



# 2019 WOMEN IN ENGINEERING WORKSHOP

Faculty of Engineering & the Built Environment



UNIVERSITY OF CAPE TOWN  
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD



# 2019

# EBE BOOKLET

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# 2019 EBE WORKSHOP

## Programme

Date: 17 August 2019

<b>Time</b>	<b>Activity</b>
<b>08h30</b> <i>Snape 4B</i>	<b>Registration</b> Sign up & collection of bag and nametag
<b>09h00</b> <i>Snape 4B</i>	<b>Welcome</b> Icebreaker, Welcome & Overview of the day
<b>09h15</b> <i>Snape 4B</i>	<b>Studying Engineering at UCT</b> EBE Dean <i>Professor Alison Lewis</i>
<b>09h30</b> <i>Snape 4B</i>	<b>The Future of Engineering</b> Lecturer in Civil Engineering <i>Ms Lita Nolutshungu</i>
<b>09h45</b> <i>NEB Foyer</i>	<b>Engineering Challenge</b> Participation of Engineers in the realisation of SDGs
<b>11h15</b> <i>Snape 4B</i>	<b>Poster Presentation</b> Presentation: 3 mins & Questions: 2 mins
<b>12h00</b> <i>Snape 4B</i>	<b>Open Discussion</b> Q&A session
<b>12h30</b> <i>Snape 4B</i>	<b>Lunch</b> Interact and make some new friends!
<b>13h15</b> <i>NEB Foyer</i>	<b>Mentor Engagement</b> Interaction between UCT students & learners
<b>13h45</b> <i>NEB Foyer</i>	<b>Closing</b> Awards, Feedback & Closing remarks
<b>14h00</b>	<b>Programme Ends</b>

# EBE DEAN'S MESSAGE



It is engineers who will push boundaries and shape the future. We believe that having a diverse student body contributes enormously to the richness of our environment. Our experience is that diversity contributes to building a more humane and caring community of engineers.

Our diversity also adds to our potential to innovate and think creatively in an increasingly complex world. The global problems of the 21st century and the future of our planet depend on the contribution of a wide range of skilled professionals.

So often, as young women, you are told if you want to be an engineer, you need to be good at maths and science. There is so much more you need to know about the innovative and exciting work of engineers. In the Faculty of Engineering & the Built Environment, research is happening in the fields of energy, water, urbanisation, innovation, infrastructure, environment, and so much more.

We need more women in engineering. I do hope you will join us on this exciting journey.

*Professor Alison Lewis*

*Dean: Faculty of Engineering & the Built Environment, UCT*

# MEET OUR SPEAKER



I grew up in Langa, Cape Town and went to Rustenburg Girls' High School. I chose to study civil engineering as I had an interest in how bridges were built and saw the profession as being central to developing communities. I saw civil engineering as a profession which provides a foundation for modern society through infrastructure development and the optimisation of the performance and efficiency of these community systems.

In December 2009, I graduated from the Cape Peninsula University of Technology with a BTech in Civil Engineering. After graduating, I worked in industry as a Site Engineer for WBHO where I was involved in various projects including the extension of OR Tambo International Airport.

In 2014, I decided to further my studies and applied to do my master's degree at the University of Cape Town. I graduated in December 2018 with my MSc (Eng) specialising in Geotechnical Engineering.

I am now a lecturer in the Department of Civil Engineering teaching various undergraduate courses. I am passionate about using my skills to make a difference in my community.

Ms Lita Nolutshungu

# WOMEN IN ENGINEERING

“As an engineer, my job will involve developing creative and innovative solutions to challenging and complex problems. Challenge accepted!”

*Avu Maake*

*Civil Engineering Master's graduate*



“There’s no monopoly on who can excel in the engineering field. Women’s insight and creativity can be a great advantage.”

*Zarmeen Ghoor*

*Master's student in civil engineering*

“It can often be a tall climb for women trying to access the world’s possibilities, until they stand on the shoulders of a woman who has been there. I want to be those shoulders.”

*Hlumelo Marepula*

*final-year chemical engineering student.*



# OVERVIEW OF THE SDGs

In the year 2015, the world faced several disasters such as famines, poverty, droughts, and wars, which affected the quality of life.

At the United Nations Summit in September 2015, 193 governments from around the world decided to join forces to make the world a better place by creating a plan of actions known as the Sustainable Development Goals (SDGs).

**SDGs**  
*Set of*  
**17 universal**  
*guidelines*

The SDGs are a set of **17 universal guidelines** designed to drive the world into a sustainable and resilient path by 2030.

The SDGs aim to create a future where all forms of poverty and inequalities are eradicated, and the effects of climate change are limited.



# THE “5 P’s” OF THE SDGs

With the motto, “**Leave no one behind**”, the SDGs mobilises every country to strive together for the creation of better world by focusing on:

## PEOPLE

End all forms of poverty and hunger and to ensure that all human beings can fulfil their potential in dignity and equality.



## PLANET



Ensure that the planet can support the needs of present and future generations by protecting the planet from degradation and taking action on climate change.

## PROSPERITY

Ensure that all human beings can enjoy prosperous and fulfilling lives in an harmonious environment.



## PEACE



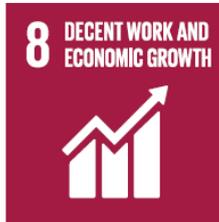
Foster peaceful, just and inclusive societies free from all form of fear, violence and injustice.

## PARTNERSHIP

Enhance global solidarity and partnership to work together in the establishment of a healthy, safe and sustainable world.



# SUSTAINABLE DEVELOPMENT GOALS



# SUSTAINABLE DEVELOPMENT GOALS



# SDG 6: Clean Water and Sanitation



## Ensure Availability and Sustainable Management of Water and Sanitation for All



### Targets:

- ❑ Ensure that everyone has access to:

- ❖ Safe and affordable drinking water
- ❖ Adequate sanitation

- ❑ Improve sanitation management
- ❑ Protect our ecosystems
- ❑ Encourage recycling and safe reuse of water
- ❑ Monitor and reduce contamination of water quality

*Water scarcity or the lack of sufficient available water*

*resources to meet our needs, affects more than 40 per cent of the global population.*

*The big problem is water pollution. Pollution occurs when substances are dumped in water sources.*

*“Anything else you are interested in is not going to happen if you can’t breathe the air and drink the water. Don’t sit this one out. Do something.”*

**Carl Sagan**

American astronomer and author

# SDG 6: Clean Water and Sanitation



## *Case Study*

Unpolluted water bodies (*i.e.* lakes, seas, and underground water reservoirs) are required to maintain sustainable level of animal life in these bodies. Water from fresh water bodies equally need to be unpolluted to be used in agriculture and other relevant human activities.

However, it has been observed that waste material from human activities like agriculture, deforestation and mining have severe pollution effects on several water bodies resulting in numerous negative effects.

*As a group, investigate how the agricultural activities contribute to the water pollution and provide solutions on how the water pollution from the agricultural activities can be limited.*

# SDG 7: Affordable and Clean Energy



Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All

## Targets:

- ❑ Establish sustainable energy systems to:
  - ❖ Reduce our impacts on the planet
  - ❖ Address energy inequalities
- ❑ Promote energy efficiency by developing technology that wastes less energy
- ❑ Increase the use of renewable energy sources globally
- ❑ Work together to research and develop renewable and clean energy resources

*Energy is Power: Power to do, participate and build.*

“The climate challenge illustrates how we have to change. The developing countries need more support and opportunities to develop and use clean energy. Because if the current situation continues, then the world will not be able to handle this burden.”

*Energy powers our Economy, Transportation, Health and Livelihoods.*

**Gro Harlem Brundtland**  
Former Prime Minister of Norway

# SDG 7: Affordable and Clean Energy



## *Case Study*

The energy production across the world is based on fossil fuels such as coal, oil, and gas. These fossil fuels are transformed through combustion to make **fuels** used in our cars and **power** used to charge our phones and light up our cities.

However, the transformation and use of the fossil fuels lead to the generation of large amounts of greenhouse gases which are making drastic changes in the climate.

The use of fossil fuels is therefore not sustainable due to its impacts on the climate and the environment. Recently, the use of renewable energy sources has been considered as the suitable solution to ensure a sustainable production of energy.

*As a group, identify the impacts of the use of fossil fuels and investigate how the use of the renewable energy sources can drive the world towards a sustainable future.*

# SDG 9: Industry, Innovation And Infrastructure



## Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialisation and Foster Innovation

### **Targets:**

- ❑ Develop sustainable and resilient infrastructure to support:
  - ❖ Economic development
  - ❖ Human well-being
- ❑ Reduce environmental impact and promote sustainable development in businesses and industries
- ❑ Ensure universal access to the Internet and new technologies

*Technological progress helps us address big global challenges such as creating jobs and becoming more energy efficient.*

*“Never before in history has innovation offered promise of so much to so many in so short a time.”*

*Bridging the digital divide, promoting sustainable industries and investing in scientific research and innovation are all important ways to facilitate sustainable development.*

**Bill Gates**  
American businessman  
and philanthropist

# SDG 9: Industry, Innovation And Infrastructure



## *Case Study*

Technological progress helps us address big global challenges such as creating jobs and becoming more energy efficient.

For example, the world is becoming ever more interconnected and prosperous thanks to the internet. The more connected we are, the more we can all benefit from the wisdom and contribution of people everywhere on earth.

*As a group, in addition of the Internet identify two other outcomes of technological progress and investigate how these outcomes contribute in the establishment of a sustainable world.*

# SDG 11: Sustainable Cities And Communities



## Make Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable

### Targets:

*More than half the world's population now lives in cities, and that figure will go to about two-thirds of humanity by the year 2050.*

- Ensure everyone has access to quality, safe housing and basic services
- Provide safe, accessible and organised public transport
- Ensure waste management and air quality is monitored

*“In the planning and designing of new communities, housing projects and urban renewal, the planners both private and public, need to give explicit consideration to the kind of world that is being created for the children who will be growing up in these settings.”*

*To make cities sustainable for all, we should create good, affordable public housing and green spaces, upgrade slum settlements, and invest in public transport.*

**Urie Bronfenbrenner**  
Russian-American  
psychologist

# SDG 11: Sustainable Cities And Communities



## *Case Study*

More than half the world's population now lives in cities, and that figure will go to about two-third of humanity by the year 2050.

Cities are getting bigger. In 1990, there were ten “mega-cities” with 10 million inhabitants or more. In 2014, there were 28 mega-cities, home to 453 million people.

With this rapid increase in the number of cities and number of people living in cities, the transformation of our current cities into sustainable and adequate cities is then primordial.

*As a group, identify four key elements of the city of Cape Town which need to be transformed or improved to make Cape Town a sustainable city.*

# SDG 13: Climate Action



## Take Urgent Action to Combat Climate Change and its Impacts

### Targets:

- ❑ Ensure people are well prepared for hazards related to climate change and natural disasters
- ❑ Address issues of climate change through government action and resource allocation

“Climate change is not just a problem for the future. It is impacting us every day, everywhere”

**Dr. Vandana Shiva**  
Indian scholar and environmental activist

*Climate change is the biggest threat to our development and well-being, impacting all life on the planet.*

*Greenhouse gases are emitted into the atmosphere from natural and man-made sources.*

*These gases contribute to the overall increase in temperature because they trap solar radiation from the sun in our atmosphere, warming our planet.*

# SDG 13: Climate Action



## Case Study

Human activities and actions have impacted the climate in several ways.

The current warming trend is of importance because most of it is extremely likely (greater than 95 percent probability) to be the result of human activity since the mid-20th century and proceeding at a rate that is unprecedented over decades to millennia (NASA).

The prevalence of gases like carbon-dioxide, methane and nitrous oxide imply more heat from the Sun is absorbed and reflected in all directions hence warming the Earth (causing climate change).

*As a group, identify the greenhouse gases and investigate their effects on the climate changes. Additionally propose three action plans to limit their emissions into the atmosphere.*

# SDG 14: Life below Water



## Conserve and Sustainably Use our Oceans, Seas and Marine Resources

### **Targets:**

- ❑ Reduce marine pollution by 2025 by reducing sources of pollution
- ❑ Enact laws that protect our oceans from destructive fishing practices
- ❑ Minimize the impacts of ocean acidification

**13,000**  
*pieces of plastic litter over every square kilometre of ocean.*

*Keeping our oceans clean and healthy is in our best interests because they protect our drinking water, weather, climate, food and oxygen.*

**Oceans**  
*absorb about 30 percent of the carbon dioxide that humans produce; but we are producing more carbon dioxide than ever before and that makes the oceans more acidic.*

*“We know that when we protect our oceans we are protecting our future.”*

**Bill Clinton**  
Former US President

# SDG 14:Life below Water



## Case Study

The world's oceans - their temperature, chemistry, currents and life - drive global systems that make the Earth habitable for humankind. How we manage this vital resource is essential for humanity as a whole.

Marine debris - plastics, metals, glass, and other solid waste materials that enter the ocean environment - can be found virtually everywhere in the ocean. 60 to 95 percent of it is plastic. UC Santa Barbara's National Center for Ecological Analysis and Synthesis estimates that 8 million metric tons of plastic ends up in our oceans each year. This is quite alarming.

*As a group, identify the impacts of plastics pollution and investigate how plastics pollution can be decreased and eventually eradicated to enhance life below water.*