

## Welcome



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## What is an Eco-Car?



Shell  
**Eco-marathon®**

The  Shell Eco-Marathon is a unique competition that challenges students to design, build and drive the most energy-efficient car.

At the current events around the world (Americas, Europe, Asia & now South Africa), hundreds of team compete to travel the furthest distance on an *equivalent 1 litre of fuel*.

The competition is split into two classes. The **Prototype** class focuses on maximum efficiency, while passenger comfort takes a back seat. The **UrbanConcept** class encourages more practical designs.



## Timeline

- 2011-2012 NMMU Solar Car
- 2013 Feb Shell Eco-Marathon concept
- 2013 NMMU Solar Car **MISSION:  
ABORTED**
- 2014 Feb NMMU Eco-Car start
- 2015 NMMU Eco-Car 1.0
- 2016 **1** NMMU Eco-Car 2.0
- 2017 NMMU Eco-Car 3.0





**2015 Shell Eco-Marathon: South Africa**

**Zwartkops Raceway**





## 2016 Shell Eco-Marathon: South Africa



## Zwartkops Raceway





## Engagement Activities

## Shell Eco-Marathon: Africa





## Engagement Activities

## Schools, Industry & Governmental visits

- over 200 companies
- thousands of:
  - local, national & international
  - School Learners
  - Industry personnel
    - *multi-sectored*
    - *multi-levelled*
  - Academic personnel
    - local & international institutions
  - Governmental personnel
    - National Ministers
    - Agency representatives
    - International representatives
      - *Ambassadors*
        - *German, French, Nigerian*
- many:





## Engagement Activities

Expo's



- VW Factory Demo Day
- SA Automotive Week
- Michelin Annual Dealers Conference
- NMB Science & Technology Week
- SAIEE Conference
- SAEE Conference
- Petrolheads Paradise Expo
- VWSA ThinkBlue Expo
- Green Revolution Conference
- Johannesburg International Motor Show
- World of Wheels Motor Fair
- Working World Exhibition
- Knysna Motor Show
- IWMSA Cocktail Evening
- Altair ATCx Conference
- Altair International ATC: Europe





## Engagement Activities

## ROI: Media Outreach & Sponsorship



Die span studente en dosente spog met hul trofee en wenmotor. Van links is Amish Lalla, Jon-Ross Jacobs, Martin Badenhorst, Mervin Knoesen, Clive Hands, Charl Rossouw, Christopher Korte, Brett Steyn en Takudzwanashe Vudjizana.

### NMMU maak Afrika se beste eko-motor

'n Span studente van Port Elizabeth het 'n voertuig ontwerp wat so min brandstof benodig dat dit as Afrika se beste in dié klas bekroon is.

Die eko-motor, wat ontwerp is deur megatronika- en ingenieur-studente van die Nelson Mandela-Universiteit (NMMU), is as die wenner in die brandstofkategorie in Shell se Eko-marathon vir Afrika aangewys.

Die marathon het verlede week deelnemers van oor Afrika heen verenig by die Zwartkops-renbaan in Pretoria waar gekyk is watter motor die verste kon reis op een liter brandstof.

Die NMMU-span het gewen nadat sy motor 'n afstand van 127,86 kilometer afgelê het.

Dit is meer as dubbeld die afstand van sy naaste mededinger, 'n Nigeriese span.

Met dié afstand het die span ook 'n rekord vir die eko-marathon in Suid-Afrika opgestel en 'n



**Dié eko-motor, wat deur studente van die Nelson Mandela-Universiteit (NMMU) ontwerp is, is aangewys as die motor met die mees ekonomiese brandstofverbruik in Afrika. Die NMMU-span het met die laouere weggestap in die Afrika-ronde van die Shell-eko-marathon.**

plek verdien in die Europese ronde van Shell se kompetisie volgendes jaar. – Odette Parfitt

conservative estimate:

**R2,5 million AVE\***

*\*based on NMMU Marketing calcs & on known outputs only*

- broadcast, print & online

Altair software:

**R75,000 per annum to NMMU**

- worldclass engineering analysis software suite

Martin Badenhorst to present research at Altair Technical Conference: Europe

18 April 2017 (0 Comments)

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The presentation by Martin Badenhorst (Grad. SAIMEchE) on his research into the **Design, Optimization and Manufacture of a Carbon Composite Wheel** for the NMMU Eco-Car has been accepted for presentation in the **2017 Altair Technical Conference: Europe**, in the main Technical Track aspect of the Conference – this is to be held from June 26th - 28th in Frankenthal, Germany.

This is massively prestigious and an accomplishment for the NMMU and the mechanical engineering faculty, as it is one of the major global engineering Technical Conferences.

He will be presenting in the company of major players from Airbus, Daimler, Porsche, Boeing, Schneider Electric, Israel Aerospace Industry, Fraunhofer, NAFEMS, Jaguar, among very many others over the 3-day event.

Altair currently sponsor the mechanical engineering faculty & the NMMU with their advanced analysis suite of products, and are a direct sponsor of the NMMU Eco-Car. Altair is currently the engineering analysis 'weapon' of choice for all top OEMs globally and is utilized by over 5000 companies worldwide including Airbus, Boeing, Daimler and several F1 teams (like Ferrari). Present at this Conference are all the top players in the Automotive, Aerospace, Life/Earth Sciences, Consumer Goods, Energy & Heavy Equipment sectors including very many governmental research agencies.

Congratulations to Martin and the best of luck for the Conference!

### Bay team wins eco-vehicle challenge

Guy Rogers  
rogersg@timesmedia.co.za

NMMU has rocketed to victory in the Shell Eco-Marathon Africa challenge to design, build and drive the most energy-efficient cars.

The NMMU eco-car team of six engineering students and lecturer Clive Hands took their little torpedoshaped car with its 250ml tank to a record-breaking 127.86km/L.

"With that efficiency, an average sedan on a 70l tank could drive from Cape Town to Cairo plus a further 1750km," elated team leader Martin Badenhorst said yesterday.

Achieved at average speeds of between 27 and 32km/h in seven runs, their new record more than doubles the winning 58km/L that won the event last year after the NMMU team had to pull out because of clutch problems.

Built for optimum aerodynamics, strength and lightness, the NMMU eco-car uses sewing-machine oil for its low viscosity and sports a high-

density polystyrene shell and a scooter engine. The eco-marathon was run at Zwartkops Raceway in Pretoria at the weekend with electric, battery, hydrogen and standard petrol categories.

Badenhorst said there had been an early problem as the car's pressure system had started to overheat and melt their plastic Coke-bottle fuel



**GREEN MACHINE:** The NMMU Eco-Car has been declared the most energy efficient vehicle in its category in Africa

pump, but this had been rectified by cutting vents in part of the vehicle.

Before each vehicle set off for the final runs, a Shell team brought in from Europe measured the precise volume of fuel in the tanks of the competitors, from South Africa and Nigeria.

Each run was over four laps and after the cars were pulled into the pits, the Shell team took over again to judge consumption.

"We had to do a few unforeseen tyre changes and ended up with BMX bicycle tyres on the front – which had served us well in practice – and Michelin high-performance ones on the back," Badenhorst said.

"It's incredible to think our car has gone from a blank piece of paper to the most fuel-efficient vehicle in its category on the continent."

Badenhorst said the team had now qualified to take the car to compete in the Shell Eco-Marathon Europe in the middle of next year, so they would be trying to raise funding.

### KNYSNA-PLETT HERALD



Clever car made by students



The NMMU Eco-Car will be on display at the Knysna Motor Show on April 30. Photos: Supplied

KNYSNA NEWS - Nelson Mandela Metropolitan University's award-winning Eco-Car will be a star attraction at this year's Knysna Motor Show, sponsored by Sanlam Private Wealth, on April 30 on the Knysna High School sports field in Waterfront Drive.

"We'll have around 400 vintage, veteran, and modern cars and motorcycles on show – but the NMMU Eco-Car will be the only futuristic vehicle there," said organiser Peter Pretorius of the Garden Route Motor Club.

The ultra-light, carbon-composite car is powered by a fuel-injected, 125cc, 4-stroke engine. Designed and built by NMMU students, it qualified as the most fuel-efficient internal combustion engine vehicle in Africa when it produced a measured consumption of 127.86km/l of ordinary unleaded petrol to beat Nigeria's Team Fupre (Federal University of Petroleum Resources – 52.44km/l) and Team ABU (Agmadu Bello University – 44.94km/l) in last year's Shell Eco-Marathon: South Africa.

"In theory it could do 6 393km on a standard 50-litre tank," said Pretorius. "That's about the distance from Johannesburg to Cairo."

**Programme**  
Pretorius encouraged show-goers to attend the Knysna Motor Show's award ceremonies.

"Enjoy the motorcycle tour and engine start-up in the Motul Motorcycle Tent at 11:00, and post your vote for the Motorcycle Room Trophy for best motorcycle on show in the ballot box before 13:00 to stand a chance of winning a fantastic two-night B&B stay at the luxurious Conrad Pezula Hotel," he said. The award and lucky draw will take place in the tent at 14:00.

Floating trophies for cars will be awarded at the grandstand at 12:30.

**These include:**  
• Best Old Car, judged by Classic Car Africa's Stuart Grant and the Franschoek Motor Museum's Wayne Harley;

• Classic Car Africa's Meilleur View Voiture Trophy for the most beautiful pre-war vintage or veteran car (Prize by Prince Albert's Karoo View Cottages);

• Classic Car Africa's Concours d'Elegance Trophy for best classic car (appearance, cleanliness, and originality – prize by Protea Hotels); and

• Autoglym Car Care and Valeting Products' Style Et Lux Trophy for the best one-car group.

"And, of course, you'll also be able to meet members of the NMMU's current Eco-Car team, who are now working on reducing the weight of the vehicle, and increasing its fuel efficiency in preparation for this year's Shell Eco-Marathon," said Mr. Pretorius.

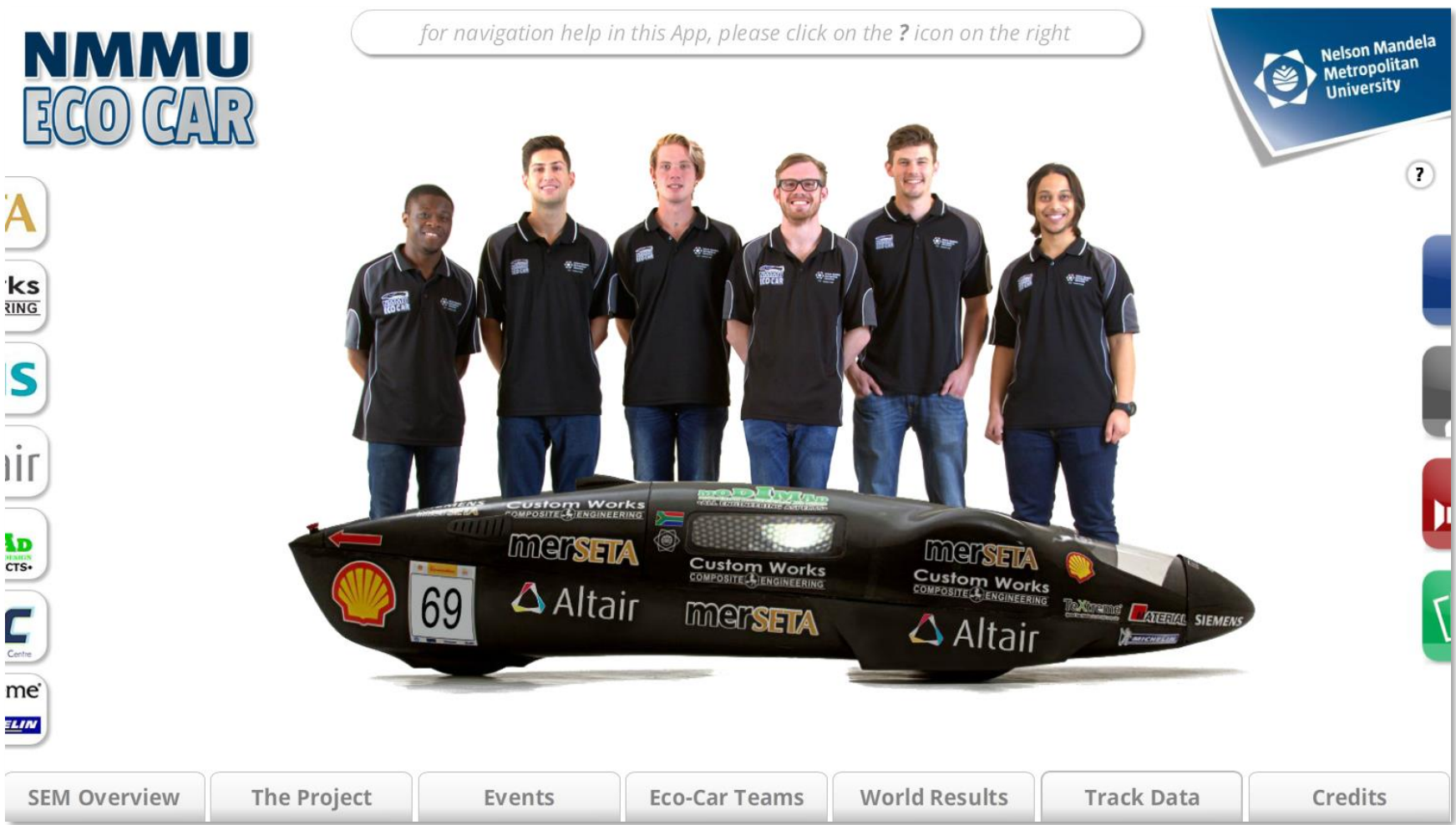
Gates open 09:30 to 16:00. Tickets: adults R40, children 12 to 18 years, R10. Food court and beer tent open all day.



## Engagement Activities

## Global outreach

### Eco-Car App



The screenshot shows the NMMU Eco-Car App interface. At the top left is the 'NMMU ECO CAR' logo. Below it is a vertical sidebar with icons for 'A', 'ks RING', 'S', 'air', 'b marts CTS', 'C Centre', 'me', and 'ELIN'. The main content area features a photo of six team members standing behind a black aerodynamic race car. The car is covered in sponsor logos including Shell, Altair, merSETA, Custom Works Composite Engineering, and Siemens. A text box above the photo reads: 'for navigation help in this App, please click on the ? icon on the right'. In the top right corner of the app, there is a Nelson Mandela Metropolitan University logo and a question mark icon. At the bottom, a navigation bar contains the following menu items: SEM Overview, The Project, Events, Eco-Car Teams, World Results, Track Data, and Credits.



Q & A

