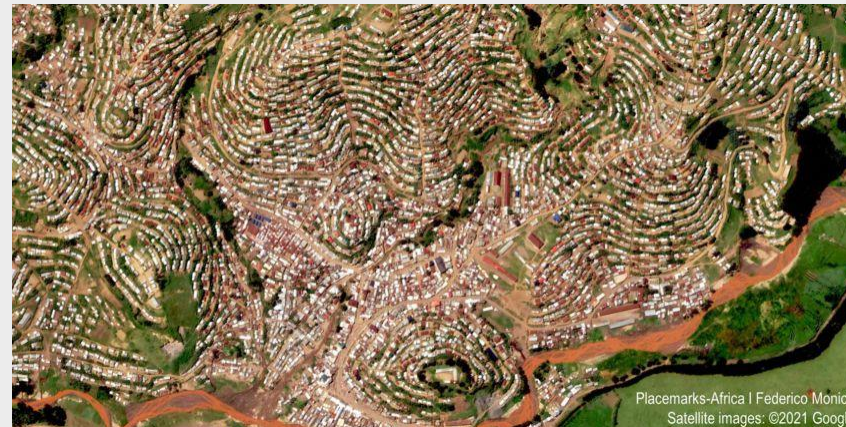


Building an interdisciplinary international network as a young researcher



Nonkululeko Radebe, PhD student at the Karlsruhe Institute of Technology (KIT), Germany



Global partnership for sustainable construction and resource efficiency workshop

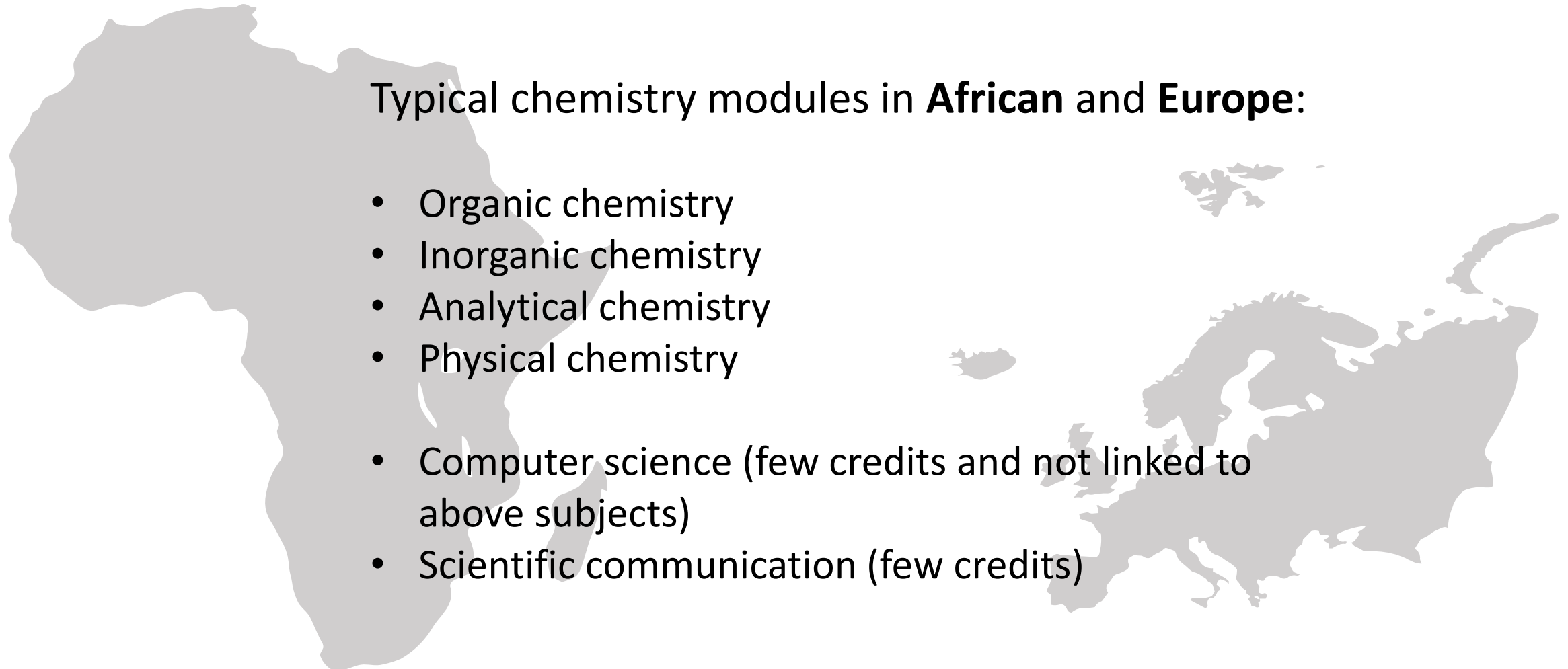
16th July 2021

Education: Does the science curricula incorporate sustainability into its modules?

Typical chemistry modules in **African** and **Europe**:

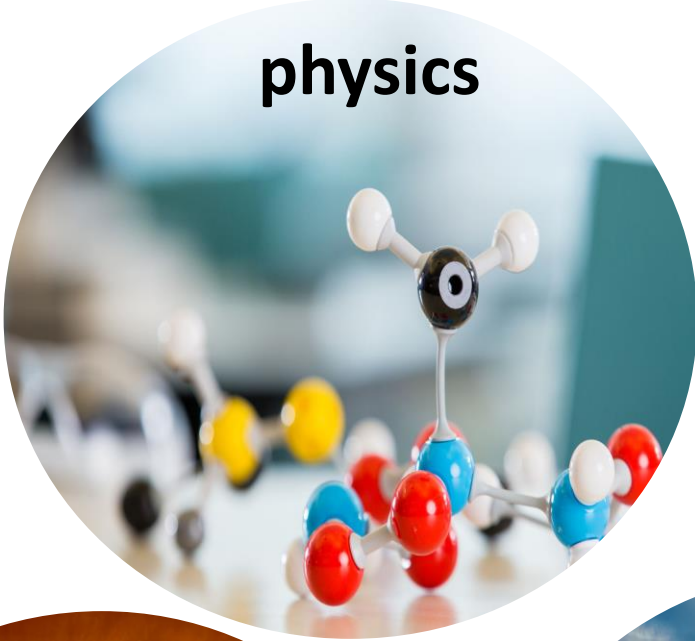
- Organic chemistry
- Inorganic chemistry
- Analytical chemistry
- Physical chemistry

- Computer science (few credits and not linked to above subjects)
- Scientific communication (few credits)



All fields of science are interconnected

physics



chemistry



biology



astronomy



**Environmental
sciences**



geology



Theories and concepts

A word cloud of scientific and theoretical concepts. The words are arranged in a roughly circular pattern, with 'energy' being the largest and most central word. Other prominent words include 'photosynthesis', 'vectors', 'thermodynamics', 'molecules', and 'radiation'. Smaller words include 'forces', 'catalysts', 'photons', 'friction', 'gravity', and 'DNA'.

radiation
molecules
forces
energy
catalysts
photons
thermodynamics
photosynthesis
vectors
friction
gravity
DNA
electricity

Theories and concepts all describe...



radiation
molecules
forces
thermodynamics
vectors
DNA
energy
catalysts
photons
photosynthesis
friction
gravity
electricity

So, what the biggest issue we are facing as a planet...

So, what the biggest issue we are facing as a planet...

Increased CO₂

Melting glaciers

Changes in agricultural patterns

Ecosystems collapse

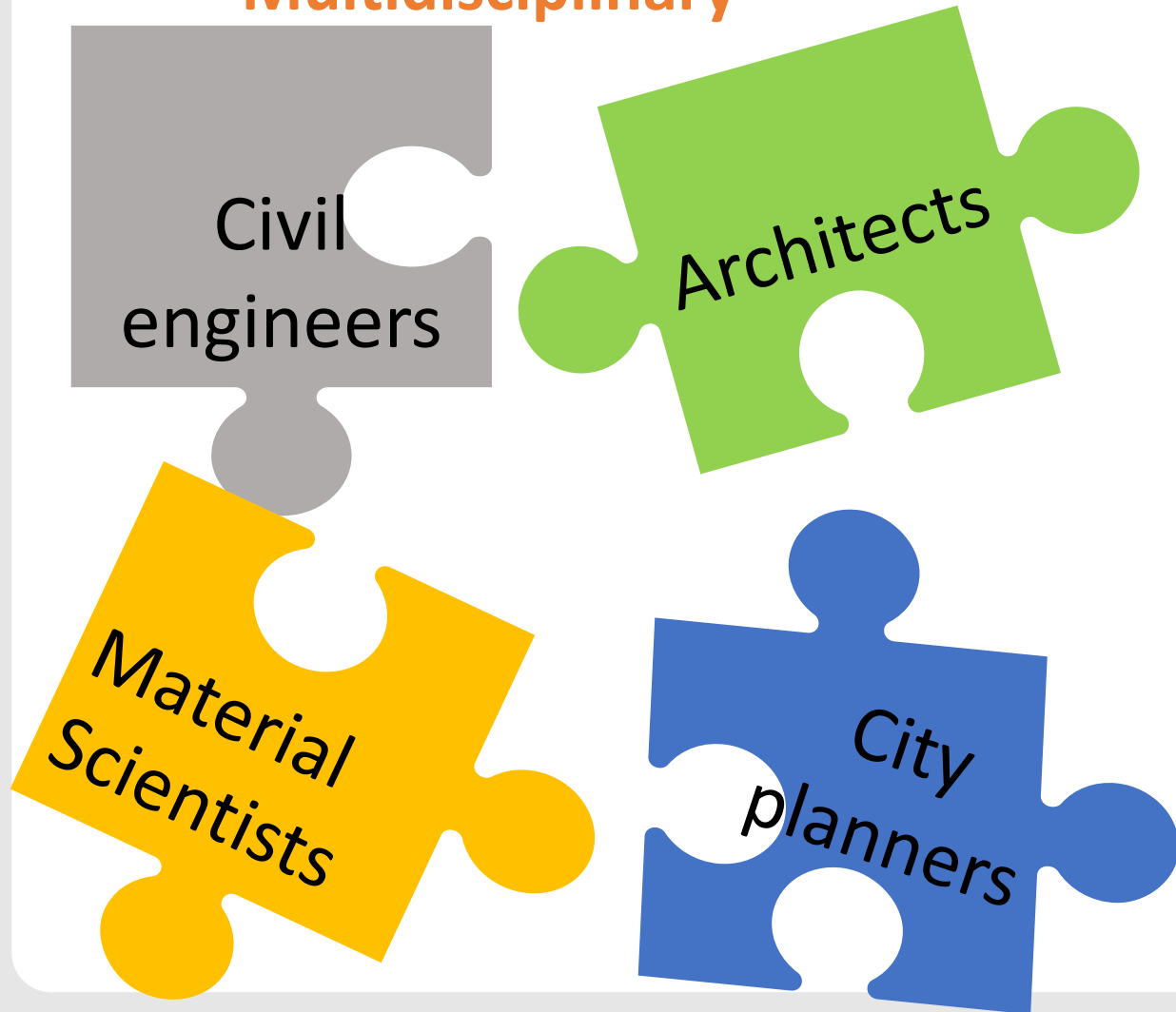
Submerging landmass

BUT

We cannot avoid that we still need to build...sustainably

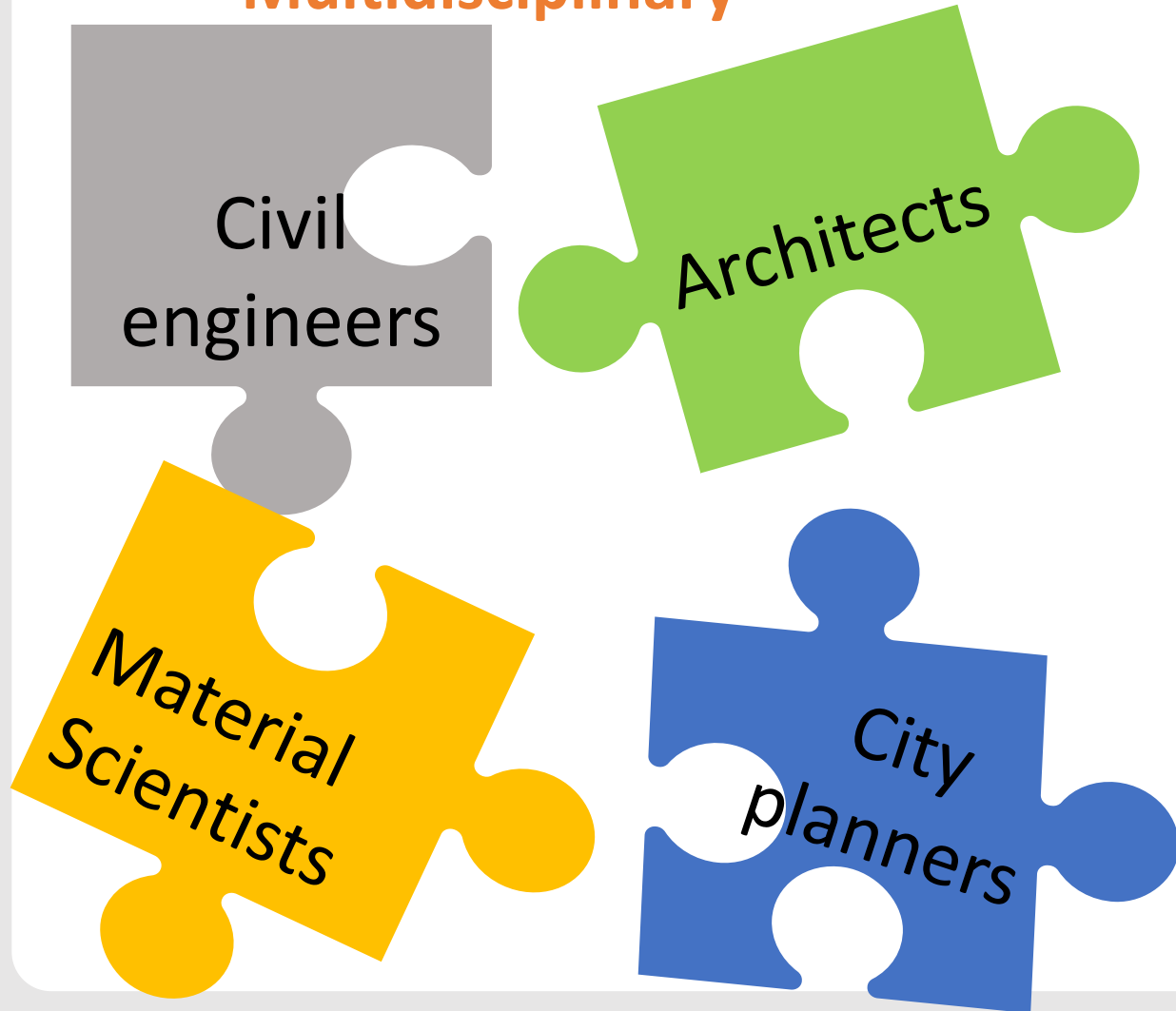
Sustainable Urbanization needs an interdisciplinary approach

Multidisciplinary

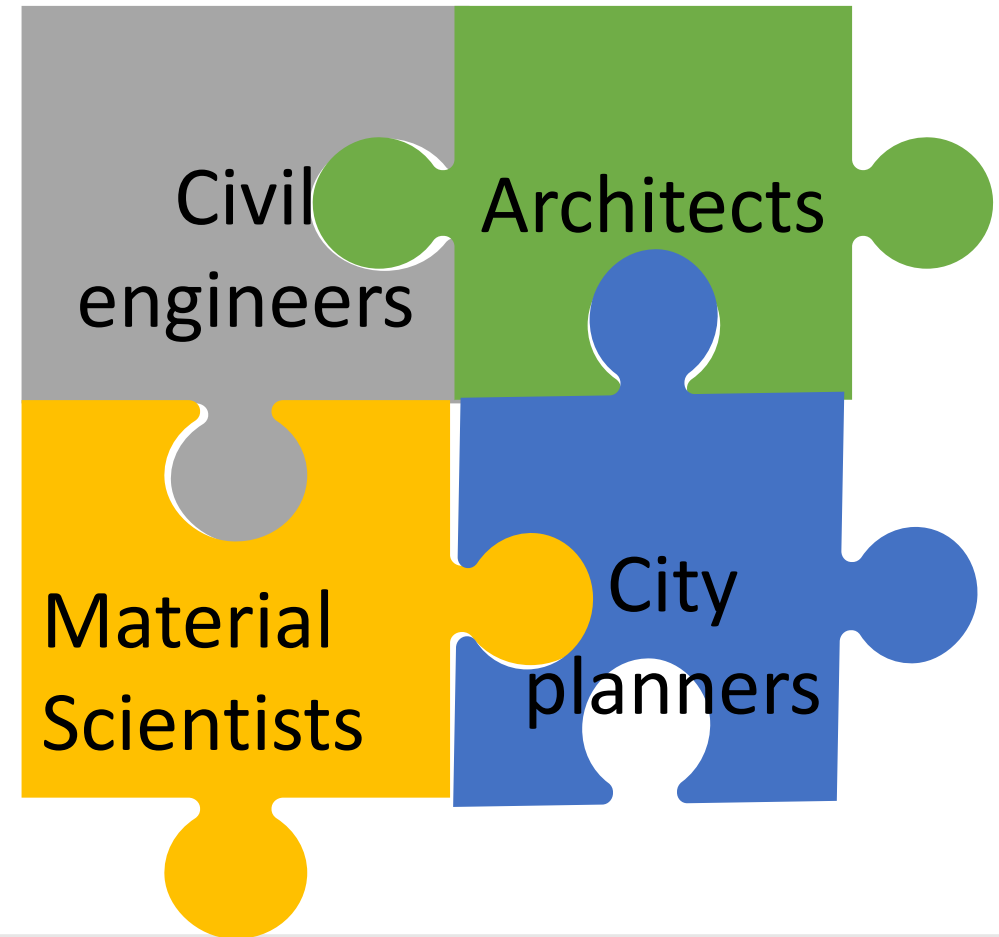


Sustainable Urbanization needs an interdisciplinary approach

Multidisciplinary



interdisciplinary



Cultivating environments for interdisciplinary conversation and actions



Innovation, Science, Engineering and Education (Nairobi 2019)

<https://isee-africa.com/>



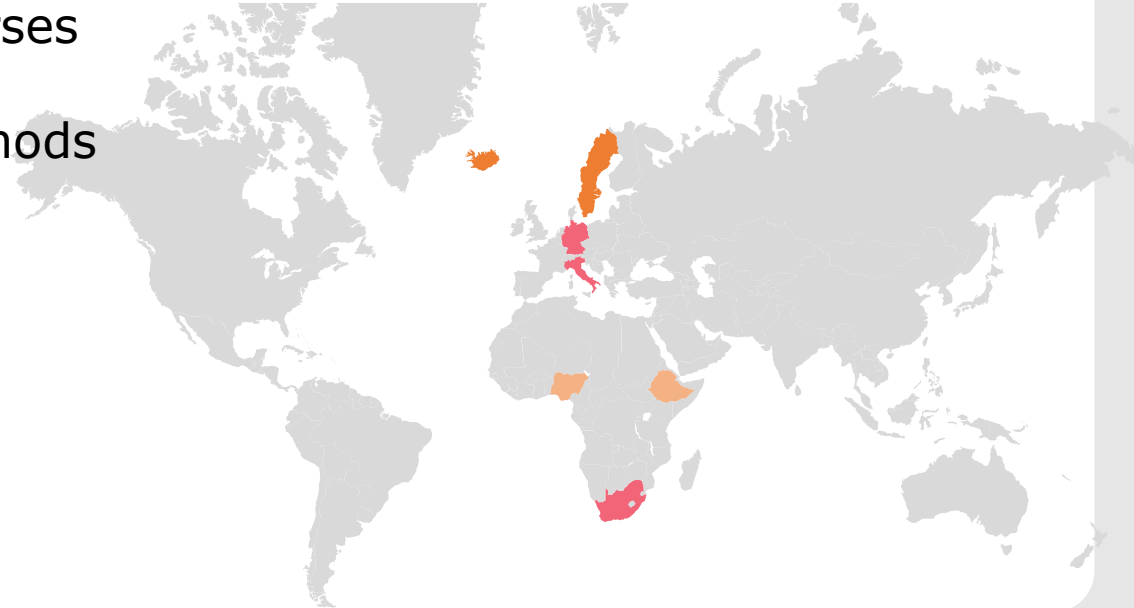
Interactive workshops

- Global and local challenges and/or potentials in construction
- Potentials for sustainable construction based on education
- Future skill requirements in civil engineering, architecture and materials
- **Global research and education requirements**
- African research and education requirements
- Contemporary teaching methods
- Gender issues in STEM education
- Language and communication barriers

Highlights from: Global research and education requirements

Requirements:

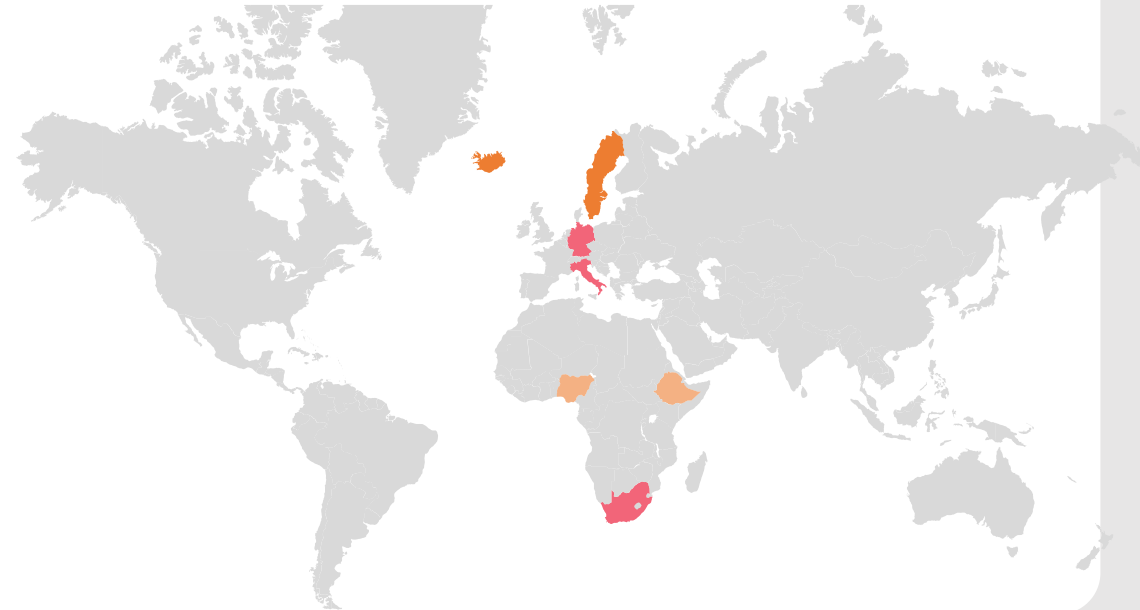
- Functionally educated researchers
- Mobility and exchanges between institutes
- Adding the sustainability component to generic courses i.e. CHEM
- Creating awareness through teaching/research methods
- Legislation changes (incentives or tax)



Highlights from: Global research and education requirements

Solution strategies:

- Researcher mobility
- Include complimentary (e.g. social sciences)
- Improved industry and research researchers
- Interdisciplinary & intercontinental research
- Push for improved funding for research
- Infrastructure



Harnessing the connections to do something meaningful: New project

Female **A**cademic **L**eadership Network
for **C**onscious **E**ngineering and **S**cience
towards **S**ustainable Urbanisation



<http://falconess.org/>

Mission

The **FALCONESS**-project is about **scientific questions** related to sustainable **urban development** in Africa. The link between engineering and scientific topics with socio-economic aspects is a core element.

Subjects of study are:

- Lagos,
- Dar es Salaam,
 - Cairo,
- Johannesburg and
 - Accra

Harnessing the connections to do something meaningful: New project

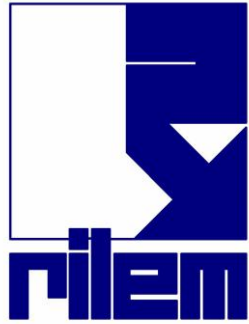
Aims



<http://falconess.org/>

- creating **networks** between **African female academics/professionals** and international decision makers and leaders on personal, professional, and institutional level.
- studying and **evaluating a wide range of African cities** which are widely distributed over the continent with an enormous bandwidth of cultural, historical, geographical and economical boundary frameworks
- connecting the expertise of a **wide range of disciplines in STEM** (civil engineering, architecture, natural sciences) with **socio-economic disciplines** (economics, social sciences, communication).
- **connecting generations** and multiple hierarchy levels
- developing synergies with **interacting networks and research activities**

International Union of Laboratories and Experts in Construction Materials, Systems and Structures: RILEM



www.rilem.net



291-AMC : Use of Agro-Based Materials as Cementitious Additions in Concrete and Cement-Based Materials

Promote sustainable and safe construction



New directions of research



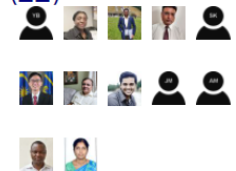
[Presentation](#) | [Events](#) | [Members](#) | [Documents](#)

Technical Committee 291-AMC

General Information

Chair: Prof. Said KENAI
Deputy Chair: Dr. Mike B. OTIENO
Activity starting in: 2018
[Cluster A](#)

Group members (22)



[ALL MEMBERS](#)

RILEM Technical committees

Technical Committees (TCs)
are the **cornerstone** of RILEM



TC work typically results in:

- Technical Exchange
- State-of-the-art (STAR) reports
- Recommendations on test methods

Example of TCs:

- Fingerprinting bituminous binders using physico-chemical analysis
- Use of Agro-Based Materials as Cementitious Additions in Concrete and Cement-Based Materials

International Union of Laboratories and Experts in Construction Materials, Systems and Structures: RILEM

291-AMC : Use of Agro-Based Materials as Cementitious Additions in Concrete and Cement-Based Materials

[Presentation](#)

[Events](#)

[Members](#)

Technical Committee 291-AMC

General Information

Chair: Prof. Said KENAI

Deputy Chair: Dr. Mike B. OTIENO

Activity starting in: 2018

Cluster A

- focus on the **agro-based materials** that can be used as **cementitious additions** in regions where established materials are not available or too expensive, as in the global South (with focus on sub-Saharan Africa).
- Focus will mainly be on **fresh (plastic)**, strength and durability properties.
 - Aspects such as creep and shrinkage, and fracture characteristics of mortar and/or concrete may be covered but will not form the core of this TC.
- Promote the use of agro-based materials.



RILEM YOUTH COUNCIL



JOANITTA NDAWULA
RYC Chair



SURENDER SINGH
RYC Vice-Chair
South Asia



DAVID ORENSE
Marketing and communication
Manager
North America & The Carribean



Madga POSANI
RYC Secretary
Europe



Marie Joshua Tapas
Pacific



Heongwon SUH
East Asia



Bo Ran
China



Nonkululeko W.
Radebe
Sub Saharan Africa



Said Bouzit
*Middle East
North Africa*



Evgenii RUMIANTSEV
*Eastern Europe
Central Europe*



José Vidal
González AVIÑA
Latin America

Building a Sub-Saharan RILEM youth community

apter

background | Clear frame

The slide features a flowchart on the left and five video thumbnails on the right. The flowchart starts with a circle containing 'Approaching lecturers' (green box) and 'increasing relationship within researchers' (yellow box). Below this is a blue box 'Afro-centric incentives to join RILEM' and a yellow box 'peers approach peers vs top down approach'. An arrow points from this circle to a central green box 'Joint Research, Collaboration and knowledge sharing within the group'. To the right, a blue box 'RVC_Sub-Saharan Chapter mandate: SMART goals' is connected to a yellow box 'Identify the major challenges for young researchers in Sub-Saharan Africa'. Below this is an orange box 'Individual tasks'. A green box 'Virtual networking seminars (i.e. Seminar or sustainable construction methods)' is also connected to the central green box.

Nonkululeko Radebe

Jeanitta Ndawula

Wolfram Schmidt

Alison Nabitengeru Ki...

Biruktawit Taye (ビルク)

The (my) approach

Consider what
your expertise
are verses what
your interest are

If your current
network (i.e
research group)
does align with
your interests join
external societies
and project that
do

Be an active
participant in the
networks you are
a part of

Take home message/questions

- What links are missing in your network?
- How can you ensure that the gap is closed?
- Is it important to you?

Thank you!

Contact me via email nonkululeko.radebe@kit.edu or
Nonkululeko Radebe on LinkedIn and Researchgate

