



Tshwane University
of Technology
We empower people



UK IAPP – SA EEESCEP

Barend van Wyk

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Live your life. Create your destiny.

Royal Academy IAPP – SA EEESCEP Program

- UK launched / SA early 2017
- 500 000 £ (Newton Fund) + 10 million R (DHET) over 24 months
- Max 50 000 £ / project

Population & Unemployment

- Total population 54 000 000.
- Total economically active 20 887 000 million, Unemployed 5 230 000 million.
- Only 7.9% have completed post school education
- 11,5% with Tertiary Education unemployed.
- GDP: 13.3% manufacturing, 3.7% electricity, 8.4% mining

Population & Unemployment

- Population young, unemployment high, GDP needs to GROW ! Energy, Health, Water, Sanitation, Transport & Manufacturing problematic.
- Engineering education should evolve to have a *direct influence* on these issues, instead of an *indirect / muted influence*.

Schooling

- Secondary enrolment 4 593 480
- NSC candidates 571 819
- 225 458 sat for Grade 12 Math & only 35% (78 910) achieved > 40% (Physical science 167 997, 37% (67 198) > 40%)
- Number of capable potential engineering students & mathematics and science schooling problematic. Engineering education should have built in measures to address this and extend beyond university borders.

Universities

- Total enrolment 983 200 (all disciplines)
- 16 of 23 Universities offer Diplomas & Degrees in Engineering
- ECSA co-signatory of Dublin, Sydney & Washington Accords
- Average student to staff ratio 55:1
- Completion rates for 3 year diplomas 42%;
4 year degrees 49%

Universities....

- 5 825 Diplomas, 5 754 Bachelors, 1 075 Master & Doctoral degrees awarded in Engineering annually (12 368 out of 130 050)
- SET graduates 1994: 27.8% - 2014: 29.4%
- Developing Existing Engineering Education Staff Capacity identified as key priority (IAPP - EEESCEP). Innovative ways to cope with massification.

1	323	<u>University of Cape Town</u>
2	473	<u>Stellenbosch University</u>
3	547	<u>University of the Witwatersrand</u>
4	561	<u>University of Pretoria</u>
5	652	<u>University of Kwazulu Natal</u>
6	855	<u>University of the Western Cape</u>
7	985	<u>University of Johannesburg</u>
8	1110	<u>Rhodes University</u>
9	1248	<u>University of South Africa</u>
10	1303	<u>North West University</u>
11	1470	<u>University of the Free State</u>
12	1813	<u>Nelson Mandela Metropolitan University</u>
13	2106	<u>Cape Peninsula University of Technology</u>
14	2206	<u>Tshwane University of Technology</u>
15	2662	<u>Durban University of Technology</u>
16	2794	<u>University of Fort Hare</u>
17	2915	<u>University of Limpopo</u>
18	3364	<u>University of Venda</u>



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Engineering and the Built Environment Tshwane University of Technology

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EBE @ TUT

- 10 000 students in faculty (53 000 at university)
- 168 full-time academics
- Diploma, Bachelor, Master and Doctoral (Dublin & Sydney Accords)
- Electrical, Civil, Mechanical & Mechatronics, Chemical, Metallurgical & Polymer, Industrial, Building Sciences, Architecture, Geomatics





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CENTRES, INSTITUTES & TECHNOLOGY STATIONS (CITSI)

- The Technology Station in Electronics (TSE)
- Technology Station Chemicals (TSC)
- Institute for Advanced Tooling (IAT)
- Centre for Electric Energy and Power (CEEP)
- The French South African Technical Institute in Electronics (F' SATIE)
- Nano-Engineering Institute
- Composite Innovation Centre
- FESTO FACT Centre





IAT:CNC Technology Platforms



5-Axis CNC Milling machine



3-Axis CNC Milling machine



CNC Turning machine





IAT:EDM Technology Platforms



NC EDM Die Sink machine



CNC EDM Wire machine



NC EDM Drill machine





TSC: Technology Platforms



Essential oil extraction

Biodiesel from cooking oil





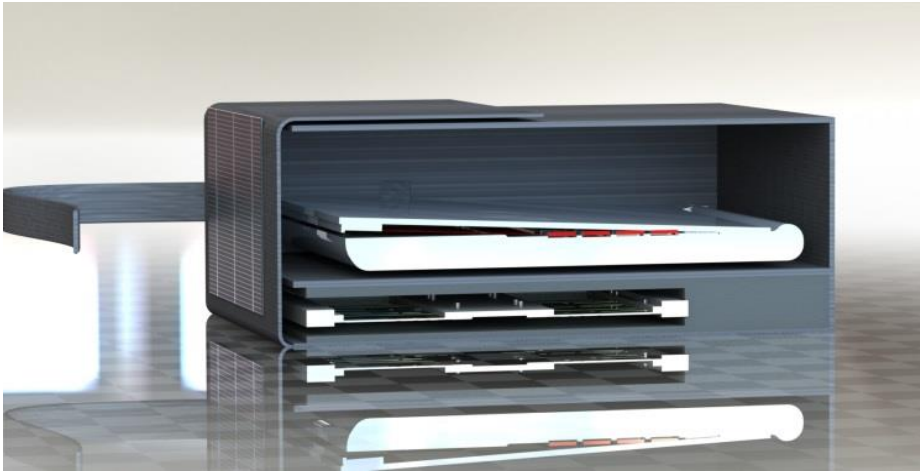
TSE: Technology Platforms



*Rapid prototyping and
manufacturing*



TSE: Product Example: Wireless Power Harvesting Bag



Cross section of device
used to harvest power
from wireless signals to
charge various devices



