



# The H3Africa and H3ABioNet Infrastructure

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CPGR  
WORLD-CLASS  
BIO-TECH  
MADE IN  
AFRICA

# Where am I from?

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CENTRE FOR PROTEOMIC  
& GENOMIC RESEARCH

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Empowering the Life  
Science and Biotech  
sectors in South Africa

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## ABOUT US

The *Centre for Proteomic and Genomic Research (CPGR)* is a non-profit organisation providing state-of-the-art 'omics' services to the life science and biotech communities in South Africa. Based in Cape Town, we combine state-of-the-art, information-rich genomic and proteomic technologies with bio-computational pipelines to create fit-for-purpose offerings for customers in academia and industry. We strive towards developing innovative local solutions to render 'omics'

## OUR SERVICES

An efficient integration of a range of internal and external processes allows us to render complete Genomics and Proteomics services. As a consequence, the services we render can meet key requirements in Genomics and Proteomics projects including: turnaround, quality and costs. We are adept at assembling available know-how and resources into fit-for-purpose propositions based on our clients' needs. A combination of technologies and adherence to stage-specific

# Outline

Introduction to H3A

Who are we?

Where are we?

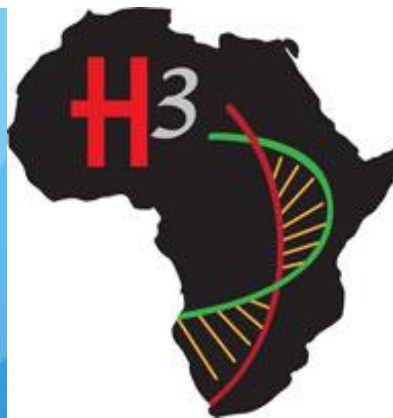
Capacity and Infrastructure

H3ABioNet Project

What have we achieved and what is next?

Examples of impacts towards sustainability?

Acknowledgement



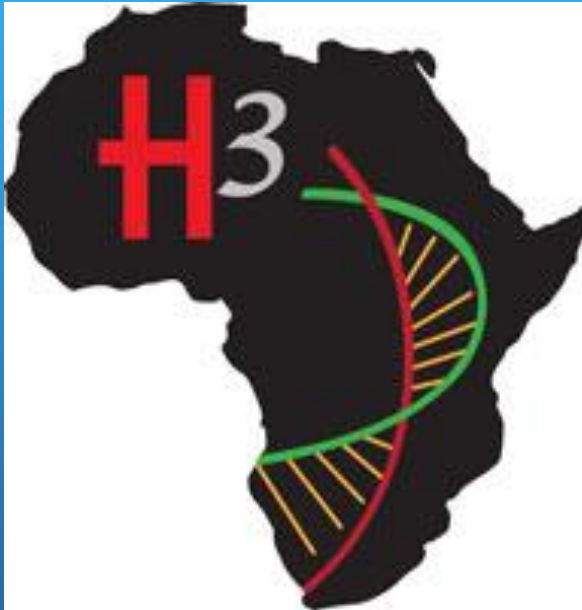
# H3A = Human Heredity and Health in Africa

[www.h3africa.org](http://www.h3africa.org)



**wellcome**trust

# Vision of H3Africa



**“To facilitate an Africa-based contemporary research approach to the study of genomics and environmental determinants of common diseases with the goal of improving the health of African populations”**

To achieve this, the following issues must be addressed:

- Ensuring access to relevant genomic technologies for African scientists
- Facilitating integration between genomic and clinical studies
- Facilitating training at all levels, and particularly in training research leaders
- Establishing necessary research infrastructure

# The Goals of H3Africa

- Increase the number of African scientists who are internationally competitive in genomics and population-based research
- Establish collaborative networks of African investigators pursuing genomics-based, disease-oriented projects
- Create/expand infrastructure for genomics and supporting research, such as bioinformatics and biobanking capacity and ethics



# H3AFRICA VISION



# H3Africa in a nutshell

>\$76 million first round of funding, for 5 years. More anticipated!

25 projects. More projects are to be funded.

27 African countries (North, East, West and South of Africa)

>500 investigators

Up to 75,000 research participants (Samples and meta data)

## Developing and H3Africa GWAS array

- Based on whole genome sequence data (H3A, collaborations and public domain)
- Represent common variation across African populations
- Genotype over 50 000 H3A participants

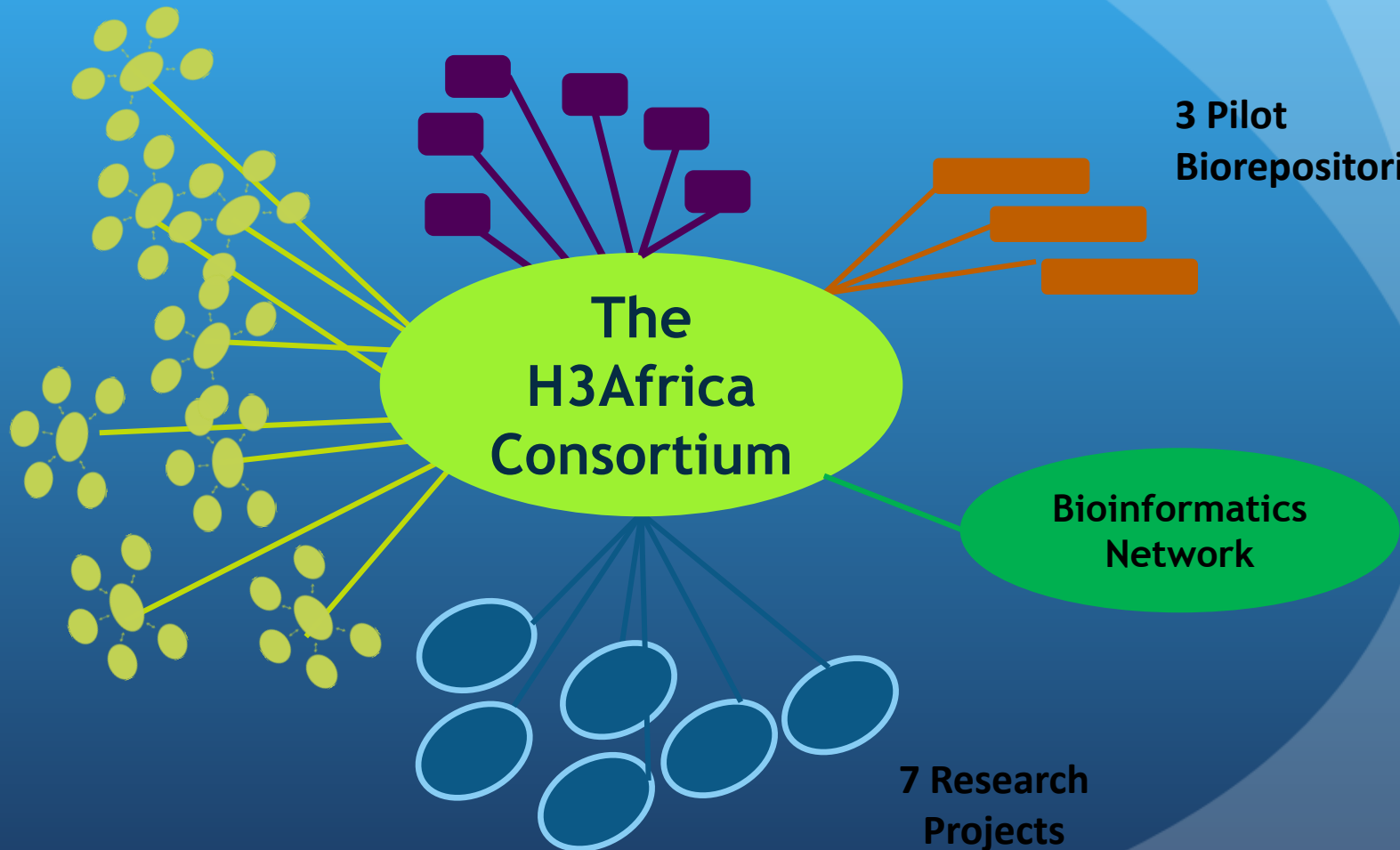


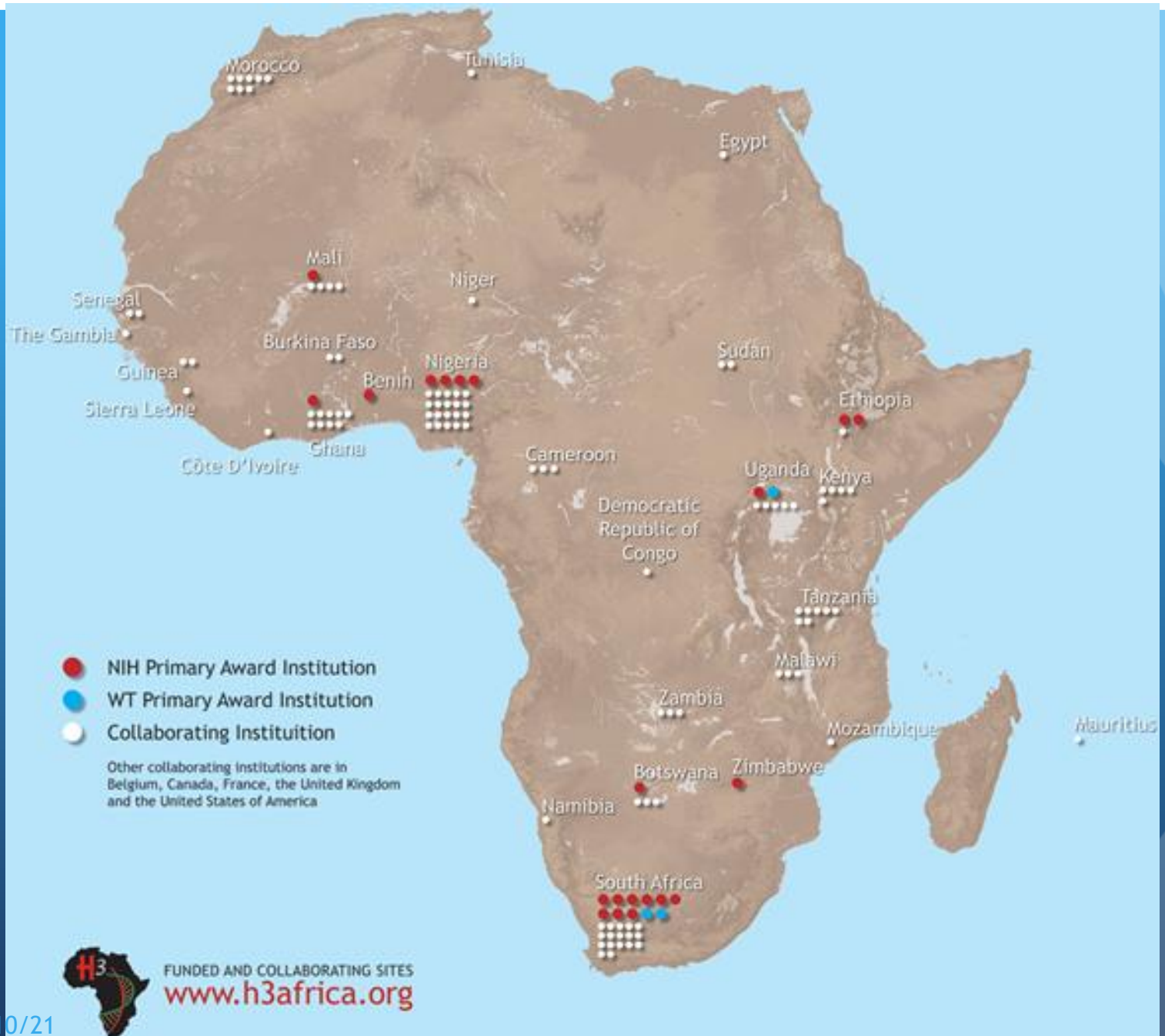
# The H3Africa Consortium

**8 Collaborative  
Centers**

**6 Ethics Grants**

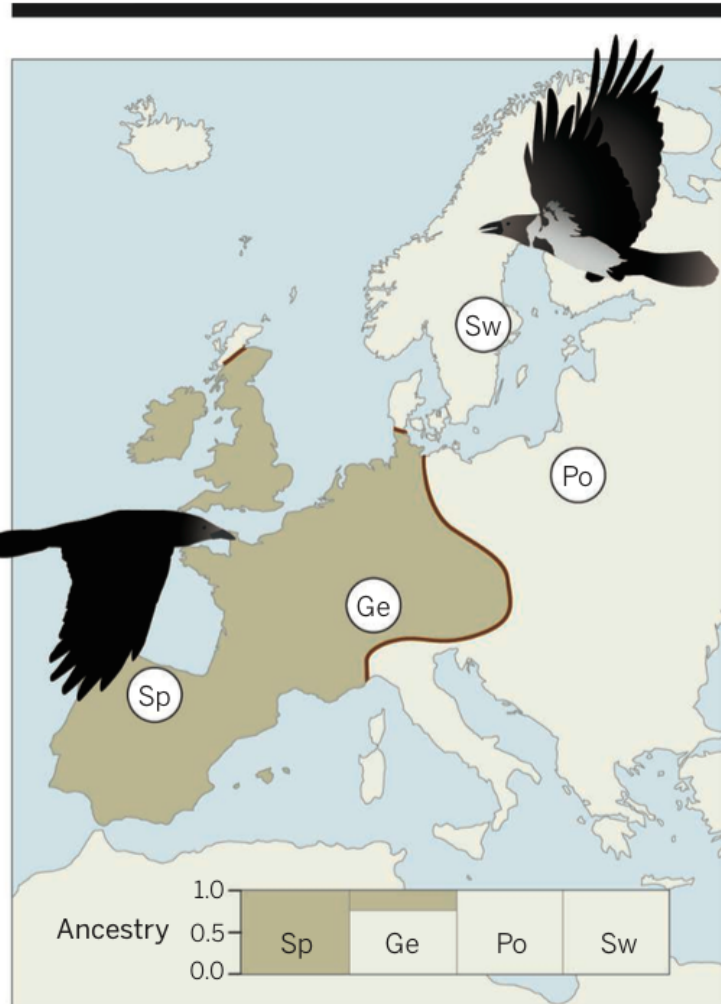
**3 Pilot  
Biorepositories**





# Mark up Paper in Science

INSIGHTS | PERSPECTIVES



barrier that culminated in the speciation of these two crow taxa. Armed with this new very detailed genetic information, it is clear that none of the currently formulated species concepts fully apply to these two crow taxa (unless one is willing relax some stringency in the various definitions). Indeed, the genomes of German carrion crows are much more similar to those of hooded crows than to Spanish carrion crows. Put simply, apart from the few carrion crow type “speciation islands,” German carrion crows could be considered to represent hooded crows with a black (carrion crow) phenotype.

There is a clear need for additional population genomic studies using a more dense sampling, especially among the fully black carrion crows, before the complexity of reproductive isolation and speciation among these two taxa can be

## RESEARCH CAPACITY

### *Enabling the genomic revolution in Africa*

H3Africa is developing capacity for health-related genomics research in Africa

By The H3Africa Consortium\*†

Our understanding of genome biology, genomics, and disease, and even human history, has advanced tremendously with the completion of the Human Genome Project. Technological advances coupled with significant cost reductions in genomic research have yielded novel insights into disease etiol-

# Data and Sample Sharing - H3A Policy

- Ensure that the release of samples and data are “Equitable, ethical, peer reviewed and efficient”
- Biorepositories as *custodians* of samples
- For three years, samples will only shared with:
  - a. Investigators based in Africa
  - b. Investigators outside of Africa collaborating with African researchers who will aim to build African research capacity

Ethical considerations

Informed consent

Participant identification

Stigmatisation

Benefit sharing

# Data and Sample Sharing - H3A Policy

- Data and Biospecimens Access Committee (DBAC) will review requests and approve secondary use
  - All secondary use must be compatible with original consent and ethics approval
  - Consult with ethics committees
  - DBAC composed of majority of Africans

## Benefits

Optimal use of resources

Increased opportunity for knowledge generation

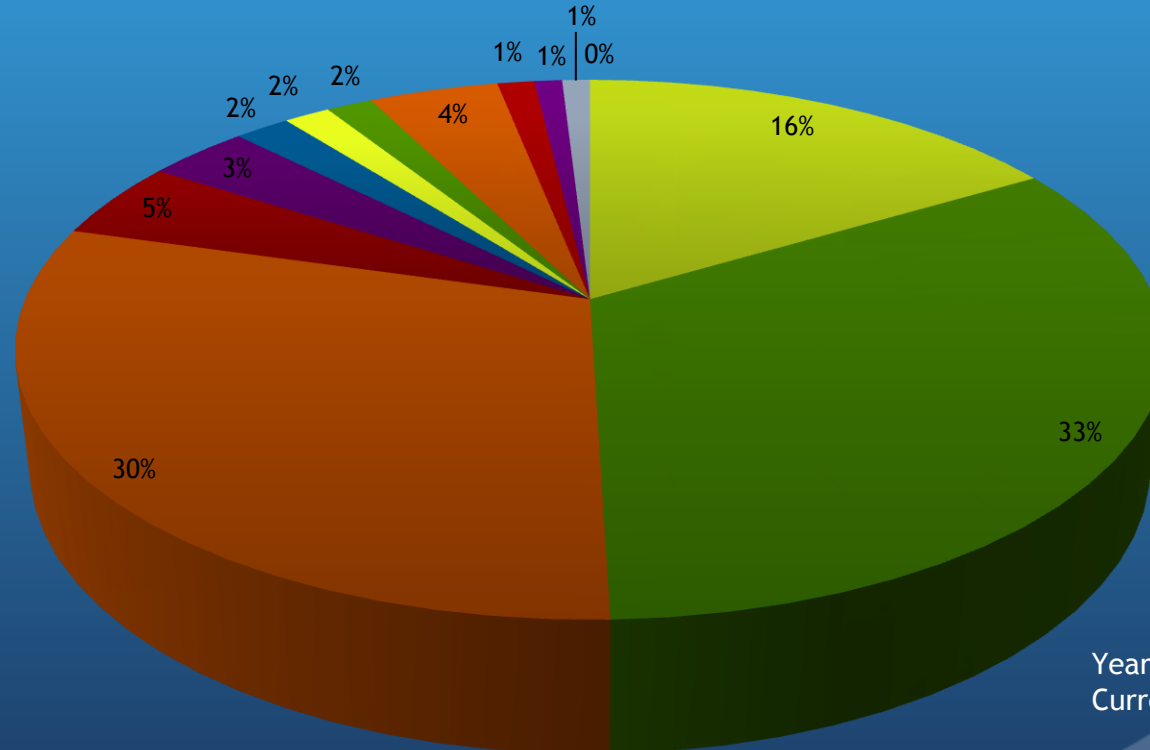
Reduce number of samples collected

Replication and Validation

# Capacity

## H3A Membership 2014


■ H3A Membership 2014   ■ PI's   ■ Co PI's   ■ Co Investigators   ■ Statistician  
 ■ Molecular geneticist   ■ Paediatric cardiologist   ■ Statistical geneticist   ■ Genetic epidemiologist   ■ Research Scientist  
 ■ Molecular geneticist   ■ Medical scientist   ■ Lab Manager



Year 2014 = 321  
 Current membership = +-487




# H3ABioNet: [www.h3abionet.org](http://www.h3abionet.org)




## H3ABioNet

Pan African Bioinformatics Network for H3Africa



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H3ABioNet is a Pan African Bioinformatics network comprising 32 Bioinformatics research groups distributed amongst [15 African countries](#) and 2 partner Institutions based in the USA which will support [H3Africa](#) researchers and their projects while developing Bioinformatics capacity within Africa.

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### Latest News

**[Congratulations to Prof Mulder as one of only six African scientists who made 'The world's most influential scientific minds 2014' list](#)**

**[H3ABioNet features in ASBCB](#)**

**[H3ABioNet Joins the Global Alliance](#)**

**H3ABioNet Helpdesk**

**Contact Us**

# Infrastructure conti...

- Bioinformatics Help Desk for African Scientists
- H3A Data archive repository for submission into EGA
- Patient Recruitment database for H3A
- NetCapDB (Monitors growth of network capacity and produces reports for nodes)
- Node Bioinformatics Accreditation board

## Coming soon:

- H3Africa Chip: Opportunity to add panels for rare diseases!!!
- Coming soon: African Genome Variation Database





# GROWTH

## EDUCATION

# “Broadband” Bioinformatics Skills Transfer with the Knowledge Transfer Programme (KTP): Educational Model for Upliftment and Sustainable Development

**Emile R. Chimusa<sup>1</sup>, Mamana Mbiyavanga<sup>2</sup>, Velaphi Masilela<sup>2</sup>, Judit Kumuthini<sup>2\*</sup>**

**1** Computational Biology Group, Department of Integrative Biomedical Sciences, Institute of Infectious Disease and Molecular Medicine, University of Cape Town, Cape Town, South Africa, **2** Centre for Proteomic and Genomic Research, Cape Town, South Africa

\* [judit.kumuthini@cpgr.org.za](mailto:judit.kumuthini@cpgr.org.za)



# International Experts and Committee members 20

## LIST OF EXPERTS



 **CATHAL.SEOIGHE**  
Seoighe, Cathal  
<http://www.maths.nuigalway.ie/~cathal/>

Professor

Bio

Ph

Tri

Mc

Red

Yellow

Blue

Pr

Pl

Ph

Ur

Mc

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Blue

## WHAT ARE THE BENEFITS FOR THE SCIENTIFIC ADVISORY & REVIEW COMMITTEES?

- They provide an opportunity to collaborate
- There is a recognition of reputation and accolades
- There is social upliftment in the field of expertise
- It provides a level of personal satisfaction
- There is a fulfilment of an individual's organisational mandate

## LIST OF MEMBERS

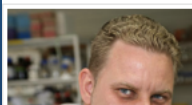


 **CATHAL.SEOIGHE**  
Seoighe, Cathal  
<http://www.maths.nuigalway.ie/~cathal/>

Professor  
Bioinformatics, National University of Ireland Galway

PhD  
Trinity College Dublin,

More...



 **DEAN.EVERETT**  
Everett, Dean  
<http://www.liv.ac.uk/infection-and-global-health/staff/dean-everett/>

## LIST OF MEMBERS



 **ALAN.CHRISTOFFELS**  
Christoffels, Alan  
<http://www.sanbi.ac.za/people-2/faculty/alan-christoffels/>

Director

Cape

**KERR**

anager  
I Biology, University of Edinburgh

8

**OWEN**

<http://www.com/pub/andrew-owen/26/0/442>

ecology, University of Liverpool

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## Research

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### Open innovation

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[Non-communicable diseases in Africa](#)
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[Targeting the immune system through open innovation](#)
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# Non-communicable diseases in Africa

In Africa and across developing countries, non-communicable diseases (NCDs) such as cancer and diabetes pose an increasing threat. Current projections indicate that by 2020, the largest increases in deaths from NCDs will occur in Africa.

At the 2014 UN NCD Review Meeting, a comprehensive assessment of the progress achieved in the prevention and control of NCDs in Africa highlighted the need for capacity building, collaboration and mobilisation of interest groups, including civil society and advocacy groups, government, and the private sector, and mobilising global funding for NCDs to enable effective and sustainable action.

In response to this, we announced a series of investments in our business in Africa totalling £130m. Included in this was an initiative to build the world's first R&D Open Lab for non-communicable diseases in Africa. Building on







### **My Team Members:**

Dr. Gordon Wells  
Mr. Abraham van der Berg  
Mr. Mamana Mbiyavanga

### **Organizations:**

CPGR  
H3A and H3ABioNet  
ICORD

2016/10/21

### **Funders:**

DST  
TIA  
NIH

### **KTP:**

Experts  
Review Committee  
Scientific Advisory Committee



# Centre for Proteomic & Genomic Research

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