

Faculty of Engineering, the  
Built Environment and Information Technology  
*Technology for tomorrow*

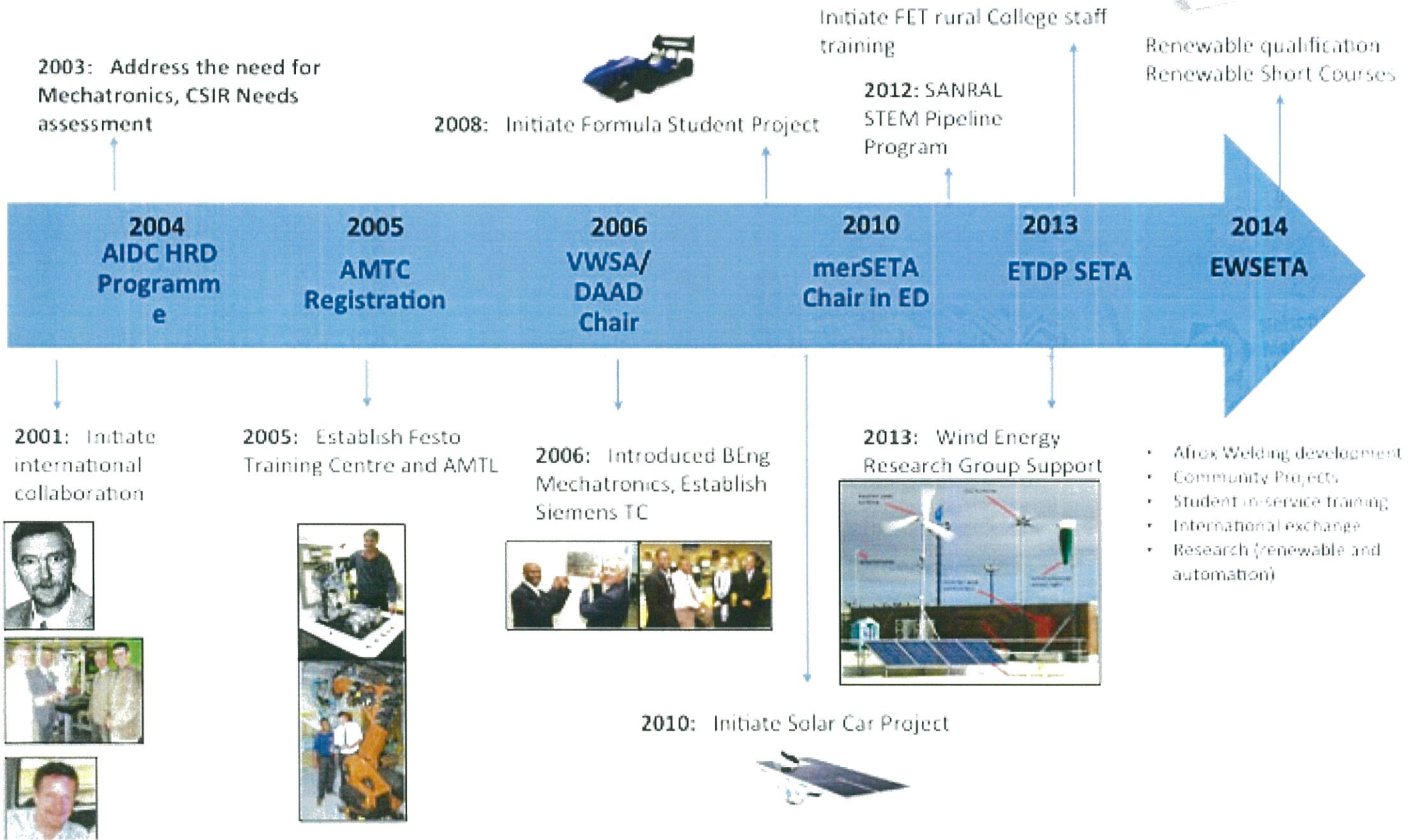
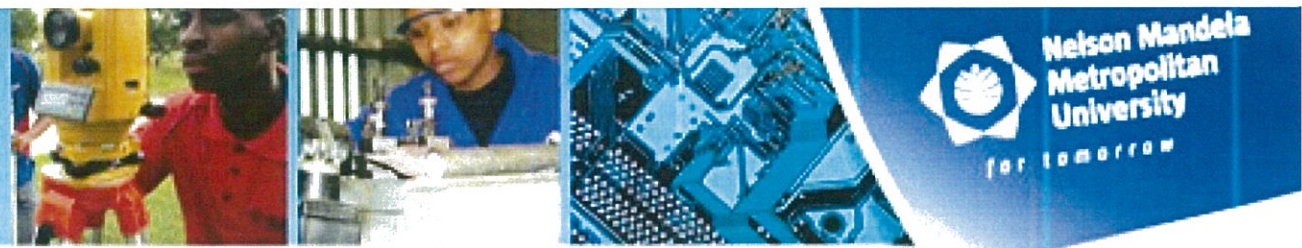
 **Nelson Mandela  
Metropolitan  
University**  
*for tomorrow*

## Advanced Mechatronic Technology Centre (AMTC)

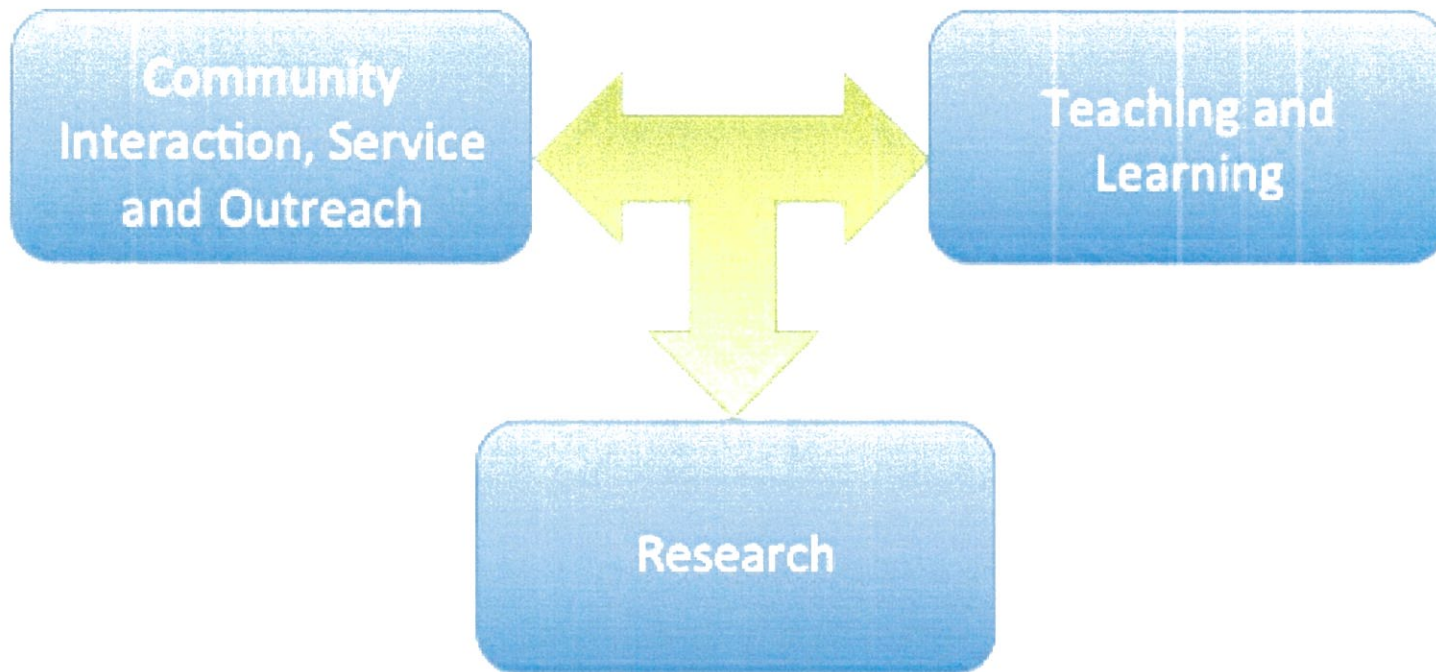
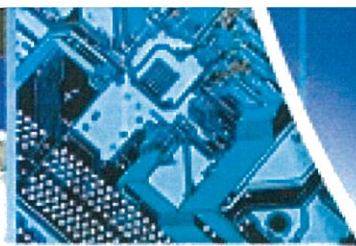
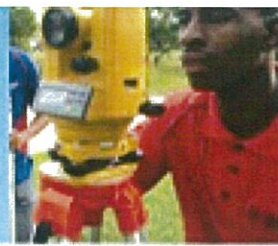
Karl du Preez, Mechanical Engineering  
[karl.dupreez@nmmu.ac.za](mailto:karl.dupreez@nmmu.ac.za)  
041-56043644



# AMTC HISTORY



# ENGAGEMENT CATAGORIES



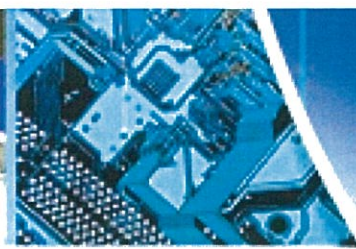
# COMMUNITY INTERACTION, SERVICE AND OUTREACH



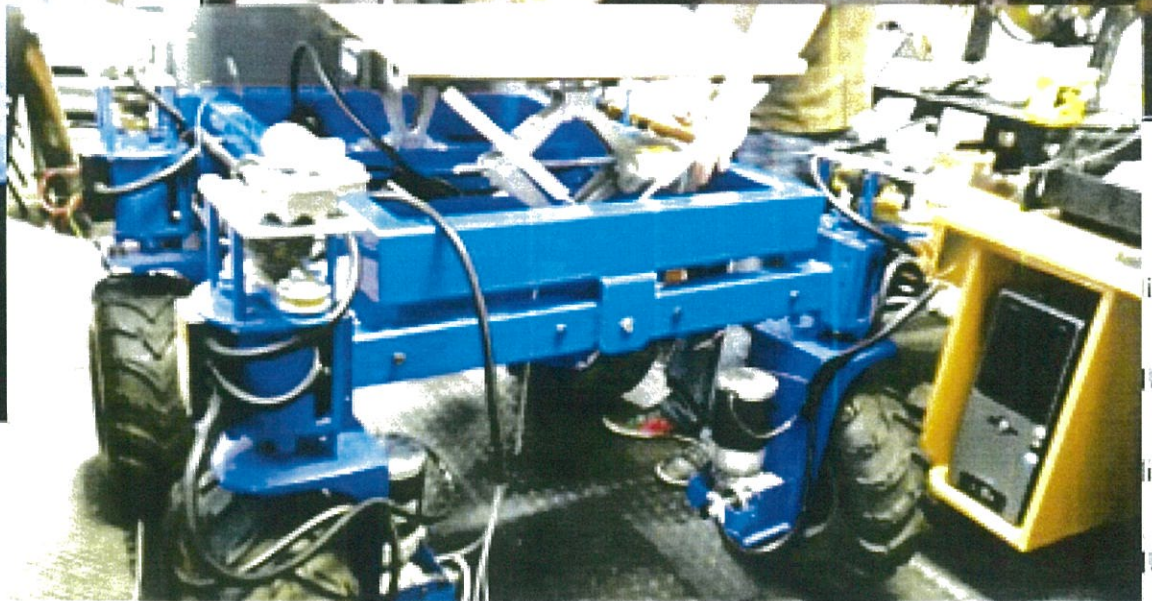
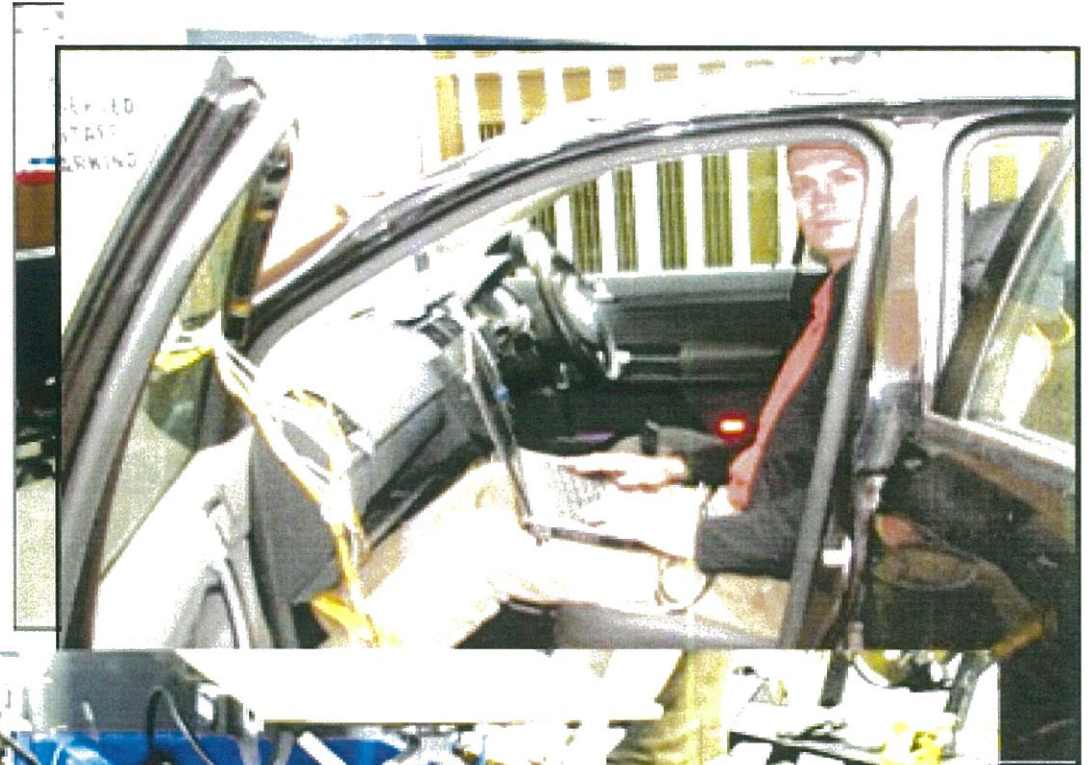
FET Colleges (rural and urban)  
Technical High Schools  
Rural Schools  
Community  
Automation Training



# TEACHING AND LEARNING

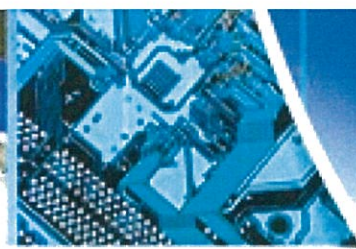


- In-service Training (S1 and S2)
- Final year Design Projects
- M&D support
- Industry related solutions
- Woman in Engineering (wela)
- Staff and Student International Exchange

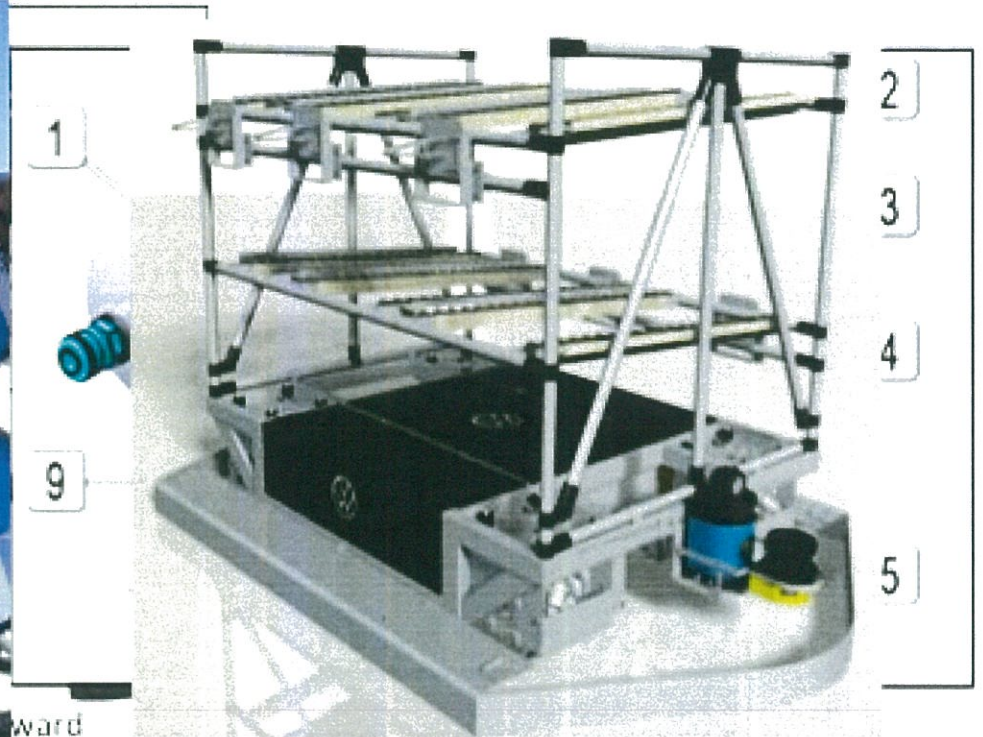


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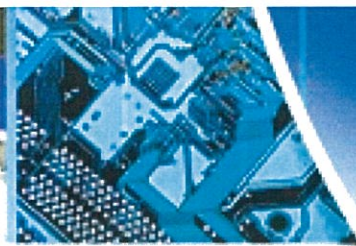
# AMTC OUTPUTS: RESEARCH



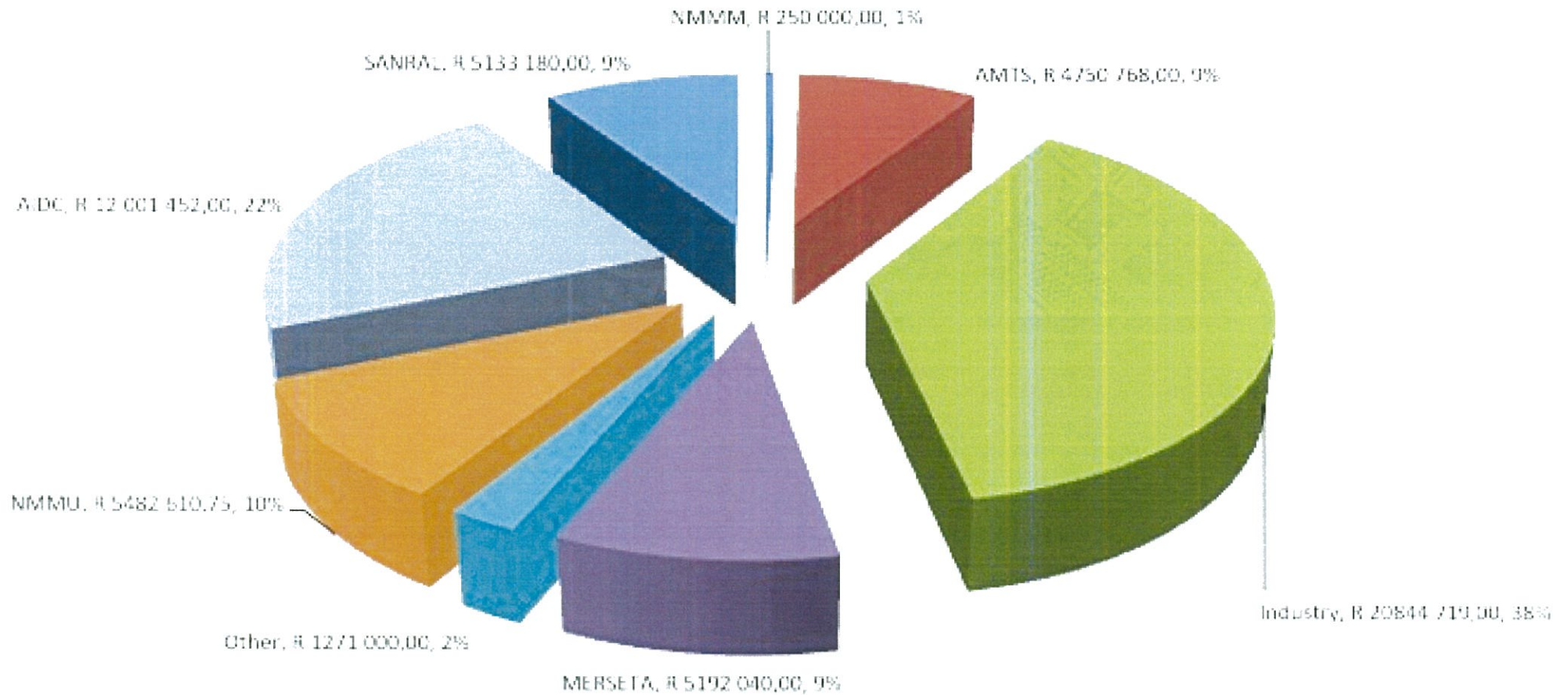
	2007	2008	2009	2010	2011	2012	2013	Totals
Conference Papers and Publications	5	3	1	7	5		5	26
MTech Dissertations	2	3	2	1	7	7	3	25
PhD Dissertations					2			1
<b>Totals</b>	<b>7</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>14</b>	<b>7</b>	<b>8</b>	<b>52</b>



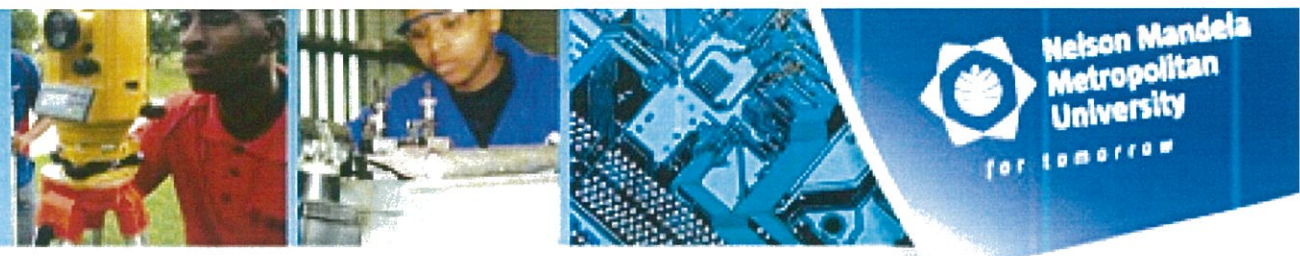
# ENGAGEMENT OUTPUTS AND IMPACT



## Match Funding Leveraged 2004 -2013



# ENGAGEMENT



## Improvement of quality of life

- **Student Internship Programme**
- The AMTC supports **community projects** (UCL, Somerset East Winter School and AECDP Winter School)
- **Student development programmes** (Cyber Junkyard, Solar vehicle design, wela)
- **Industry development** (Automation training)
- Supports all **Open Day activities** of the NMMU with displays of all their projects and actively **promotes engineering as a career** at a various number of High Schools through **presentations, laboratory tours and High School competitions.**



Sine Boqwana



Ikho Bambiso



Akhona Wini



John Fernandes

## Application of relevant knowledge

- Technical Educators and FET College **staff training** (PLC programming, Pneumatics, Hydraulics and Autocad)
- Junior Cyber Junkyard **Competition** for Technical High School and FET Colleges (artifact; Water pumping automated system)
- Student design projects – **Artifacts**; Solar Vehicle Projects, Pneumatic Driven Automated Vehicle.
- Student **internship placement** at Automotive Supplier Companies



Maphitsi Colwana

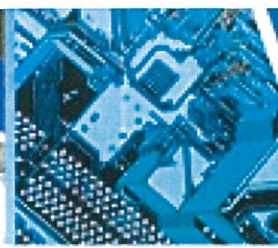


Hiten Palmer





# BENEFICIARIES, TARGET GROUPS?



## 1. Engineering Students

- a. In-service training opportunities (P1 and P2)
- b. Vac work for BEng students
- c. Final year design support for BEng students
- d. Research support to M and D students
- e. International exchange
- f. Employment readiness
- g. Female student support

## 2. Industry

- a. Collaborative projects
- b. Prototype development
- c. R&D capacity
- d. Project collaboration (media exposure)

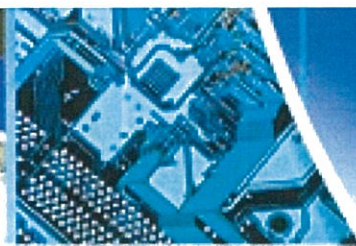
## 3. Disadvantaged communities

- a. Engineering winter schools for PDI students
- b. Engineering awareness support for rural schools
- c. Bursaries for PDI

## 4. NMMU Staff Members

- a. Research support (funding and infrastructure)
- b. 3<sup>rd</sup> stream income opportunities (SLP and contract development)
- c. International exchange
- d. Technical and HR support

# PARTNERS/ STAKEHOLDERS



## External (signed MOUs)

### 1. VWSA

- a. Project id and implementation
- b. VWSA/DAAD Chair

### 2. DAAD

- a. VWSA/DAAD Chair
- b. International Exchange

### 3. AIDC

- a. HR development
- b. Engineering Project support
- c. PDI Winter School

### 4. merSETA

- a. Technical High School Development
- b. FET College Development
- c. WELA
- d. New Technology

### 5. ETD P SETA

- a. Rural FET College WIL support

### 7. AFROX

- a. Technical High School lab development

### 8. EWSETA

- a. RE Qualification development
- b. RE SLP development

### 9. University of Stellenbosch

- a. RE SLP Development

### 10. Energy Training Foundation (ENTF)

- a. Accreditation and offering of REP

### 11. Universities of Ostfalia and Ruitlingen

- a. Staff and Student Exchange
- b. Research projects

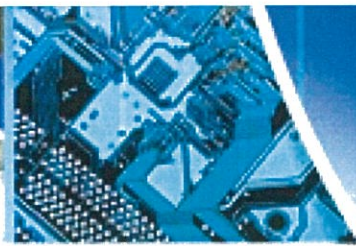
### 12. SIEMENS

- a. Automation Training

### 13. Afrox

- a. Technical High School lab development

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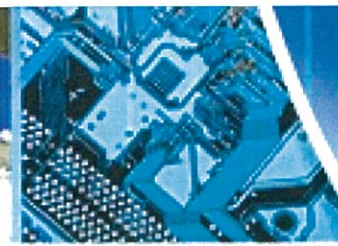
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# MAJOR CHALLENGES/ THREATS



## 1. Human resource appointments for AMTC

- Contract Staff – administrative and technical
- Budget allocation 33%
- NMMU Technical support for under and post grad students

## 2. Policies and Procedures

- Procurement process (petty cash not allowed)
- MOU legal contract process

## 3. Student Projects

- Availability of PDI Engineering students (post and under grad)
- Ability to attract students (industry salary competition)
- Securing funding on an annual basis

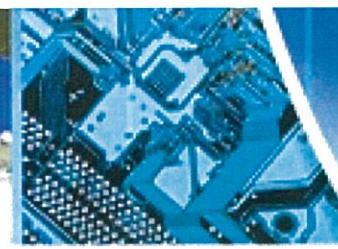
## 4. Schools and Colleges

- Availability of lecturing staff from High Schools and Colleges
- High School Infrastructure
- High School educator qualifications – retirement age

## 5. Siemens Training Centre

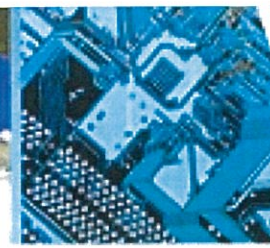
- Technical support staff

# BENEFITS OF ENGAGEMENT



1. Enrich our institution's research, teaching and learning - Projects defined and researched in **partnership** can result in **greater impact and relevance**
2. Strengthen and **enrich NMMU's brand and identity** and increase public appreciation and support for higher education and for research
3. **Demonstrate accountability** in a climate of increasing scrutiny
4. **Motivating and developing staff and students** - many believe they've a duty to explain their work and its social and ethical implications whilst the act of engaging can develop transferable skills (e.g. leadership, communication, listening, partnership working and project management).
5. **Enriching the student experience**
6. Help **maximise knowledge flows** and learning between universities and society
7. Contribute to social justice and corporate responsibility, **helping people to make a difference**
8. **Stimulate creativity and innovation**

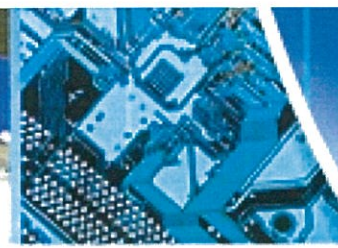
## LESSONS LEARNT



1. Emerge from the Ashes
  - “the problem is”
2. Involve qualified and passionate staff
  - Treat staff as individuals and manage their strengths
3. Pool resources (collaboration) - **Creatively find and use resources**
4. Keep developing and improving opportunities
5. Build Strong Goals, KPIs and Assessment structures – build a strategy around needs.
6. Engagement must be in the Universities corporate plan.
7. Sustainable partnership relationships - long-term results will be more achievable. Success of partnerships are built on interpersonal relationships.
8. Involve key partners.
9. Be prepared to take calculated risks!

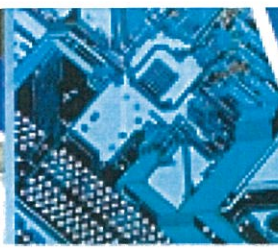
**“Funding is sometimes easy to find, spending it is not so easy!” - Karl and Theo**

## Institutional Level Support



1. Keep engagement in corporate plan!
2. Human Resource allocation for engagement units (documented track record)
  - Full-time technical and administrative staff (units do not qualify for staff allocation on format budget procedure)
3. Space allocation for expansion
  - New Renewable Energy Qualification
  - New Mechatronic Higher Certificate
  - New Marine Engineering Qualification
4. Entities to offer qualifications?
  - Financial Model

Thank you!



Employees most committed to their organizations  
put in **57% more effort** on the job and  
are **87% less likely to resign** than employees who  
consider themselves disengaged.

The keys to corporate responsibility employee engagement, PricewaterhouseCoopers (PWC)  
[www.pwc.com/en\\_US/us/about-us/.../pwc-employee-engagement.pdf](http://www.pwc.com/en_US/us/about-us/.../pwc-employee-engagement.pdf)