KidneyGenAfrica: 1st Training Workshop

25th – 30th January 2026

University of the Witwatersrand, Johannesburg, South Africa

Objectives

Day 1 - Defining CKD in Africa

Objective 1: To understand clinical phenotypes of kidney disease and biomarkers of kidney function.

Objective 2: To understand the epidemiology of CKD in Africa, including prevalence, incidence, risk factors, chronic conditions, and multimorbidity.

Day 2 - Genetic epidemiology of CKD in African populations

Objective 3: To revise what is known about the genetic factors contributing to kidney disease in Africa.

Objective 4: To critically appraise the role of *APOL1* in kidney disease in African-ancestry populations.

Day 3 - Genetic association studies for kidney-related phenotypes

Objective 5: To develop an in-depth understanding of Genome-Wide Association Studies (GWAS) design, analysis, and interpretation in the context of kidney-related phenotypes.

Objective 6 To review genetic association studies for kidney-related phenotypes among European and African ancestry populations and identify current knowledge gaps.

Day 4 - Beyond GWAS for kidney-related phenotypes

Objective 7a: To understand how GWAS results, integrated with molecular phenotypes can illuminate both the biology and the clinical landscape of complex traits

Objective 7b: To understand the construction, validation, and limitations of PRS and explore how they can be applied to predict kidney disease risk in African populations and explore the value of integrated multiomic approaches to understanding kidney disease.

For the duration of the workshop

Objective 8: To understand the ethical and regulatory landscape related to the use of genomic data for research, and how it relates to community engagement, individual study participant consent processes, data sharing, adherence to the FAIR principles, and collaborating in large genomic consortia.

Objective 9: To develop skills to effectively present genetic epidemiology findings related to kidney disease, including data visualisation and oral presentation.

List of trainers & support

1. Andrew Morris
2. Annette MacLeod
3. Batte Anthony
4. Casianne Robinson-Cohen
5. Charles Rotimi
6. Cristian Pattaro
7. Dorothea Nitsch
8. Eleftheria Zeggini
9. Jean Tristan Brandenburg
10. June Fabian
11. Laurie Tomlinson
12. Michele Ramsay
13. Michelle Bishop
14. Oyekanmi Nash
15. Oyesola Ojewunmi
16. Rebecca Camenzuli
17. Robert Kalyesubula
18. Segun Fatumo
19. Shaun Aron
20. Vaishnavi Vikas Gangadhar
21. Walt Adamson

List of Scientific Advisory Board members

1. Charles Rotimi (Chair)
2. Claudia Langenberg
3. Nicola Mulder
4. Eleftheria Zeggini
5. Robert Kalyesubula

Annual Partnership Meeting attendees

1. Segun Fatumo
2. June Fabian
3. Michele Ramsay
4. Cassianne Robinson Cohen
5. Cristian Pattaro
6. Oyekanmi Nash
7. Mia Crampin
8. Andrew Morris
9. Annette MacLeod
10. Dorothea Nitsch
11. Laurie Tomlinson
12. Walt Adamson
13. Rebecca Camenzuli

	Workshop Programme	Potential speakers
Day 0 (25th)	**Welcome and introductions** *Goal*: "break the ice", facilitate connections within the group and with coordinators, create a shared learning environment, and address expectations. **Engaging in active learning**: how to get the most out of this workshop **3-minute participant introductions**: use a standardized content slide **Q&A**	Michelle Bishop June Fabian Segun Fatumo Michelle Bishop
Day 1 (26th)	**CKD Phenotypes & the Epidemiology of CKD in Africa** *Goal:* Examine the burden of CKD, disparities, and the unique context in Africa	June Fabian Robert Kalyesubula Others
09:00-10:45	**Introduction to kidney function & pathophysiology** Normal kidney anatomy and physiology Kidney disease and associated risk: contextualizing mechanisms of injury, highlighting differences between global geographies	Robert K (09h00-09h45) 10 minutes Q/A June F(09h55-10h35) 10 minutes Q/A
10:45-11:15	**Morning Break**	
11:15-13:00	**Measuring kidney function** The use of biomarkers to assess kidney function: GFR/urinary albumin excretion/others Introducing the KDIGO CKD Guidelines 2024: Definitions of CKD and their relationship to morbidity and mortality, and risk prediction **Expert panel: "Prejudice and pitfalls of CKD measures in global nephrology"**	June F (11h15-11h50) Robert K (11h55-12h30) Dorothea+ Laurie
13:00-14:00	**Lunch Break**	
14:00-15:30	**The epidemiology of CKD** Large-scale epidemiological studies (Global Burden of Disease; ISN): contextualize findings, limitations, and how they apply to low-resource settings. **Data resources in Africa for kidney disease research** Review of cohorts: AWI-Gen, UGR, ARK, MEIRU, H3Africa, KidneyGenAfrica, CKD-Africa Challenges, gaps, opportunities	External - Elliot Robert/June Cindy George?
15:30-16:00	**Afternoon Break**	
16:00-17:30	**Practical:** Case studies using CKD phenotypes across African cohorts, with different questions for each group.	
Day 2 (27th)	**Genetic contributors to kidney disease in African populations** *Goal:* To review monogenic and polygenic contributors to kidney disease in African populations, and how these differ along the life course.	June Fabian Jean Tristan Brandenburg Robert Kalyesubula

09:00-10:45	**Complexities of kidney disease in adults** Interactions between inherited risk, infectious and non-communicable diseases, and environmental exposures. **Debate: "Fire in the kidney – Is inflammation the driver or innocent bystander?"**	TBD
10:45-11:15	**Morning Break**	
11:15-13:00	***APOL1*-associated kidney disease in Africa** *Goal*: Understand the origin and distribution of *APOL1* variants in Africa, and differences between *APOL1* risk in continental vs diaspora African ancestry populations. ***APOL1* background and evolutionary context** Protective role with trypanosomiasis, variants associated with CKD, and penetrance. **Disease associations and second-hit triggers** CKD phenotypes, role of infection, pregnancy, haemoglobinopathies as triggers. **Clinical and translational implications** Drug trials, implications for kidney transplantation, ethics and policy considerations, and interpreting KDIGO guidance in the context of African realities.	Casianne Robinson-Cohen Jean Tristan Brandenburg
13:00-14:00	**Lunch Break**	
14:00-15:30	**Practical:** Convert provided genotype data *to APOL1* risk haplotypes, discuss the meaning of the results, and their interpretation in clinical and research cohorts.	
15:30-16:00	**Afternoon Break**	
16:00-16:30	**Monogenic kidney disease in children and young people** Congenital abnormalities of the kidney and urinary tract (CAKUT) Clinical presentation vs genetic mutation, and how this is poorly characterised in Africa (nephrotic syndrome and sickle cell disease) Monogenic kidney disease with late-onset presentation Single gene targeted therapies – controversies and challenges in Africa	Dr Batte Anthony
16:30-17:30	**Keynote: Leveraging African genomic Diversity to advance precision medicine for all global populations**	Dr Charles Rotimi
Day 3 (28th)	**Genome-Wide Association Studies (GWAS) in CKD** *Goal:* Introduce GWAS concepts and methods, and provide participants with hands-on experience in designing, running, and interpreting GWAS for kidney phenotypes in African cohorts.	Cristian Pattaro Segun Fatumo Casianne Robinson-Cohen Sola Ojewunmi others
09:00-10:45	**GWAS foundations** How do we define CKD phenotypes, design GWAS studies, consider power and sample size, and where does GWAS fit within the broader genetic epidemiology toolkit? **Data preparation and quality control**	

	Genotyping arrays and imputation, importance of reference panels for African data (Illumina H3Africa array). Quality control: call rates, Hardy–Weinberg equilibrium, and MAF thresholds. Population stratification: principal component analysis, admixture.	
10:45-11:15	**Morning Break**	
11:15-13:00	**Running GWAS** Association testing using linear/logistic regression, covariate adjustment, output and visualisation using Manhattan and QQ plots. GWAS meta-analyses: within and between ancestries. **Challenges in African populations** Shorter LD blocks and higher diversity, limited reference panels for imputation, and smaller sample sizes.	
13:00-14:00	**Lunch Break**	
14:00-15:30	**Practical 1: Mini-GWAS (R/PLINK lab)** Run QC and a regression-based GWAS using a dummy CKD dataset, generate outputs, and interpret results. **Practical 2: Case Interpretation (Breakaway groups)** Work with pre-prepared KidneyGenAfrica GWAS summary statistics to assess novel loci in African cohorts, compare these results with those from European ancestry studies, and discuss the biological/translational relevance.	
15:30-16:00	**Afternoon Break**	
16:00-17:30	Trans ancestry meta-analysis	Andrew Morris
Day 4 (29th)	**From GWAS to the biology of CKD and risk prediction** *Goal*: To understand how GWAS findings are translated into biological insight and risk prediction, through post-GWAS functional analysis, polygenic risk scores (PRS), and an introduction to multi-omics approaches.	Cristian Pattaro Segun Fatumo Casianne Robinson-Cohen Sola Ojewunmi
09:00-10:45	**Post-GWAS Functional Analysis:** Fine-mapping, functional annotation using various tools (FUMA, VEP, GTEx, kidney eQTLs), colocalization with expression (eQTL, pQTL). **Practical 1: Case interpretation (Breakaway groups)** Review relevant papers published by African CKD research groups.	
10:45-11:15	**Morning Break**	
11:15-13:00	**Using multi-omics approaches to link GWAS loci to functional pathways and therapeutics for CKD in African populations** Proteomics, transcriptomics, metabolomics, exposomics, and using omics to identify pathways that can be targeted for innovative drug development. Include relevant case examples, including the *GATM* locus (creatinine metabolism → functional annotation → proteomic signatures).	
13:00-14:00	**Lunch Break**	

14:00-15:30	**Polygenic Risk Scores:** Utilizing PRS as a tool to combine multiple GWAS hits into a predictive score, and how to construct PRS scores using available software (effect sizes from GWAS, weighted sum of alleles), interpreting PRS performance plots, applications in clinical nephrology include CKD risk prediction and transplant outcomes, limitations in African populations relating to the transferability gap from Euro-centric GWAS, and the utility of multi-ancestry models.	
15:30-16:00	**Afternoon Break**	
16:00-16:30	**The use of GWAS summary stats to expand knowledge on T2D biology and clinical epidemiology landscape**	
16:30-17:30	Critical discussion on PGS/PRS **PRS and multi-omics in Africa – hope or hype for CKD"**	Segun
Day 5	**Integrating ethical considerations for using genomic data in Africa, KidneyGenAfrica research opportunities, and next steps** *Goal*: Consolidate learning from the week, reflect on ethical and policy issues in African genomics, and plan next steps in kidney genomics research for participants.	Michele Ramsay Segun Fatumo June Fabian Others
09:00-10:45	**Ethics, Data & Community Engagement** WHO guidance on genomics and equity, genomic ethics in African contexts - addressing informed consent, broad consent, re-use of samples, and returning results, benefit sharing, and data justice; understanding the complexities of FAIR data principles (Findable, Accessible, Interoperable, Reusable) and challenges in African settings - connectivity, HPC/cloud access, costs, regulatory restrictions. Navigating access to international databases (EGA, dbGaP, GA4GH), and exploring local solutions: H3Africa Data Archive, H3ABioNet, institutional HPCs.	
10:45-11:15	**Morning Break**	
11:15-13:00	**Case interpretation (Breakaway groups):** Different examples highlighting aspects of ethical use of genomics data will be prepared for each group for discussion and presentation. **Research Careers & Funding Pathways:** Publishing strategies (open access, consortia authorship) Fellowship and grant opportunities (H3Africa, Wellcome, GACD, NIH Fogarty, UKRI) Career-building in genomics: networks, mentorship, and grant-writing skills **Interactive panel:** senior researchers + early-career researchers	
13:00-14:00	**Lunch Break**	
14:00-17:00	**Annual KidneyGenAfrica Partnership Meeting (faculty, SAB, SC)**	
14:00-17:00	**Parallel breakaway groups:** Design a mini research proposal for presentation. Presentations: 5 minutes per group + 2 minutes Q&A and feedback on proposals.	