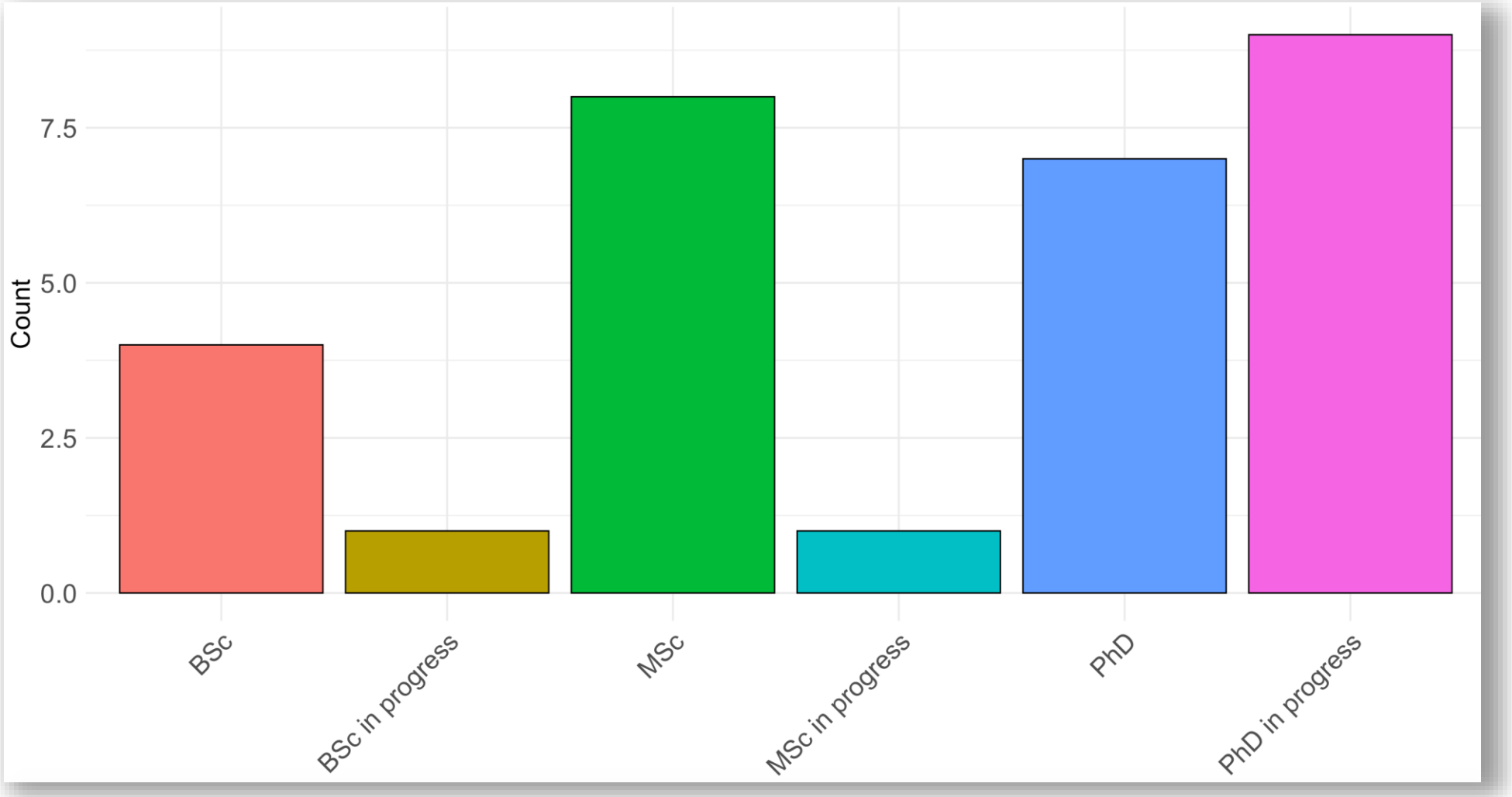
Experience in Bioinformatics



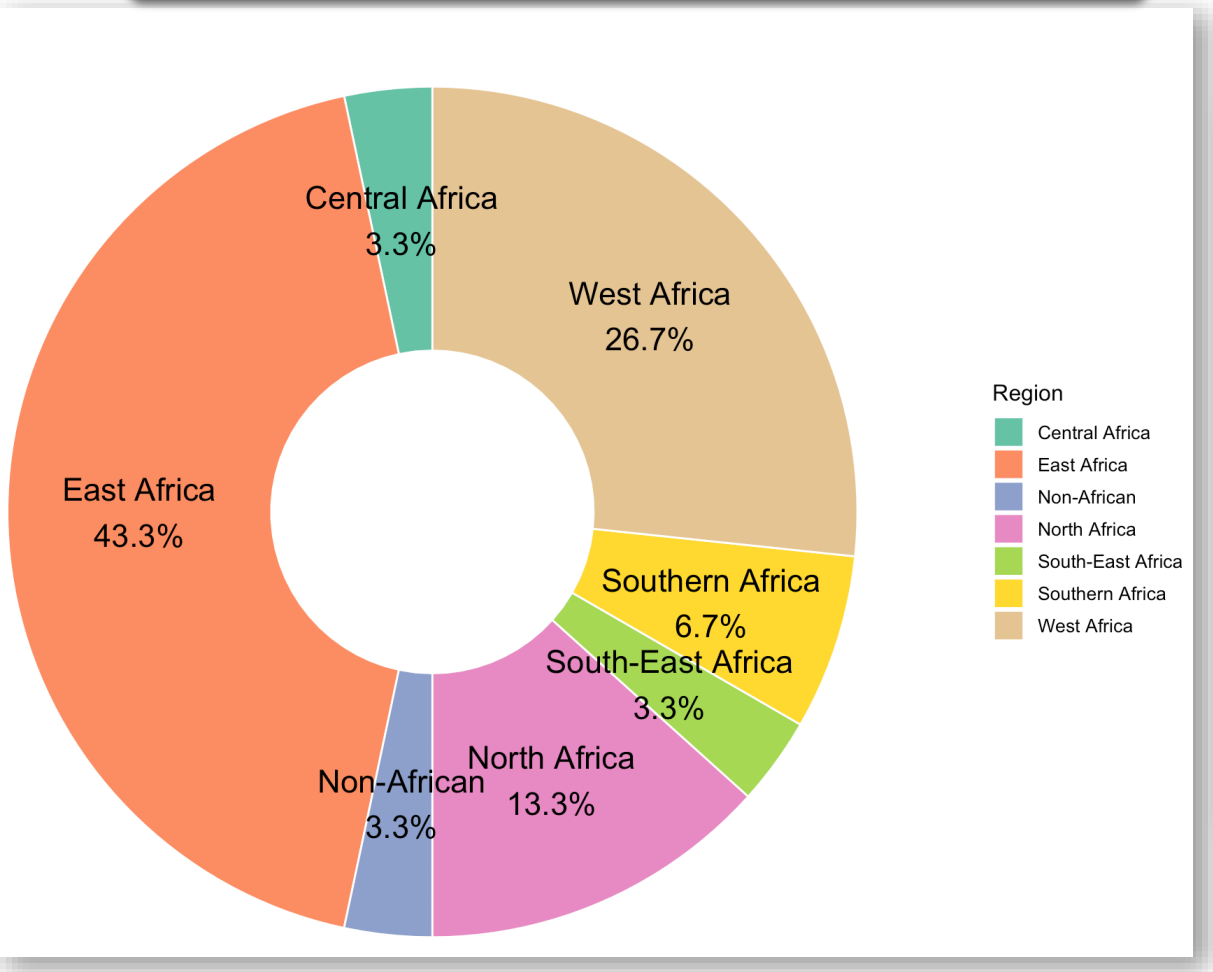
Gender of Course Participants



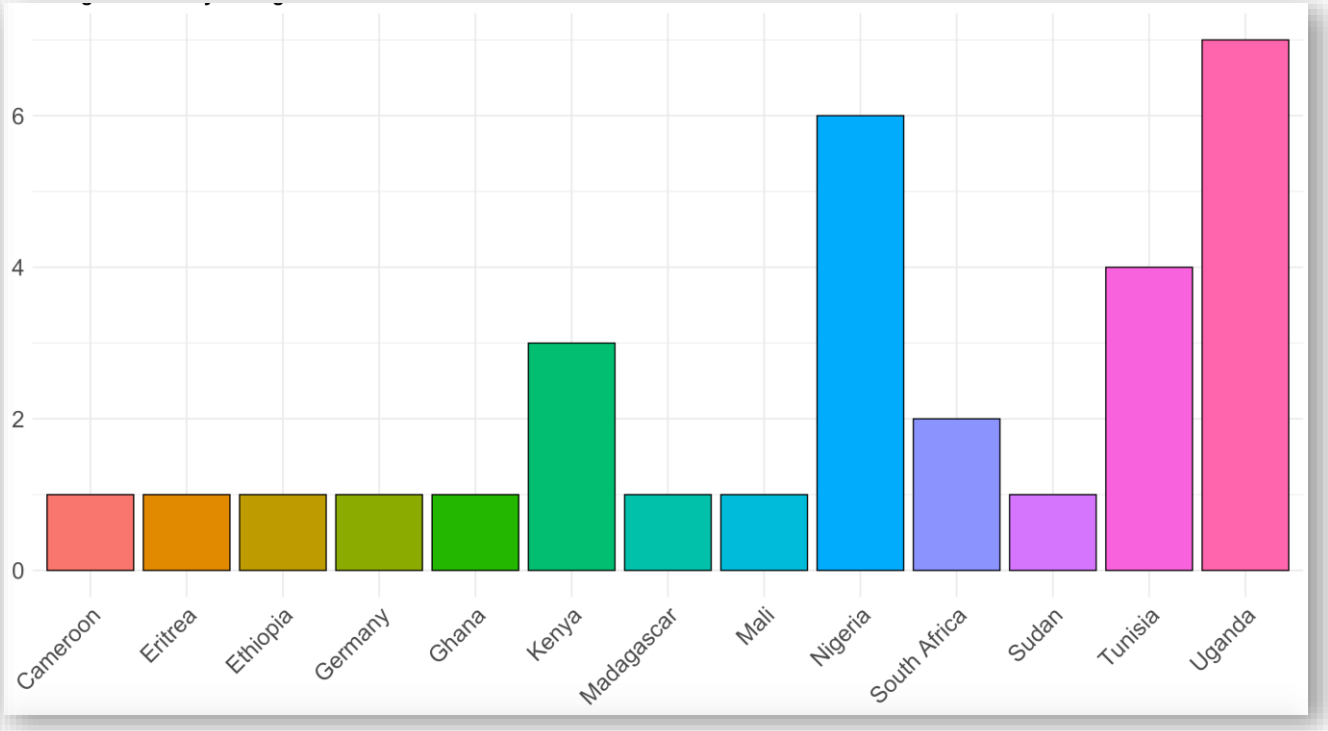
Highest Academic Training of Course Participants



Origin of course participants by region



Origin of course participants by country



Workshop Aims

- Provide an introduction to the use of Machine Learning (ML) and Artificial Intelligence (AI) in the field of genetics
- Provide examples and experience of practical applications
- Provide participants with the skills needed to use generative AI to adapt ML algorithms for their own research purposes
- Consider ethical issues relating to the use of ML and AI in research more broadly

The motivation behind this course?

We are starting to explore the opportunities for implementing AI in the context of psychiatric genetic research.

Eager to help in the advancement of AI literacy on the continent.

We are eager to build links and partnerships with the diverse scientific communities and ecosystems on the continent.

We welcome opportunities to learn more about your work and the scientific communities you work within.

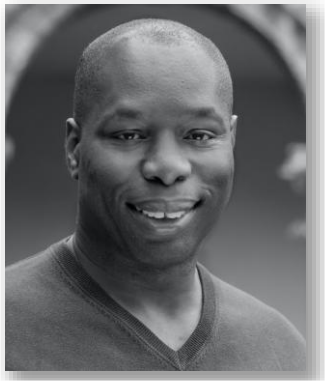
We would like to build bridges between our research community and yours.

The Training Team

Trainers:

Dr Itunu Isewon

Covenant University



Dr Conrad Iyegbe

Mount Sinai Hospital

Teaching Assistants:

Emmanuel Alagbe

Covenant University

Faith Adegoke

Covenant University

Dr Melek Chaouch

Institut Pasteur

Invited Guests

Dr Raquel Iniesta

Reader in Statistical Learning for Personalised Medicine

King's College London, UK

Professor Lukoye Atwoli

Professor and Dean

Aga Khan University, Kenya

Workshop Day Plan

- 8:00 AM - 8:30 AM: Registration
- 8:45 AM - 9:00 AM: Opening Remarks
- 9:00 AM – 9:45 AM: Plenary I - General Introduction to Machine Learning and Artificial Intelligence
- 9:45 AM - 10:00 AM: Q&A and Practical Examples
- 10:00 AM - 10:20 AM: Scheduled break
- 10:20 AM - 12:15 PM: Practical Session 1 – Hands-On Workshop (Machine Learning)
- 12:15 PM - 12:30 PM: Group photo
- 12:30 PM - 1:00 PM: Lunch Break
- 1:00 PM - 2:00 PM: Plenary II – Integrating multi-modal data with AI for targeted treatment in Depression and Hypertension
- 2:00 PM – 3:00 PM: Ethical Considerations in AI Adoption in Human Genetics Research
- 3:00 PM - 3:30 PM: Practical Session 2 – Hands-On Application of Generative AI Models for Programming Tasks (Independent Task)
- 3:30 PM - 3:50 PM: Scheduled break
- 3:50 PM - 5:00 PM: Practical Session 2 Continued
- 5:00 PM - 5:30 PM: Practical Session 2 Review
- 5:30 PM - 6:00 PM: Closing Discussions, Survey, and Final remarks

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Course Information

Course scripts will be available in Python and R as from next week

The workshop GitHub page will serve as a permanent point of reference

Prizes up for grabs

Workshop Etiquette

- Please tweet generously! @PGC_Africa
- Use of all social media (eg. LinkedIn) is highy encouraged!

QR codes: Registration and Pre-conference Survey

QR codes: GitHub Page

QR codes: ML Whatsapp Group

wellcome connecting science

Computational Course

Polygenic Risk Score Analysis

24-27 June 2025, Kampala, Uganda

Join our leading experts in Uganda, for hands-on training in how to apply the latest bioinformatics tools and approaches to construct polygenic risk scores (PRS).

Key topics will include:

- A high-level overview of genome-wide association studies (GWAS)
- An introduction to pathway PRS
- Using PRS to detect rare variant contributions to risk
- Understanding the “PRS Portability Problem”
- Strategies for applying PRS to diverse and admixed ancestry samples

Application deadline: **1 April 2025**

SCAN ME

Government interest in the application of AI

African governments see AI as critical for bridging infrastructure gaps and accelerating sustainable development.

Government interest in the application of AI

SDG3:
Good Health and Well-being

Genetics

African governments see AI as critical for bridging infrastructure gaps and accelerating sustainable development.

Public health applications of AI

Pressing health challenges

- High infectious disease and maternal mortality rates (WHO Africa Report, 2021)
- Overburdened healthcare infrastructure

AI-assisted telemedicine & diagnostics

- Faster identification of illnesses
- Remote care delivery to underserved areas

Partnerships with NGOs & private sector

- Bring advanced imaging and predictive analytics to clinics
- Improve resources in under-resourced settings

Potential Impact of AI

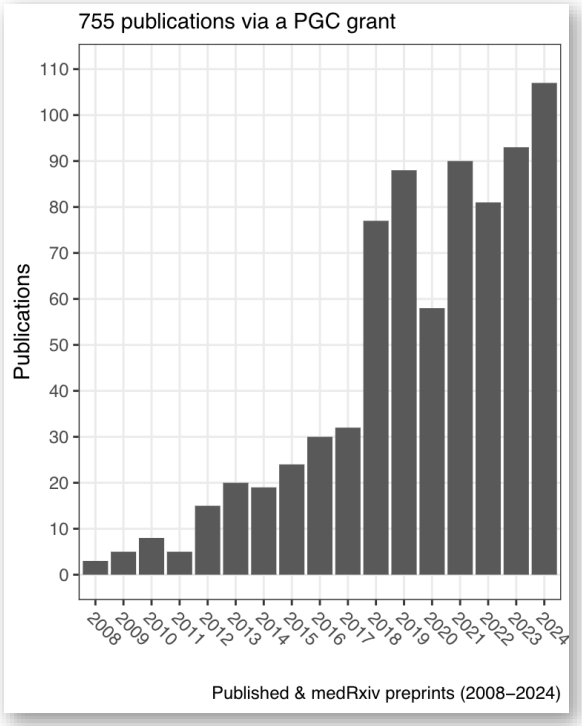
- Immediate patient outcome improvements
- Modernised data collection for evidence-based policy
- Accelerated progress on health-related SDGs

Applications in the Psychiatric context

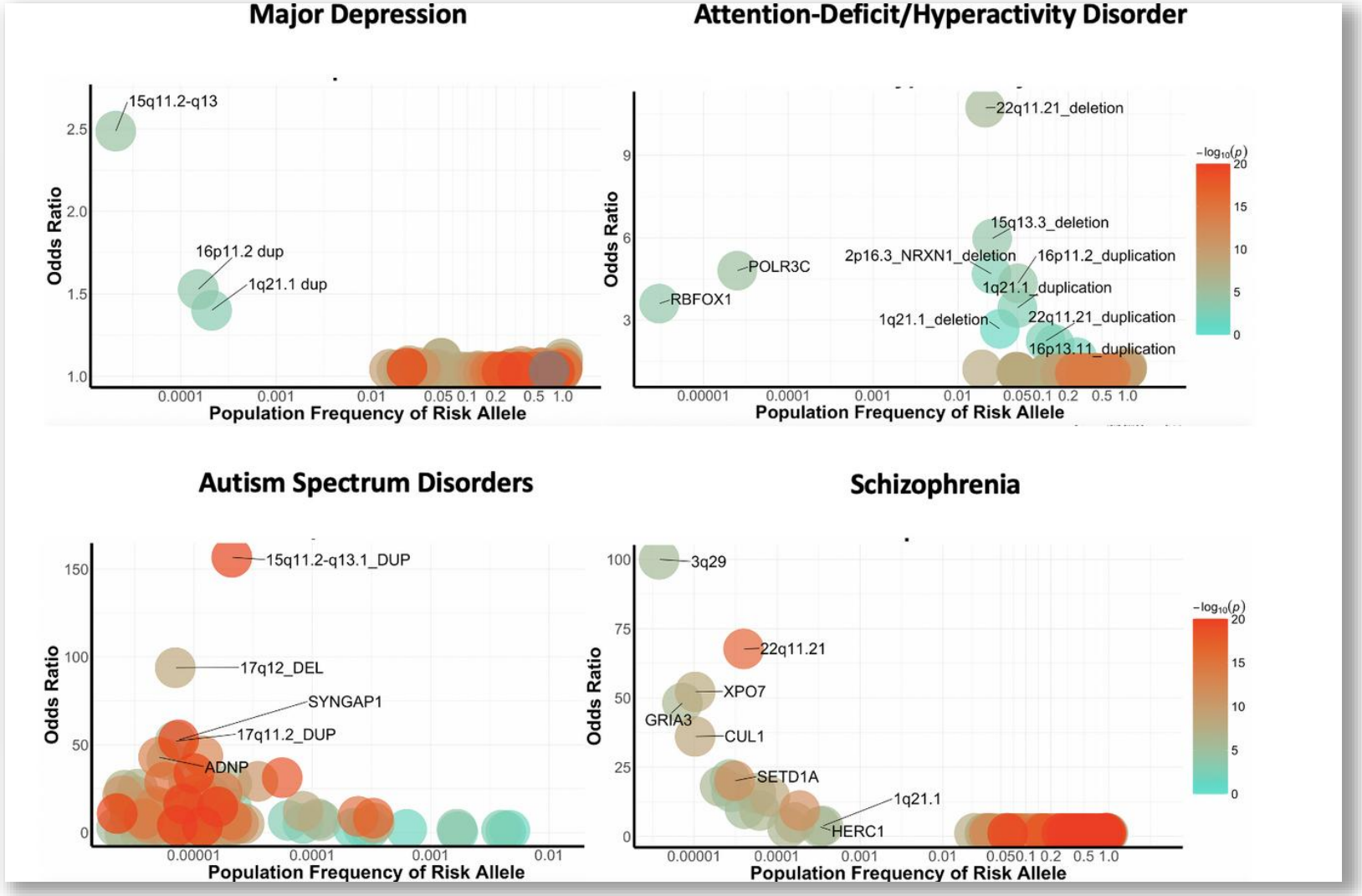
PGC Africa plans to harness AI to address clinical, data and infrastructure challenges:

- Sharp increase in rates of depression, substance abuse, suicide
- Large data gaps
- Critical workforce shortages
- A need to combine genetic with other contextual information to strengthen mental health strategies on the continent

PGC-identified risk variants span the allelic frequency spectrum

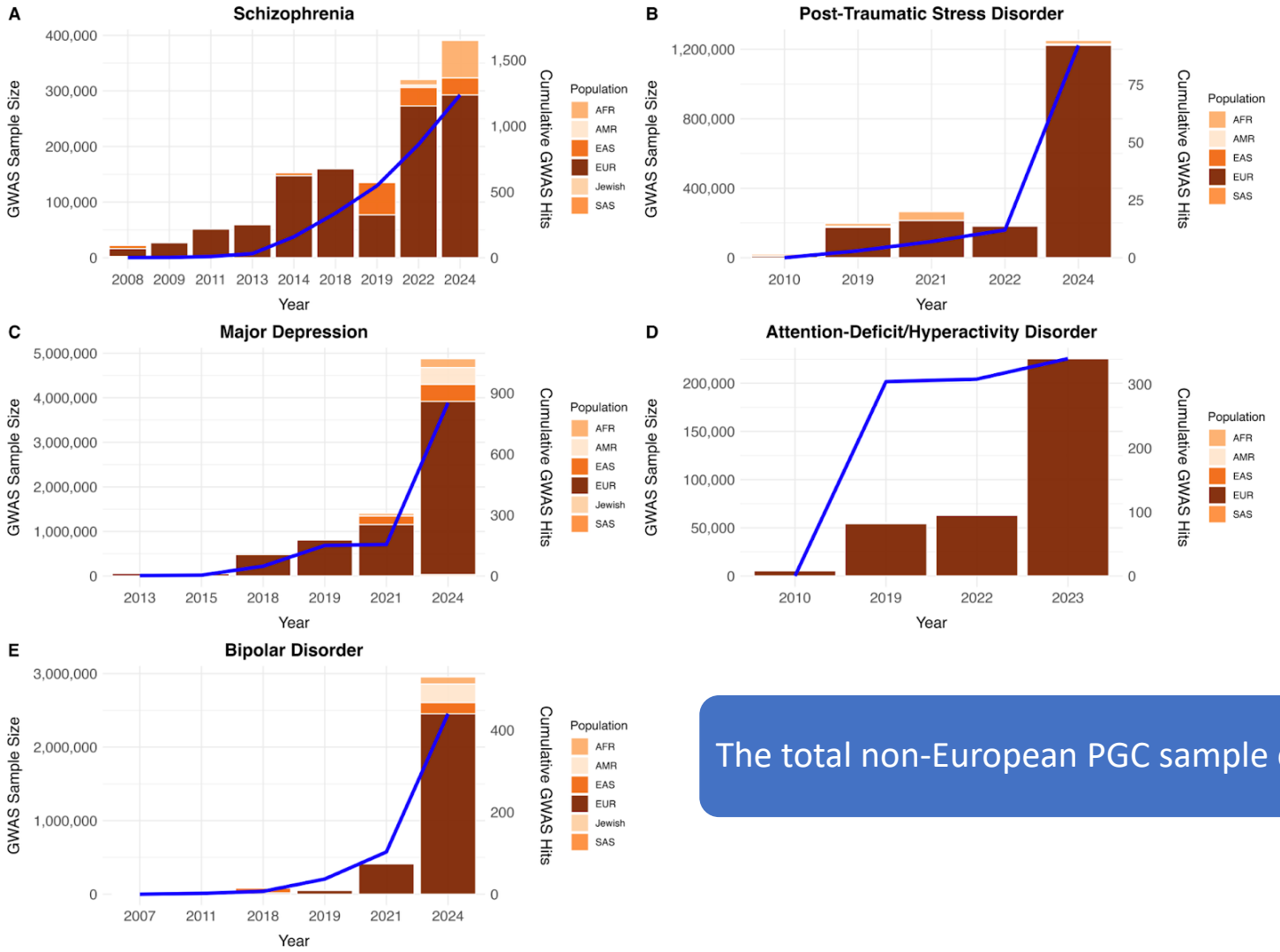


The PGC has a H Index of 118



Iyegbe et al,
under review

Under-representation in psychiatric genetics research



The total non-European PGC sample component in 2025 is 15%

Iyegbe et al, *under review*

Google

Established an AI research lab in Accra (2019)

Aims to tap local talent and develop regionally suited technologies

(Source: Google Africa Blog, 2019)

IBM

Expanded its research footprint in Kenya and South Africa

Focuses on healthcare diagnostics and climate modeling

(Source: IBM Research – Africa)

Microsoft

Founded the Africa Development Centre in Nairobi and Lagos

Seeks to leverage a growing tech-savvy population

Fosters innovations that can scale across the continent

(Source: Microsoft ADC Press Release, 2020)

Meta (formerly Facebook)

Supports developer communities and connectivity initiatives

Operates across multiple African countries

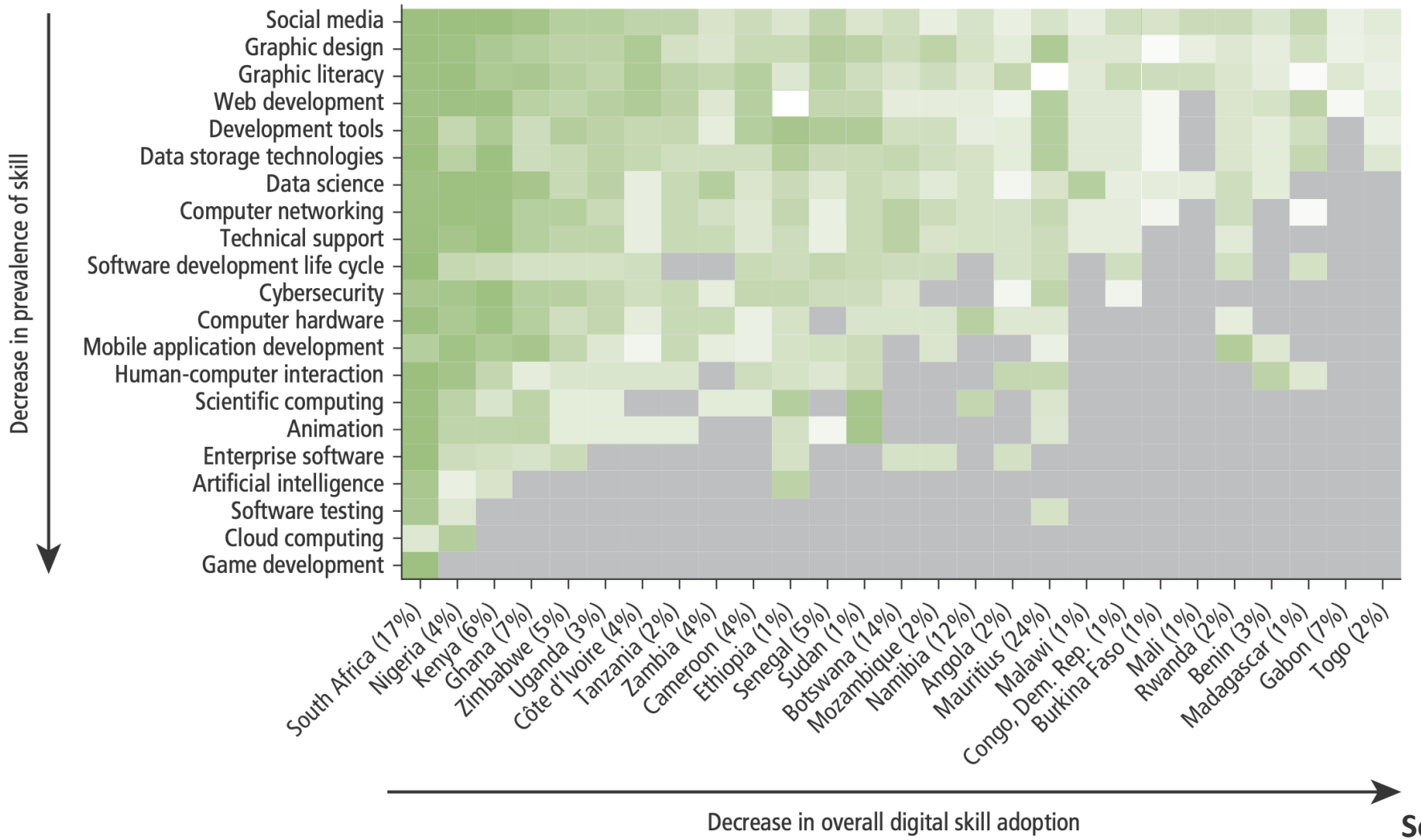
Aims to boost user engagement and leverage diverse data ecosystems

(Source: Meta Africa Press Release, 2021)

“The main resource for doing research is talented people, and you will find more talent in Africa than anywhere else”

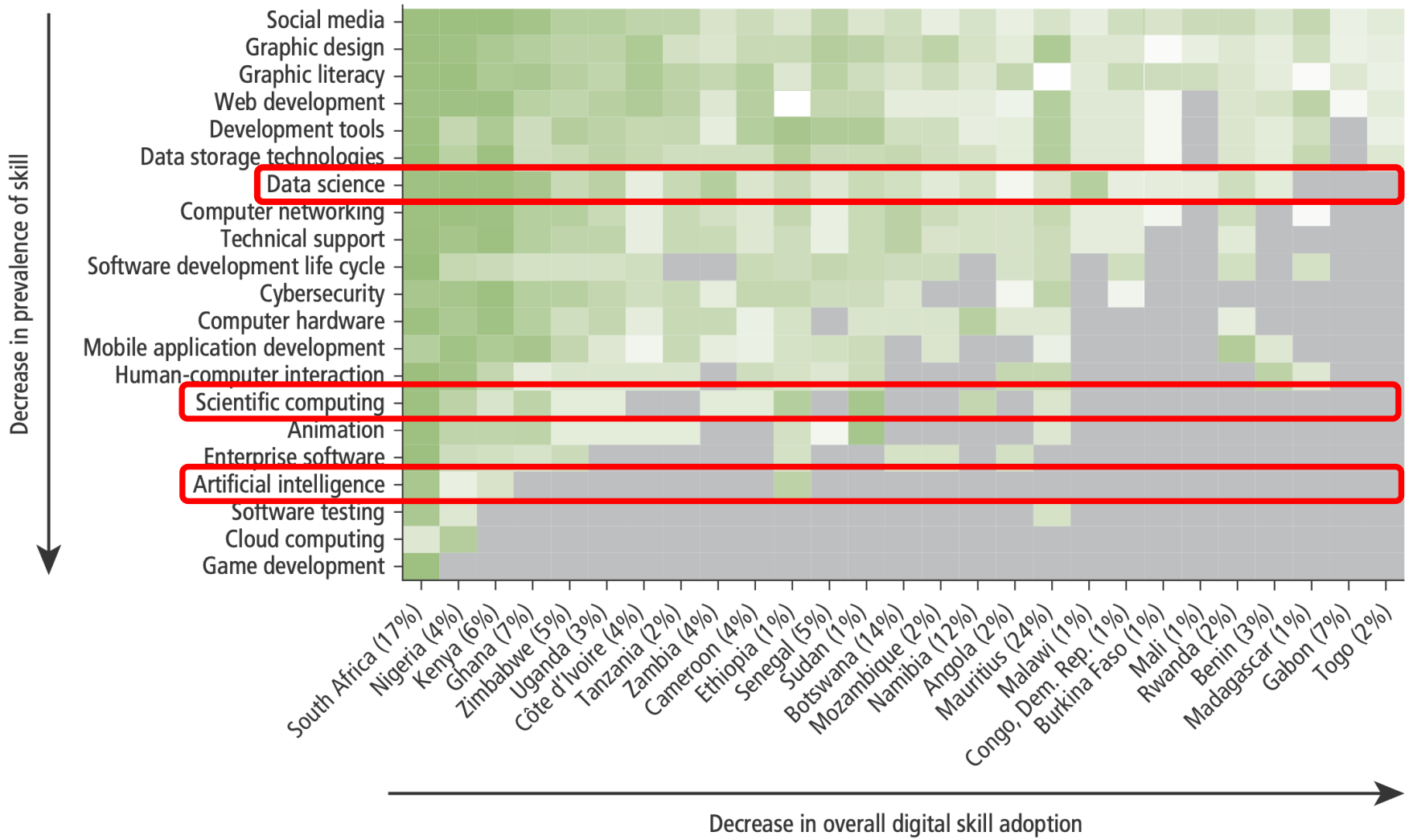
- Moustapha Cisse, Director of Google AI Ghana.

Africa’s technology talent



Source: World Bank 2020 Report

Africa's technology talent



Source:
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