# Motorsport: Formula for success

Last Updated: 12:01am BST 15/08/2008

**The Formula Student competition is developing the talents of the next generation of road car engineers, as Jesse Crosse reports**

Automotive engineering has always ranked highly as a steady career choice. But the car is increasingly seen as a harbinger of doom, uniquely responsible for global warming. Might another profession offer better prospects?

Brain power:, the University of Hertfordshire's hydrogen car

The Institution of Mechanical Engineers doesn't agree, which is why the Formula Student competition is now enjoying its 11th successful year, grooming automotive engineering students with "real world" skills. As Pat Symonds, Executive Director of Engineering for the Renault Formula One team and Formula Student ambassador, puts it, "Students come to us with very good academic qualities but we want a little more than that." Their task is to design and build a competitive racing car in just one year for less than £16,000, with its commercial feasibility as well as its performance scrutinised by a panel of eminent judges.

Engineers are by nature optimistic people and Formula Student is designed to exploit that to the full. At the opening of this year's event, chairman John Wood emphasised, "This is not a motor race. It's an engineering competition using the enthusiasm of young people as a driving force." This year was the biggest yet, with 88 university teams from across the globe taking part.

Designing racers may seem at odds with a low-carbon future, although as Symonds points out, "Racing cars are quite efficient." But for the first time this year, a new Formula Student category, "1A", was introduced for low-carbon vehicles using alternative fuels. There were only three entries, all British; a hydrogen-powered machine from the University of Hertfordshire, a hybrid from Oxford Brookes University and a biofuel car from Coventry. Like most of the conventional entries, they use 250cc motorcycle engines as a basis, plus an electric motor in the case of Oxford Brookes.

Hybrids are among the most complex vehicles to master, due to the marriage of an internal combustion engine and electric motor. K.C. Chaing, second year motorsport engineering student and deputy leader of the Oxford Brookes team, explains the team's pragmatic approach: "We used a KTM motocross engine because it's proven, light and reliable, and coupled it to a small brushless electric motor. There's also a 12-volt battery system and 48-volt supercapacitors for normal running." Supercapacitors are storage devices that can absorb an electrical charge and release huge bursts of power much more quickly than a battery. They are ideal for storing energy recovered from the electric motor when the car is slowing, ready to boost acceleration later. Their use in hybrid vehicles is still on the cutting edge (the Toyota Prius doesn't have them) and their inclusion is an illustration of the advanced thinking demonstrated by Formula Student competitors.



Hybrids are also notoriously complex when it comes to electronics, so the team was quick to enrol electronics engineering student Philip Pickles. "The driver has buttons on the dashboard to control the hybrid drive," he explains. "He can boost the power when coming out of corners or when someone is about to overtake." The driver has to use the system strategically, a delicate balance between the need for speed and how much electricity he has stored.

Hertfordshire's car uses a bike engine fuelled


by 600g of compressed hydrogen, created in a sustainable process that begins with rotting farm waste. That's enough fuel to complete the 26km (16.16 miles) endurance test, according to team leader Peter Treglohan. Despite a power loss when running a petrol engine on hydrogen, the team is getting 21bhp, compared to 27bhp for the standard engine, by cunningly converting the kickstart to drive an Eaton supercharger.

A hydrogen fuel-cell car has yet to appear in the competition but that should change next year, says Ralph Clague, who is completing a PhD in fuel cells at Imperial College. Clague and his colleague, Mark Cordner, are the brains behind a fuel-cell racer using technology similar to that being developed by the motor industry. But could fuel cells ever power F1 cars?

"In the drive for efficiency I have always seen fuel cells and electric motors as good for flexibility and torque, and I think they are appropriate for motorsport," says a confident Clague. Suppliers under consideration include Canadian fuel cell producer Ballard, and the car will be powered by four electric motors, one for each wheel, producing a supercar-like 590lb ft of torque.

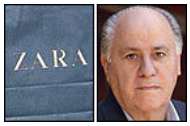
In the finale on July 13, the Hertfordshire team was victorious in Category 1A, all three producing minimal $CO_2$, and in the main Class 1 the University of Bath finished fourth, one of the highest ever placings for a British university.

The overall winner was from the University of Stuttgart, but all the cars in the paddock were impressive and in dealing with the spectre of $CO_2$ we're in good hands. As Symonds concludes, "European targets of 120g/km of $CO_2$ are extremely difficult and costly to meet. These students are the people who will go into the industry and produce those cars, and they must rise to the challenge."

**For more information go to www.formulastudent.com.**

Print | Email this story






BUSINESS
**Zara's Tsar**
Reclusive Spaniard who propelled Zara ahead of Gap.

TRAVEL
**Ways to fill the gap**
Plan your next move with our complete guide to gap years.

FEATURES
**The doorstep diet**
Four writers try out the latest home-delivery diet meals.

ARTS
**Sick jokes galore**
Comedy at Edinburgh is more dominant than ever before.