EDGE FOUNDATION

SKILLS SHORTAGES IN FORMULA 1

– An Edge special supplement

INSIDE...

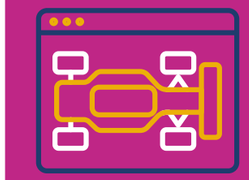
Skills Shortages in Formula 1

Teamwork, creativity, mathematical and engineering genius, with a big dose of competitive spirit - we get under the bonnet of the world of F1. What does it take to bring through the next generation of talent and keep pushing to be the best?

From raising aspirations and levelling the playing field when it comes to gender diversity in STEM careers, to meeting critical skills needs in engineering and design, Edge's Skills Shortages Bulletin F1 special supplement explores the forward-thinking initiatives that are revving things up in motorsport.

61%

of vacancies in mechanical engineering (almost two thirds) are due to skills shortages *(DfE education statistics)*

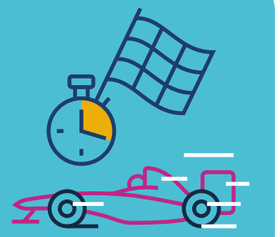


58%

of vacancies in design and development engineers are due to skills shortages *(DfE education statistics)*

54%

Over half (54%) of vacancies in electrical engineering are due to skills shortages *(DfE education statistics)*



99
% of students

Of every group of school pupils taking part in a trailblazing STEMx programme (a Oracle Red Bull Racing and Milton Keynes College partnership), **close to 100%** reported enjoying and benefiting from the experience *(Milton Keynes Academy)*

41
% worse than tennis

How does motorsport rank against other sports in terms of driving change on EDI? **41% worse than tennis** *(Inside Track: Exploring the gender gap in motorsport (More Than Equal))*

To have a 50/50 gender split on the F1 grid, female participation would need to grow to 84% of the entire global racing population *(Inside Track: Exploring the gender gap in motorsport (More Than Equal))*

84%

Last year, 3,000 university students and 113 teams descended on Silverstone for IMechE's Formula Student competition, with Edith Cowan University, Australia taking first place, scoring 915 points out of a possible 1,000.

915
points

The best companies for gender diversity on executive teams were 25% more likely to have above-average profitability than the worst, rising to 36% for those prioritising ethnic and cultural diversity *(Mckinsey & Co)*

36
% above average

Motorsport Valley

Within the tranquil Oxfordshire and West Midlands countryside, seven of the ten Formula 1 teams have set up headquarters. From McLaren's state-of -the-art wind tunnel in in Woking to Aston Martin's £200m factory near Silverstone, it's just 80 minutes by road (faster in an F1 car). Nicknamed 'Motorsport Valley', the flat airfields and presence of many aerospace engineers in the area after the Second World War made it a prime area for racing teams.

STEMx gets off the starting grid

Milton Keynes College has joined forces with six-time F1 World Champions Oracle Red Bull Racing to supercharge the talent pipeline in science, technology, engineering, and mathematics (STEM). Their collaborative initiative, STEMx, is not just an educational programme – it's a long-term strategy designed to inspire young minds, bridge the skills gap, and create direct career pathways into fast-paced, high-performing sectors.

Milton Keynes College, which serves approximately 4,000 students, is ideally located to supply the skilled workforce that powers the six Formula One teams in Motorsport Valley, the area in the Thames Valley and West Midlands where so much of the sector is based.

CEO and Principal of Milton Keynes College Group, Sally Alexander, spotted an aspiration gap. Whilst some students embraced the idea of a life in the fast lane early into life at the College (like alumnus Greg Auchterlonie – now Head of Brand Design at Red Bull Technology), many arrived with preconceived notions about STEM careers being confined to less lime-lit opportunities. They struggled to see themselves working in bold, shiny motorsport HQs. Sally made the decision to reach out to a Formula 1 team to see if the team and College could work together. She said, "If we want to effect change with young people, we are much more powerful in partnership with employers."

At the same time, Oracle Red Bull Racing were thinking about how to get talent pipelines moving and to diversify its workforce. The team already has an unrivalled reputation for nurturing the next generation of F1 drivers, so It seemed like a natural next step to want to get ahead with their talent off-track to optimise the chance of success.

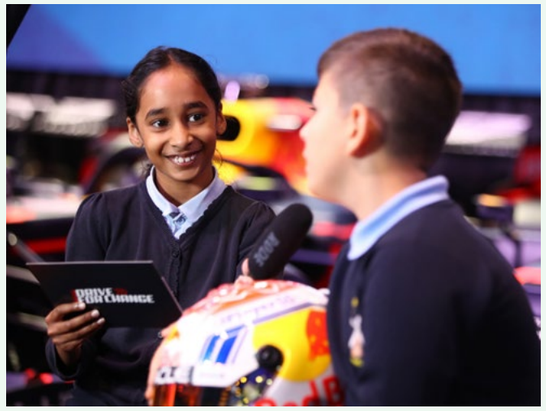
That sparked conversations about a longer-term approach – getting into schools early, to enhance young people's appreciation of technical skills in digital, mechanics, engineering, media, and E-Sports sounded good. Where better to develop core skills like teamwork, inclusion, communication, problem-solving, resilience and creativity than through the engaging programme now known as STEMx?

Milton Keynes College provided the expertise to map the Key Stage 2 (Primary) and Key Stage 3 (Secondary) curriculum with F1-inspired activities through the STEMx Learning Programme. The experience days cover a range of key subjects in motor racing including the science of speed, maths and strategy in racing, economics, sponsorship, ethics and environmental considerations. The online portal can also be accessed any time, and features personalities like Hannah Schmitz, Oracle Red Bull Racing's Principal Strategy Engineer, on making split-second, data-driven decisions during a race, Team Principal Christian Horner and the drivers.

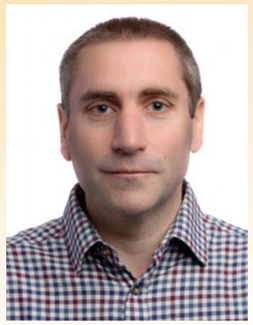
After getting off the starting line in January 2025, the STEMx team are visiting schools in the area, delivering unique experience days for children aged 9-14, including pit stop challenges, livery design, media training, coding and, of course, racing.

Sangeeta Shergill, Assistant Principal Milton Keynes Academy said, "We wanted to provide our disadvantaged students with firsthand exposure to the career opportunities available, especially with Oracle Red Bull Racing being a local presence. With Year 9 students making crucial option choices, this was an ideal time to guide them toward their future aspirations. The impact has been remarkable. Even students who typically struggle with engagement have been incredibly positive. We've gathered feedback from every group, and almost 100% of them have reported enjoying and benefiting from the experience."

Milton Keynes College and Oracle Red Bull Racing have big plans for STEMx. The goal is to spark aspiration and build skills, with practical pathways through the College to realise those ambitions in the local labour market. As the STEMx team hit the road, the model poses important questions for employers, educators and policymakers: how can we incentivise more of these partnerships?



Engineering the Future: Owen Carless on Red Bull's STEMx Initiative



We sat down with Owen Carless, Head of Mechanical Simulation at Red Bull Ford Powertrains, to talk about how he brings his F1 expertise to Oracle Red Bull Racing and Milton Keynes College's STEMx.

You've said previously that there's no such thing as an average day in your role, but what does a head of Mechanical Simulation actually do?

Good question – I've always been a simulation specialist. We do computer-based modelling and predictions of how components, sub-assemblies or the whole car will perform when it comes to racing. The idea is we can do faster, more intelligent iterations of designs and get a better performant by doing the simulations up front. And it's a subject that continuously evolves. The sort of things we do now didn't even exist as technology when I started doing my job almost 20 years ago. It's quite an exciting place to work in that regard. Our major business focus is the 2026 Project, which Red Bull have been working on feverishly for the last three and a half years. We're developing our own engines and hybrid systems for the racing cars for next year.

You've also said that you had a clear idea you wanted to work in automotive engineering but chose to study Art instead of Design and Technology at GSCE. Do you think that pathway has contributed to success in your current role?

Yes, a little bit. I mean, I wouldn't want to create the impression that I was Banksy or Picasso or something, my art is bang average, but engineering is quite a creative subject. Inherent in what we do is creating new solutions, thinking around problems, coming up with new ways forward. I think it's quite a useful skill to have, something with a bit more panache compared to working a problem from start to end in a uniform, methodical way. Being able to express yourself by drawing and writing things is really powerful.

After studying automotive engineering at university, you worked at Ricardo in engine development. Is that a typical route into F1?

I don't think there's anything like a typical route. I was very keen to work in something that I enjoyed. Fundamentally, I think I like working with people, so working with lots of different types of people and solving problems at Ricardo was good. Now, it's a little more focused. In the time I've worked at Red Bull (since 2008), we've had a big push to take on a lot more placement students. They maybe come back onto the Engineering Academy or as direct hires. We have people come through as apprentices and I guess STEMx is now part of that as well.

What would you say are the essential skills for a career in F1, given the kind of diversity of roles available?

I mean, this is a really hard question because Red Bull have got upwards of a thousand people, if not more, working in one team. And actually, we do almost everything on site. Clearly, there's the usual cliches about teamwork and ability to work in a team but successful employees here tend to be really competitive and you need that sort of drive and determination. One thing I think Red Bull do particularly well is the speed at which the business works. So it's not just the speed of the racing cars, but it's how quickly we iterate our designs. We don't dwell on failures. We accept that if you fire off enough ideas, not all are going to hit the target. You can afford to go off and innovate in different areas, because you're going really quickly, and if it doesn't work out, you can come back quickly as well.

What about the skills needed in the motorsport industry more widely: where do you see the most technical skills deficits currently?

I don't know that there's any one overarching thing where we look at it and go – this is what's holding us back. We always want people who are sharp mathematically. Maths is the language of engineering, so being able to transform what we're thinking of into mathematics and understand and quantify it is really, really important. That's not to say that you need to be an absolute wizard and come up with brand new ways of solving matrices or whatever, but you need to have a good foundation.

Would you say digital skills are a high priority?

I think more or less essential. Particularly in my area, data handling and how we take in information and process it. Being able to empathise with, okay, I've measured something, is that a realistic number? Does that seem a big number or a small number? How do I then process that in an intelligent way? How do I plot that in a way that makes sense? And perhaps most importantly, I've had an idea, how do I then communicate that? How do I understand the message behind something? How do I share that? There's quite a bit of stuff under the heading of digital skills. That's not saying that everybody is using a computer like it's an extension of their body, but a lot of the detailed engineering is all computer based and driven.

Why did Red Bull Racing decide to work with Milton Keynes College to launch STEMx and what do you hope to gain from the programme?

We want to change the narrative around STEM careers. You referenced the external view of Formula One earlier and the value it brings, because it's an exciting, well publicised, globally renowned sport. You see a team of highly trained mechanics, a couple of drivers and some people on the pit wall. That's the external image, but there's a lot more to the team than that. There's maybe a hundred people track-side. There's ten times that working back in the factory. What we're trying to do is open the door a little bit, show that what happens behind the scenes is, I think, more interesting. This is what goes on. This is what the careers are like. And we've seen some great traction already with Milton Keynes College. And working with an educational provider has helped us understand more about how engineering is presented, digested and understood at schools as well.

We also want to break down some of the perceptions and stigmas. One of the things that has always stuck in my mind is people saying, 'That's not a career for me' or even worse, 'for people like me'. And I think, 'What do you mean by people like you? You're an aspiring engineer, you're a young engineer, you're a school pupil. You can do it! There's no reason not to!' That's one thing that really, really resonated with me. We're trying to break down any ideas of what sort of person works in Formula One. Because actually, anybody can work in Formula One. Okay, it's a competitive environment. You have to work hard. You have to be switched on, but there's nothing that fundamentally stops you.

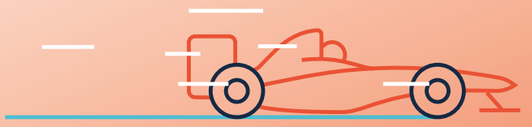
What lessons have you learned as an employer about engaging with schools, colleges and young people that might be useful for businesses looking to do something similar?

To get to this point, the STEMx project has been two or three years from the first conversations to actually having a van with 'Red Bull STEMx' on the side, going to schools, having teachers over the moon, children beside themselves with excitement – that's taken a long period of time. You get out what you put in. Get actual staff in front of people. Don't dumb it down. Make sure that we are representing the company correctly, and we're talking to the right people, and we're saying the right things.

There's a syllabus that schools can follow with different modules and we've helped link that to what happens in Formula One. It's not just engineering and mathematics. There's lots of other things in terms of media and history and marketing and everything else. That's really exciting. I've enjoyed helping the Milton Keynes College team put that together from my side.

And finally, of course, what advice would you give to young people looking to begin a career in F1?

It's really hard to give a generic answer. There's thousands of people working in Grand Prix racing, and they've all got different experience, and they do different things. Fundamentally, some kind of experience in the STEM subjects or engineering is really helpful. It doesn't matter if you don't work in Formula One straight away, the door is never closed. Don't be put off by rejections because you'll get plenty. Researching what the role is about is really helpful. If you're going to apply for a job, understand what a person doing that job does. Be competitive. Drive yourself on.



Mission diversity

In 2021, seven-time F1 world champion Lewis Hamilton launched Mission 44, a charitable foundation which works to build a fairer, more inclusive future for young people around the world and helps them to overcome social injustice and succeed. Hamilton has said that his first-hand experience was of 'an education system that worked against him' and, with this in mind, we want to look at diversity in a little more detail. Insight into the evolution of diversity initiatives within motorsport and the lessons they yield offers valuable guidance for other sectors advancing their own diversification efforts.

Diversity in the workplace is fundamentally rooted in the principle of equity, ensuring that everyone has fair access to opportunities and resources. A wealth of evidence underscores the tangible benefits of diversity. **McKinsey** have demonstrated that the best companies for gender diversity on executive teams were 25% more likely to have above-average profitability than the worst, rising to 36% for those prioritising ethnic and cultural diversity. Providing opportunities for a broader range of people can help address skills shortages, inform new innovations and challenge preconceived notions, **Enterprise Research Centre** evidence has shown.

Nonetheless, barriers in education and the workplace persist. The **House of Commons Science and Technology Select Committee** in 2023 found that girls were less inclined to pursue STEM subjects, and ethnic and socio-economic factors influenced participation. For instance, Black Caribbean students were underrepresented at both GCSE and A Level.

In motorsport, there are further problems. It has a reputation as an expensive, elite, and therefore exclusionary sport. We spoke to two of Mission 44's partners, MotorsportUK, and **Causeway Education**, to hear how they're aiming to tackle these challenges and gather their reflections.

Race for Diversity, launched by MotorsportUK in January 2024, has helped 20 schools in London, Leeds, Manchester, and Birmingham, host hands-on STEM learning activities in the language of motorsport and how these activities could function in the workplace. This might include a school visiting a local motorsport venue, with a chance to go racing in go-karts, for example, while other activities with partners might include Lego challenges, a pit stop challenge, or remote-control cars. By providing these activities and a broader community and network, the initiative intends to cultivate opportunities, particularly for those from underrepresented backgrounds, and to challenge perceptions around barriers to accessing the sport, like wealth, with the ambition of diversifying the F1 paddock. While young people are already studying STEM subjects, they are not always aware their skills can translate into motorsport careers, making it essential to showcase these pathways so they can imagine themselves in the industry. As MotorsportUK told us, 'It's not necessarily a skills shortage, it's an opportunity shortage'.

Engaging students at critical decision-making stages can help show that GCSE subjects like combined science or engineering can lead to exciting pathways. To measure impact, surveys are used to assess how many students have chosen STEM subjects as a direct result of the programme's interventions. Challenges remain with engaging schools. Aligning with recent Engineering UK findings discussed earlier in this bulletin, schools, especially in areas of high deprivation, often lack the staffing and resources for extracurricular STEM activities or student trips – a stark reminder that addressing skills shortages in one area may mean addressing shortages in another. MotorsportUK have recently begun issuing a website badge and certificate participating schools as 'Race for Diversity' schools to strengthen their position in reaching out to other funders and education budgets. And, to broaden their reach, they have launched an **Inclusion Hub** for those aged 14-24 to support them in navigating opportunities within the motorsport industry.

The most well-known roles in motorsport are the televised trackside roles: drivers, principals and mechanics. But their work is dependent on design, manufacturing and testing work based at team factories. As in many professions – such as law, where barristers dominate the public imagination – the prominence of one element of the field can obscure knowledge about such opportunities for a diverse pool of applicants. Causeway looked to develop a resource that outlined the different STEM roles in motorsport across the entire process of developing a car from design to race day.

Young people told Causeway that, while existing resources emphasised skills development in the long term, they wanted clear signposting that could inform immediate decisions including the choice of A Levels, apprenticeships, and universities. This proved tricky to accommodate: mapping choices and destinations proved unwieldy and unhelpful given the many possible pathways. Instead, assurances needed to be made about the range of valid pathways to enter the sector.

Secondly, young people wanted salary information. As Causeway said, 'the reality is that young people, particularly from low socioeconomic backgrounds, need to know whether they're going to be well-compensated, so they can compare different routes'. A handful of employers were contacted to provide responses to research questions based on insights from their own organisations. Discussions were positive and, whilst representatives were receptive to the aims of the project, resource constraints impacted sustained dialogue in some cases. While the Causeway resource was successfully launched and is in use, there is a need for mechanisms that enable employers to prioritise such diversity initiatives.

These examples show how thoughtful, targeted initiatives can begin to break down long-standing barriers and open up new possibilities. They also remind us that real change takes time, resources and collective commitment. For others working towards similar goals in different sectors, the takeaway is clear: early engagement, clearer pathways, and strong partnerships are all crucial to making progress towards a fairer, more inclusive and constructive future.

"At Mission 44, we believe all young people - regardless of background - deserve the opportunity to pursue a career that they love. We know that representation in motorsport and STEM remains unequal, which is why we're proud to partner with organisations like Motorsport UK and Causeway Education to break down barriers and open up access to careers in STEM. Whether it's demystifying careers, showcasing potential career pathways, creating powerful peer networks for young people and providing immersive and accessible work experience opportunities, our work is about reimagining what's possible. By creating tangible opportunities and challenging systemic inequalities, we can help build a more inclusive industry."

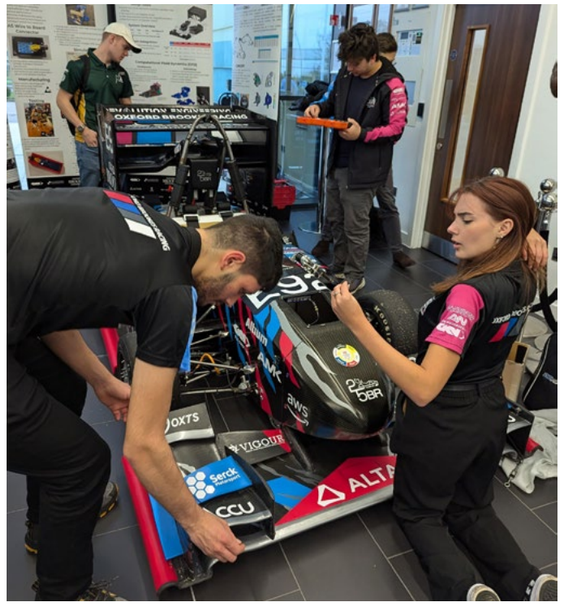
Cara Cinnamon, Chief Impact Officer at Mission 44

Formula Student: The Ultimate University Challenge

This July, Silverstone will be overrun by the brightest young engineering talent from more than 100 universities around the world as the legendary home of the British Grand Prix hosts Europe's most renowned educational motorsport competition, Formula Student.

Established in 1998 by the Institution of Mechanical Engineers (IMechE), Formula Student is more than just a race – it's a rigorous test of engineering prowess, teamwork, and business acumen. University teams design, construct and race single-seater cars, putting students' theoretical knowledge to the test through formal presentations and on-track events assessing speed, handling and reliability.

All participants, regardless of their course background, have the opportunity to demonstrate their technical, engineering, design and manufacturing skills. Competitors must secure sponsorship, manage budgets, and work cohesively as part of a team, all to a strict deadline. There's even a Business Presentation Event when students try to convince an industry panel to invest in their race car business proposal.



Whilst many higher education programmes provide a strong academic foundation in design, CAD-based modelling and simulation, the opportunities to apply these skills in real-world scenarios vary widely. Formula Student bridges this gap, offering a hands-on experience that enhances employability. Christopher Smout, Senior Marketing Executive at the IMechE said, "alumni of the competition can be found on every team on the Formula One grid and in many other motorsport series."

Many of the judges and organisers are ex-competitors, including Chief Judge Dan Jones, who is Team Leader in F1 Customer Engineering at Mercedes AMG High Performance Powertrains, and one of the leading figures in the powertrain for Mercedes AMG F1's Formula OneTM cars. So Formula Student isn't just a learning opportunity, it's a networking extravaganza, connecting students with elite employer supporters including JLR, Bentley, Babcock and AWE and high-profile engineers.

Over the past 25 years, Formula Student has supported and developed the skills of over 40,000 young engineers, opening up pathways into prominent roles in the automotive, motorsport and manufacturing sectors. Last year, 3,000 students and 113 teams descended on the Silverstone track, with Edith Cowan University scoring 915 points out of a possible 1,000 to take them to the top of the leaderboard, the same weekend that fellow Australian Oscar Piastri celebrated his first Grand Prix win.

Now that it's Go! Go! Go! for the 2025 competition season, which future industry leaders will emerge from the Formula Student ranks and who will take the coveted chequered flag?

EDGE FOUNDATION

Making Education Relevant

www.edge.co.uk