

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?

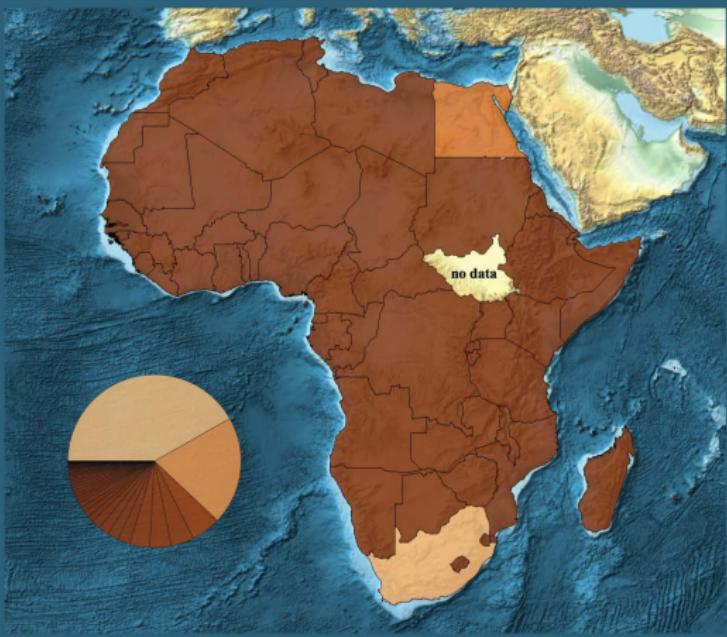
What kinds of problems do engineers solve?

- How can we ensure that everyone gets energy for lighting, cooking, and hot water?
- How do we reduce the number of road accidents?
- 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



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

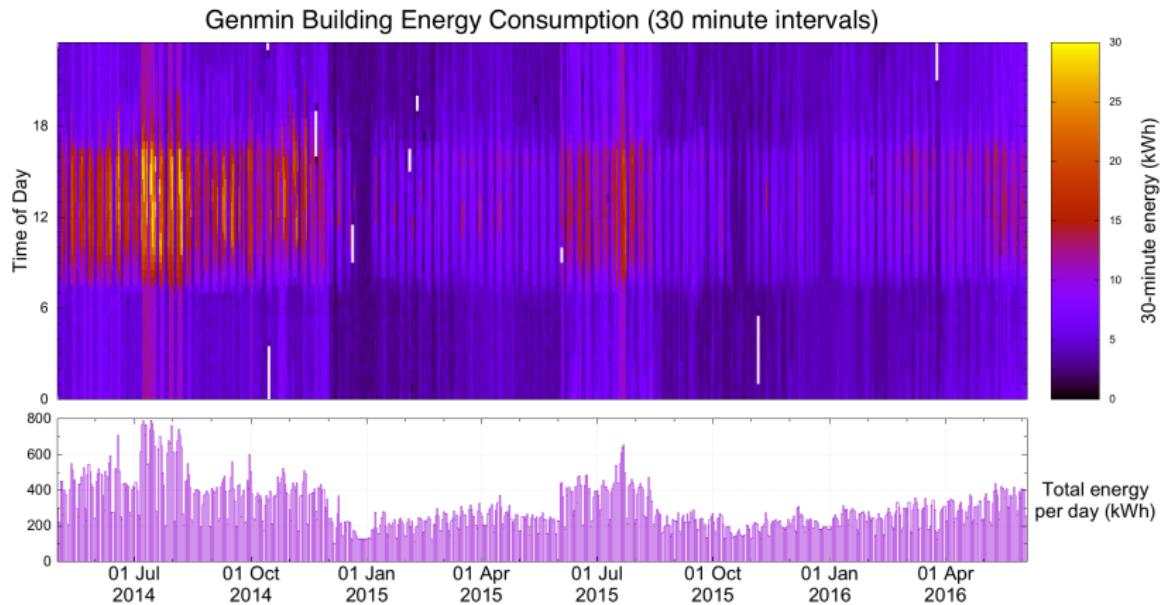
Assumed electricity tariff: R1.60

Thermal insulation

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

Bottom of tank not insulated for safety purposes.

LED Lighting



Self-Driving Cars

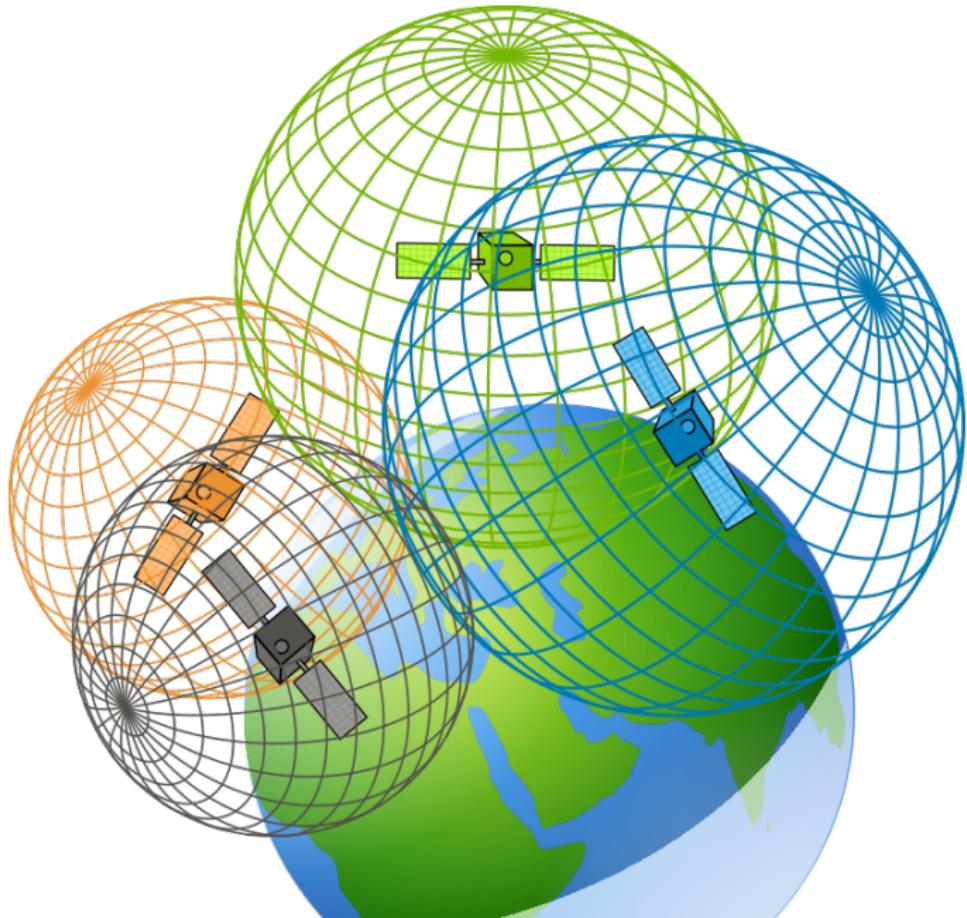
Google's Self-Driving Car



How it Works



Global Positioning System or GPS



Google Search



[Google Search](#)

[I'm Feeling Lucky](#)

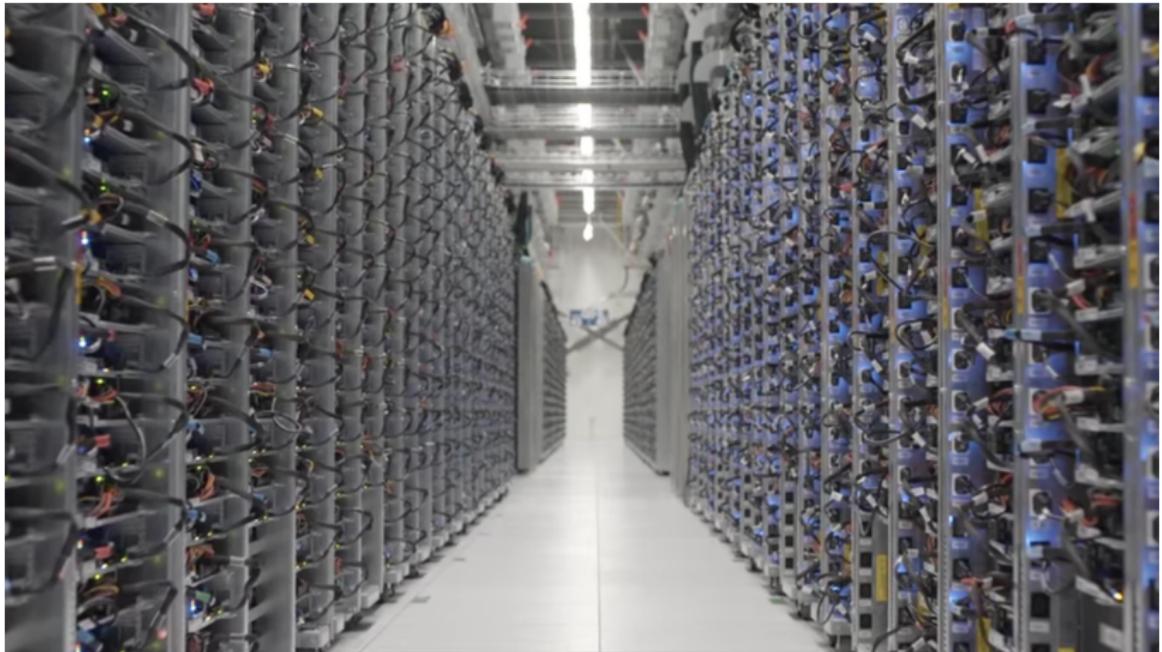
Google.co.za offered in: [Afrikaans](#) [Sesotho](#) [isiZulu](#) [IsiXhosa](#) [Setswana](#) [Northern Sotho](#)

A Google DataCenter

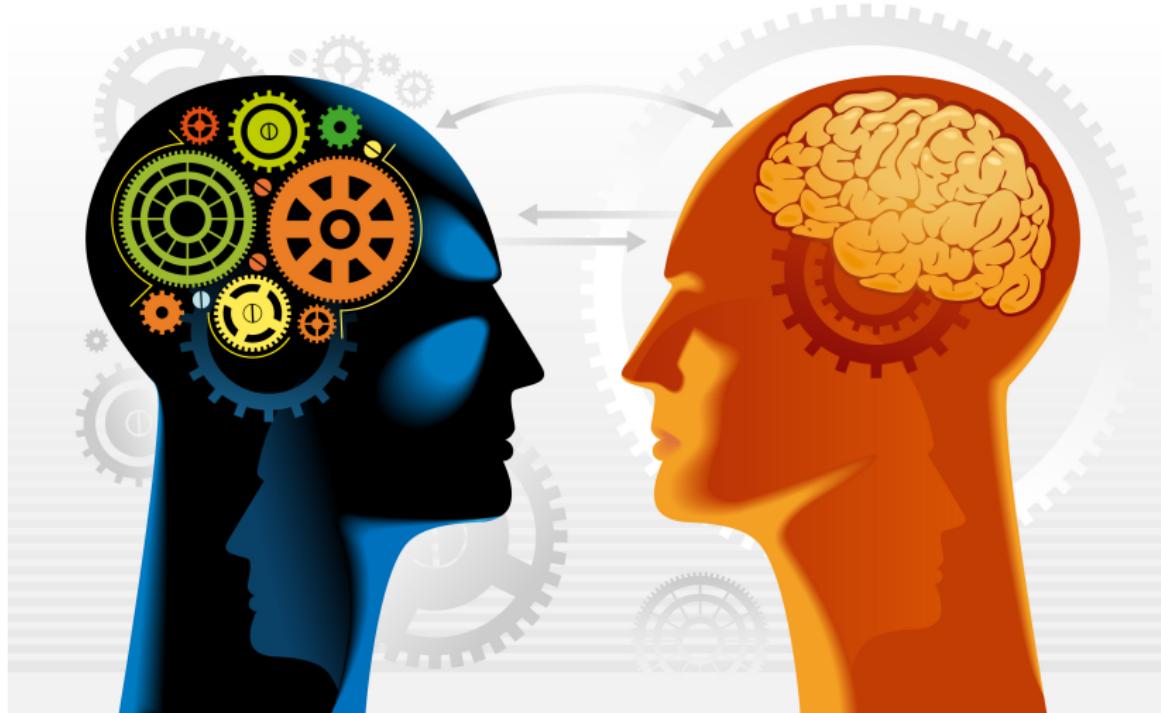


Server Floor

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!