

Electrical and Information Engineering

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Outline

- 1 What is an engineer?
- 2 What do engineers do?
- 3 How do you become an engineer?

What is an engineer?

“ *Engineer: a person who has scientific training and who designs and builds complicated products, machines, systems, or structures.* **”**

“ *Engineer: a person who uses scientific knowledge to solve practical problems.* **”**

What do engineers do?

What kinds of problems do engineers solve?

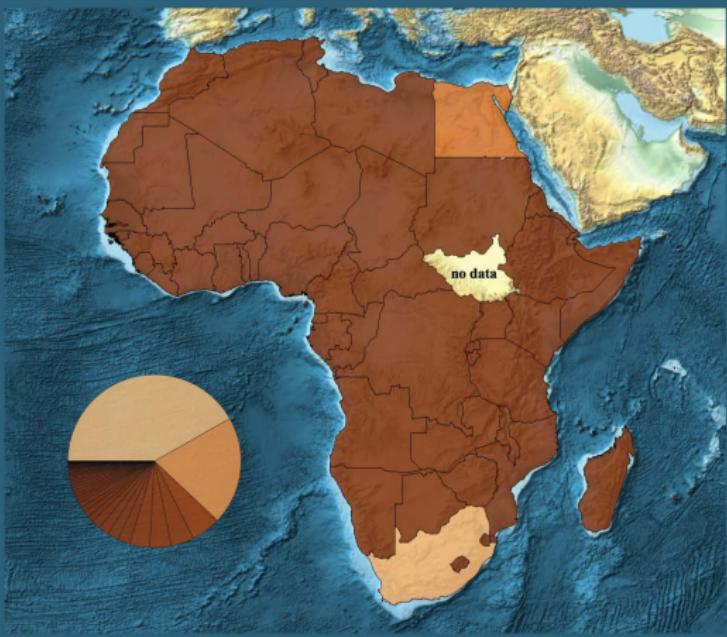
- ① How can we ensure that everyone gets energy for lighting, cooking, and hot water?
- ② How do we reduce the number of road accidents?
- ③ How do we make it easy to find relevant information on the internet?

And many others ...

Energy for Everyone

Electricity Production in Africa

Electricity
production
per country
2011



Africa at Night



Coal-Fired Power Station - Arnot



- Produce more
- Consume less

Shack with Solar Power



Windfarm in Darling (Western Cape)



Geyser Blankets

Do geyser blankets work?

Standing loss energy for a year (kWh)

Condition	Standing loss energy (kWh)	± (kWh)
Normal	±840	kWh
One geyser blanket	±600	kWh
Two geyser blankets	±520	kWh

Time for each element cycle (hours)

Condition	Time for each element cycle (hrs)	± (hrs)
Normal	±6	hrs
One geyser blanket	±8	hrs
Two geyser blankets	±9.4	hrs

Yearly savings in ZAR

Condition	Yearly savings in ZAR	± (%)
Normal	R244	±30%
One geyser blanket	R313	±38%

YES!!!

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Yu-Chieh (Jessie) Liu

Test Setup

- Kwikot 100i
- High pressure vessel
- Geyser setpoint: 70 degC
- Vertical orientation
- Standing loss tests
- No hot water draw
- Rated loss: 100W 2.16 kWh / 24 hour
- Ambient ±25degC
- Indoors

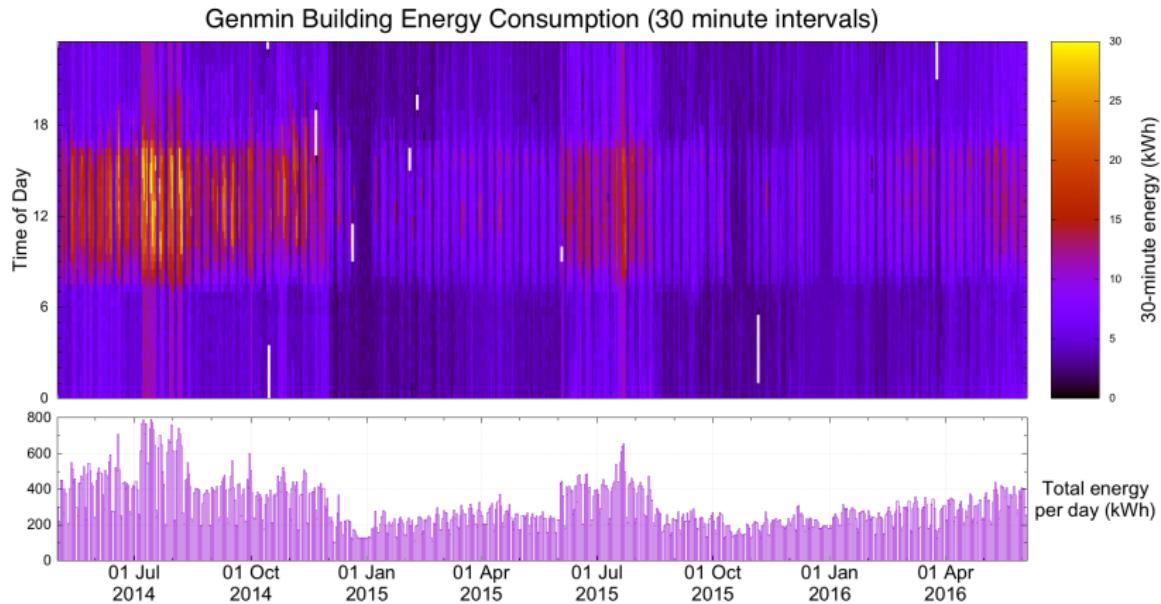
Assumed electricity tariff: R1.60

Thermal insulation

- Thickness: 50mm
- Polyester fibre
- Aluminium foil outer

Bottom of tank not insulated for safety purposes.

LED Lighting



Reducing Road Accidents

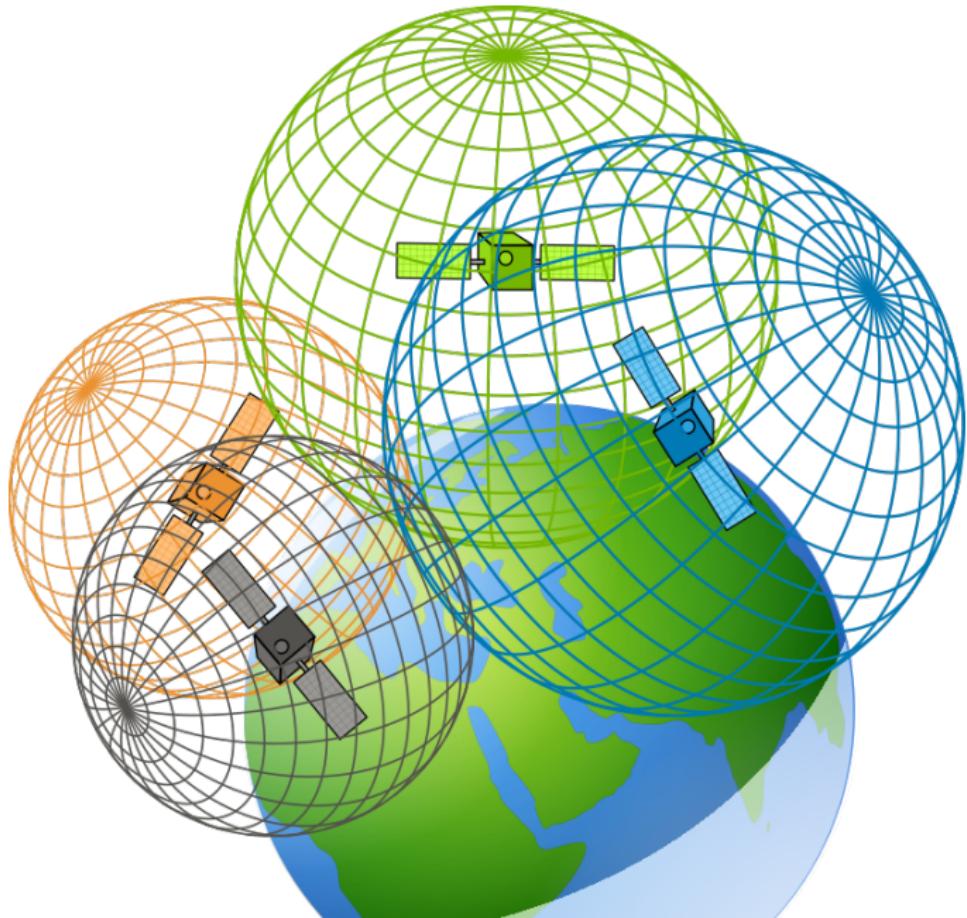
Google's Self-Driving Car



How it Works



Global Positioning System or GPS



Finding Information Online



[Google Search](#)

[I'm Feeling Lucky](#)

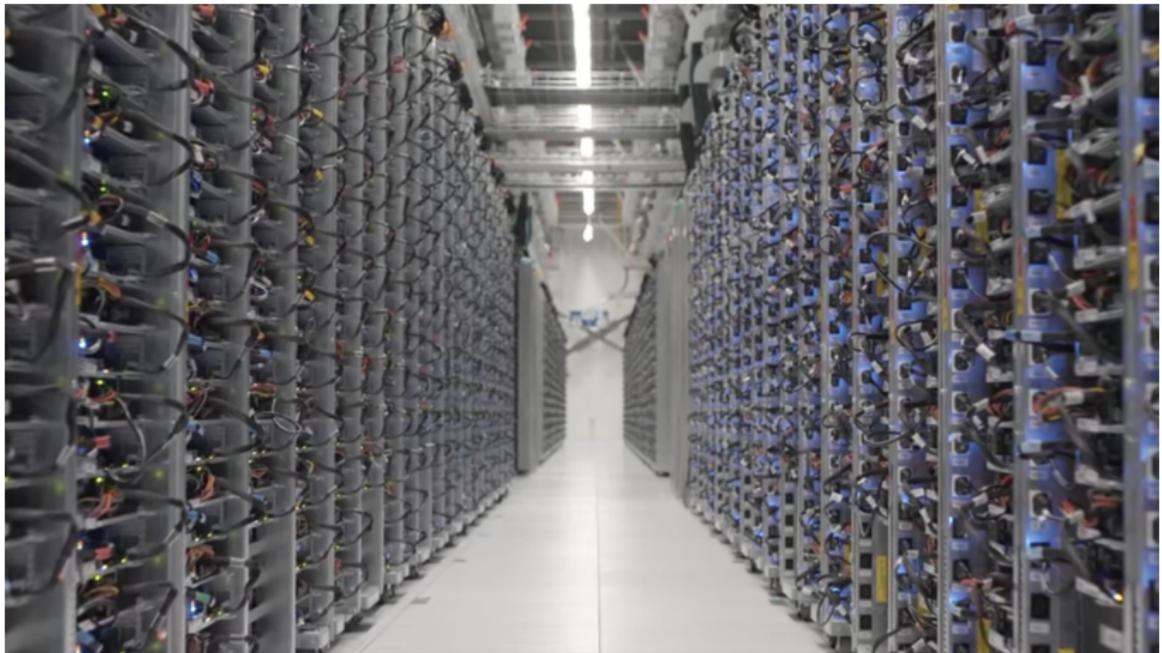
Google.co.za offered in: [Afrikaans](#) [Sesotho](#) [isiZulu](#) [IsiXhosa](#) [Setswana](#) [Northern Sotho](#)

A Google DataCenter

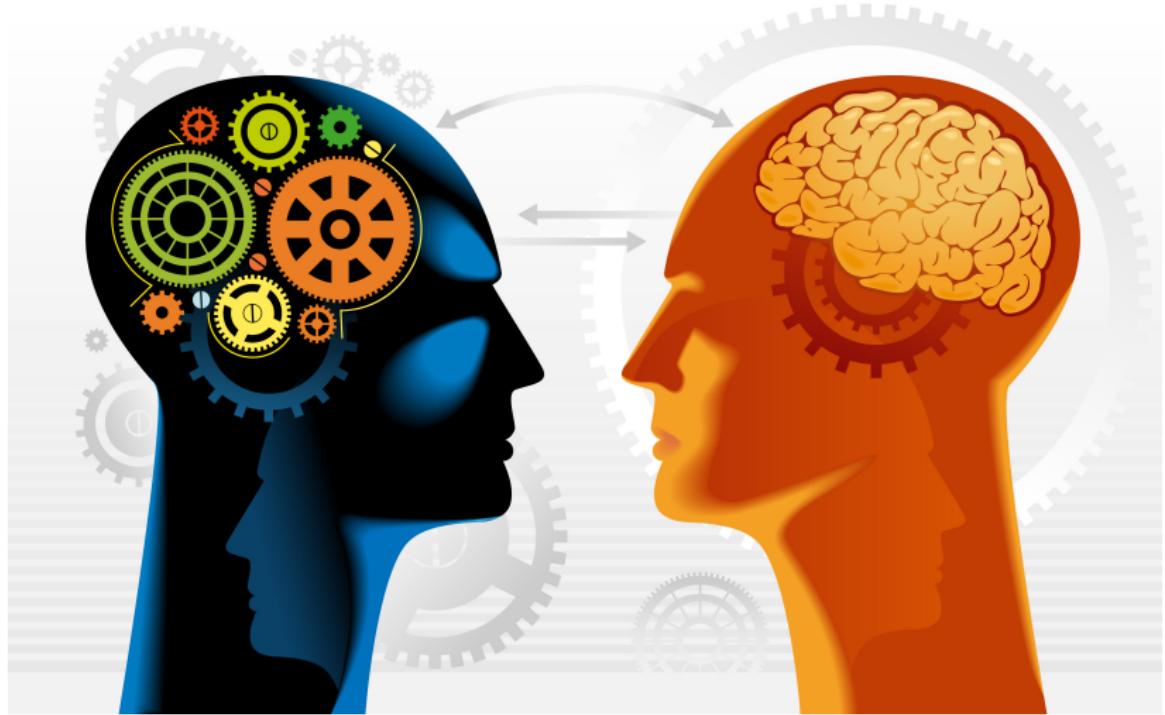


Server Floor

Server Racks



The Human-Machine Interface



Natural Language Processing



How do you become an engineer?

How do you become an engineer?

- You need to get an engineering degree from a university
- You need good grades, aim for 70%, or more, in
 - English
 - Mathematics
 - Physical Science
- APS score ≥ 36
- Also
 - logical thinking
 - good communication skills
 - the ability to work well in a team

Where We Work and Study and Play at Wits



In the Snow!



The Great Hall - Graduation



Costs and Applying for Funding

First year costs about R 45 000!

Funding options (google: “wits funding”):

- ① Undergraduate scholarships and awards
 - University entrance scholarships for APS scores ≥ 43
 - Equity and sport scholarships
- ② NSFAS loans
- ③ Bursaries from Sasol, Eskom, Transnet, Telkom, Vodacom ...

Apply early, apply for as many scholarships/bursaries as you can

Come and join us!

Fourth Year Lab Projects

Go to YouTube and search for:

“wits school of electrical and information engineering”