



UNIVERSITY OF BATH  
**TEAMBATH™**

*RACING ELECTRIC*



2024  
2025

Department of  
Electronic & Electrical  
Engineering



UNIVERSITY OF  
**BATH**



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# About Us

The University of Bath is one of the UK's top universities, amassing an impressive amount of awards over recent years.

Strong links with industry have led to a high proportion of students undergoing industrial placements, making Bath graduates some of the most employable in the country.

- Ranked 7th best university in the UK, and 5th for career after 15 months, by the Guardian University Guide 2025
- Ranked 8th best university in the UK in the Complete University Guide 2025
- Ranked 8th best university in the UK by The Times and The Sunday Times Good University Guide 2025
- Ranked 9th best university in the UK, in the Daily Mail University Guide 2025
- Awarded triple Gold in the Teaching Excellence Framework (TEF) 2023
- Ranked 9th in the Times Higher Education 'Table of Tables' 2022
- Ranked in the top 150 universities in the world in the QS World University Rankings 2025
- Ranked 16th in the UK in the Times Higher Education National Student Experience Survey 2023

**TOP 10** IN THE COMPLETE UNIVERSITY GUIDE 2025



THE TIMES  
THE SUNDAY TIMES  
**GOOD UNIVERSITY GUIDE 2023**  
UNIVERSITY OF THE YEAR



**TOP 10** UK UNIVERSITY  
The Guardian 2023

**SAFEST UNIVERSITY** 2023  
CITY IN ENGLAND AND WALES  
The Complete University Guide

**6<sup>th</sup>** FOR GRADUATE PROSPECTS 2023  
The Complete University Guide

**IN THE TOP 150** — 2025  
**QS** WORLD UNIVERSITY RANKINGS  
FOR EMPLOYER REPUTATION

**TEF 2023**  
Overall: **Gold**  
Student experience: **Gold**  
Student outcomes: **Gold**

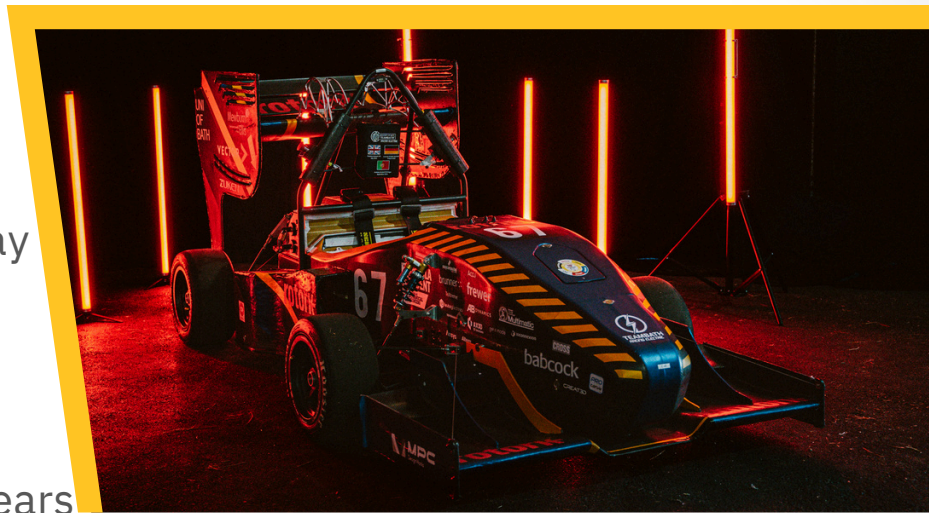
Teaching Excellence Framework



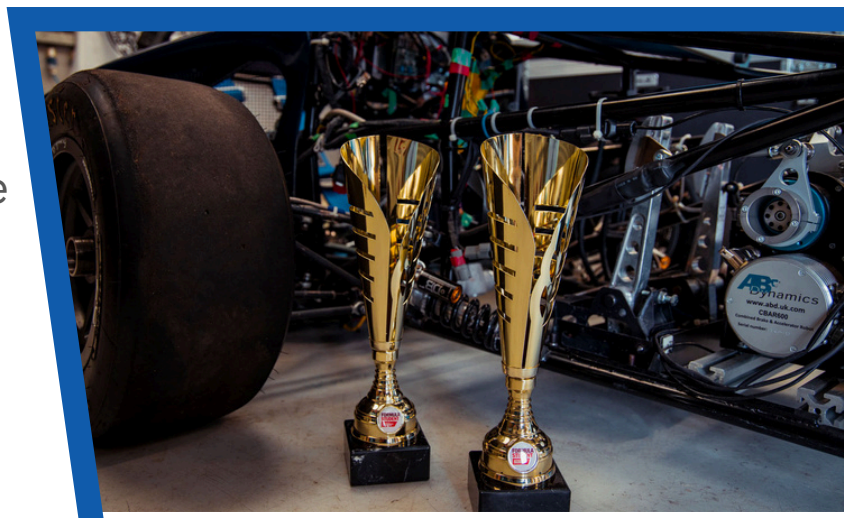
## Team Bath Racing Electric

**Team Bath Racing Electric is the University of Bath's electric Formula Student Team, based out of the Faculty of Engineering and Design. Formula Student is the world's largest student engineering competition, with over 600 universities taking part in its numerous competitions internationally.**

Each year the teams are challenged to design, manufacture, test and race a formula-style single-seater racing car. We are proud to say that we have held the title of UK's top Electric Formula Student team for most of our history. The team comprises students from all academic years studying engineering, computer science and business among other disciplines.



The core team consists of dedicated students ranging across all years of the university. They are proud to take these lead roles and work alongside our other members to deliver our car and everything else that makes us the award winning team we are.



For more information about our home competition, Formula Student UK (FSUK), please visit: [www.imeche.org/events/formula-student](http://www.imeche.org/events/formula-student)





# Our History

## 2015

- 9 members
- Initial support from university
- Proof of concept vehicle produced



## 2016

- 16 members
- Became established in the University
- Acquired own lab space
- Attended FSUK 2016



## 2017

- 40 members
- Passed all technical inspections at FSUK 2017
- Crowned Top UK Electric Formula Student Team



## 2018-2021



60 members

Finished all FSUK 2018 events

First UK team to attend FS China

Top UK Electric Formula Student Team

First UK electric team to compete in Europe

First fully designed TBRe Aerodynamics package

Official Rankings maintained from 2019 Cost & Manufacturing Event Winners

Multiple successes for AI division



## 2022

- 60 members
- Designed and competed with both a drivered and driverless vehicle
- Top UK Electric Formula Student Team and
- Top overall driverless car



## 2023

- 70 members
- First implementation of TBRe Business Operations,
- Vehicle Software and Driver Environment teams, as well as a new management structure which includes the introduction of a Programme Management role
- Ranked 3rd overall in Portugal, 4th in Spain
- Cost manufacturing win at FSUK



## 2024

- 70 members
- Debuted first ever carbon monocoque chassis
- Cost and manufacturing winners FSPT and FSUK
- Competed in every dynamic event at FSPT
- Business plan finalists FSUK & 3rd FSPT
- Overall EV class runner up at FSPT
- One of only 18 cars to compete in Endurance at FSUK





# Results

## 2019

- 1 TOP**  
UK EV team
- 1 1ST**  
UK Electric Team  
to attend Europe
- 1 WINNERS**  
Driverless  
Business  
Presentation
- 1 WINNERS**  
Driverless  
Design

## 2021

- 1 TOP**  
UK EV team
- 1 WINNER**  
Cost event
- 1 WINNER**  
Overall driverless  
car
- 1 WINNER**  
AI Simulation

## 2022

- 1 TOP**  
UK EV team
- 1 WINNER**  
Overall driverless  
car
- 6 6TH**  
Design event
- 8 8TH OVERALL**  
FS UK at Silverstone
- 3 3RD**  
Fastest EV at FS  
Italy



# Results

## 2023

- 1 WINNER**  
Cost and Manufacturing FSUK
- 3 3RD OVERALL**  
FS Portugal
- 2 2ND**  
Cost and manufacturing FS Portugal
- 4 4TH OVERALL**  
FS Spain
- 2 2ND**  
Autocross FS Spain

## 2024

- 2 2ND**  
Overall EV FSPT
- 1 WINNER**  
Cost and Manufacturing FSUK & FSPT
- 2 2ND**  
Endurance Event FSPT
- 4 FINALIST**  
Business Plan Presentation FSUK & FSPT
- 2 2ND**  
Acceleration & Skidpad FSPT



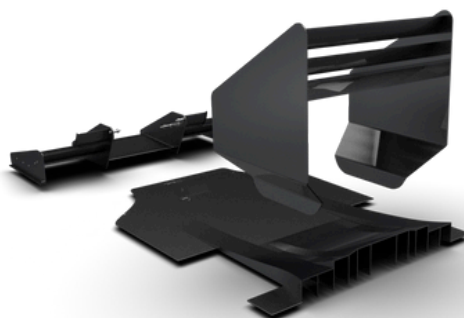
# Technical Summary of TBRe

TBRe23 successfully showed a considerable increase in predictability and reliability of the vehicle, and it currently stands as the car which has totaled the largest mileage of any TBRe prototype. Thanks to the consultancy of our sponsor MPC DesignWorks, along with the University of Bath's academic and technical support, the team has significantly improved its carbon fibre and general composites manufacturing capacity. For the 2024/25 season, the team finds itself at a very exciting turn of the vehicle's general design philosophy as we push for greater performance and competitiveness. Details on how we plan to meet our targets from a technical standpoint are provided below.



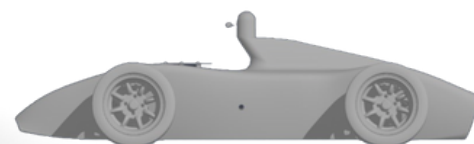
## Structures

TBRe 23's key change within the vehicle architecture was in the primary structure, where the chassis was a single-piece carbon monocoque tub. The full carbon tub embodies an efficient solution to the team's performance objectives. TBRe24 saw this change successfully reap rewards. TBRe23 also met its target of high adjustability in vehicle set-up and dynamic response primarily through the introduction of anti-roll bars paired with Multimatic corner dampers. TBRe24 evolved upon these implementations, with the new structures developed building upon the understanding of previous years to improve reliability and functionality. Overall, the secondary structures of the 2025 challenger will be a performance-orientated iteration of the suspension, steering, and brake systems of the vehicle thanks to the unparalleled amount of testing time and data acquired in 2024.



## Aerodynamics

TBRe24 was the team's third challenger to run an aerodynamic package. The experience gathered over the course of the previous seasons allowed for greater understanding of the system as a whole and was a key factor in raising the team's competitiveness. TBRe25 will build upon the aerodynamic studies conducted in the previous season, increasing the variety and complexity of vehicle scenarios in design and analysis environments. This sub-group has the most freedom in design choices, leading to the development of concepts combining various manufacturing methods and composite material elements. For the 2025 season, a new composites sub-team has been introduced to champion the research into composite manufacturing methods, looking to develop the design concepts of our aero team into reality. A key strength of the team is its manufacturing know-how and the available infrastructure of the university which allows for in-house manufacture of all aerodynamic elements.



## Autonomous Systems

The 2025 season sees the return of TBReAI, our self-driving car project. While we hope to enter the full vehicle ADS class in future years, the decision has been taken to reduce the project scope for this year, and to focus on building a robust and reliable software system for the competition-provided DDT car.

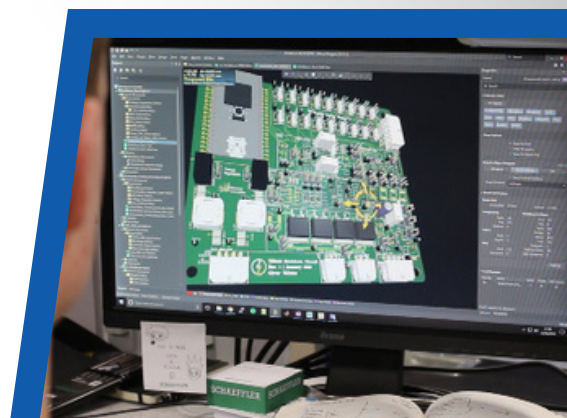
With the return of this project a lot of freedom in how we tackle technical challenges is available to us this year.

From using a mixture of LiDAR and stereoscopic cameras to detect the track boundaries to using advanced modern simulation technologies to ensure that training models can be mapped onto reality.

We aim to compete in the trackdrive, skidpad and acceleration challenges in 2025.

## Striving for Excellence on the European Stage

Team Bath Racing electric is known to race beyond the domestic Formula Student UK competition, taking part in some of the largest European events every summer. Our technical ambitions are therefore to rise to excellence on the European stage. This season again, TBRe25 is being designed with the key aim to achieve podiums (top 3 EV overall) in all competitions it attends. The team finds itself at a very exciting turn of the vehicle's general design philosophy as we push for greater performance and competitiveness. Find out how below:



## Tractive System R&D

TBRe's 2024 season marks a significant advancement in its rear-wheel drive powertrain technology, specifically through groundbreaking thermal and battery cell simulations, culminating in an average power delivery double that of previous seasons. As part of a transition to longer design cycles, we will start the development of systems for future years of TBRe. This includes kick starting R&D work for our 2025/26 high voltage battery, aiming for mass-reduction, space saving and simplicity. Additionally, we are researching in-hub motor technology and its respective control algorithms, which promise an impressive upgrade to the TBRe vehicle architecture.



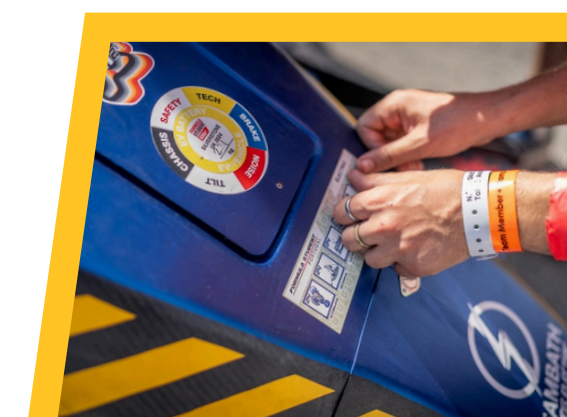
## Motor Control

With attention to a host of control tools, the team aims to unlock the full potential of its electric powertrain to deliver even more sustained power. Through the thorough characterisation of the motor, we can design and implement advanced, adaptive control to customise performance for Formula Student competitions. Techniques such as regenerative braking and advanced traction control will ensure that the system is being used to its fullest capabilities.



## Safety Systems

The mixture of high voltage electronics and competitive racing makes safety the team's highest priority. Automated systems are in place to shut down the output from the high voltage battery under any fault conditions and dual modular redundancy ensures our confidence in our electrical systems. The driver is protected from impact and mechanical failures through rigorous implementation of safety factors, professional manufacturing procedures and part testing.





# What We Can Offer

We take great pride in our sponsors and take every possible action to maximise their exposure and benefits with us, as displayed by our numerous marketing and branding efforts.



## Student Engagement

Close interaction with members of the team is an opportunity reserved for those in our Title, Platinum and Gold sponsorship packages.

We are happy to present the car and our project at corporate and promotional events for these categories of sponsors.



## Vehicle Branding

Each year, the car represents the culmination of a year's work and is the centrepiece of attention. With our success propelling us to the international stage, on-car branding guarantees that your logo will be widely broadcast.



## Apparel Branding

Our sponsors' logos are also branded on our team apparel, which is consistently worn at internal and external events throughout the season, guaranteeing the presence of your logo with the presence of our team members no matter where they are.





## Social Media Promotion

We actively incorporate social media into our day-to-day life and update our followers on the progress of the team. This also includes social media promotion of our sponsors. We operate across multiple social media platforms and offer the opportunity for our sponsors to benefit from this exposure.

Our website also features a dedicated page for our sponsors.



## Pit Board Branding

The team's pit board acts as our sponsorship hub, and each sponsor is showcased here so that the huge amount of support we receive can be recognised and appreciated.

This pit board travels with the team to all internal and external events.





# Our Sponsorship Packages

TITLE	PLATINUM	GOLD	SILVER	BRONZE
Highest Contribution	£6,000+	£3,000 - £6,000	£1,500 - £3,000	<£1,500

Sponsorship Level	Title	Platinum	Gold	Silver	Bronze
Social Media Stories	Unlimited	3+	2+	1	Sponsorship announcement only
Social Media Posts	Unlimited	2+	2	Sponsorship announcement only	Sponsorship announcement only
Networking Opportunities	Yes	Yes	Yes	No	No
Logo Size: Car	Prime position	2 large	2 medium	2 small	1 small
Logo on t-shirts, pit board and website	Yes	Yes	Yes	Yes	No
Customisation*	Yes	Yes	Yes	No	No

\*Ability to customise your package reflects your contribution to the team, with priority given to sponsors with larger contributions

**Our significantly high sponsor retention rate and outstanding quality of our existing sponsors is testimony to the benefits of sponsoring TBRe. To highlight this fact, we have asked two of our 2024 sponsors to describe their experience with TBRe sponsorship. Here is what our 2024 title sponsor, Rotork, and one of our longest-standing sponsors, Mewburn Ellis, had to say:**

### Rotork

“Rotork are proud to be the title sponsors of Team Bath Racing Electric in 2024. We have enjoyed numerous events with the team over the year, through engineering discussions to social events. A particularly enjoyable event for us was being able to host the 2024 car launch at our Headquarters in Bath. The team’s dedication and enthusiasm for the project is infectious and it great to be involved. Looking forward to 2025!”

### Mewburn Ellis

“Mewburn Ellis is proud to have sponsored Team Bath Racing Electric since 2016. We were initially drawn to become involved through an interest in automotive engineering and motorsport amongst a few of our engineering group partners. Whilst this sort of sponsorship was a bit of a step into the unknown for us at the time, we were very quickly rewarded by the resulting involvement with such an inspiring group of young people – the next generation of professional engineers.

It has been a pleasure to help the team fund their chassis development, and their attendance at the annual Silverstone event. I have also had the pleasure of working with team members after their graduation as they enter the world of professional engineering and find themselves encountering intellectual property in the real world. The team’s success last year is a testament to their drive and dedication.”



**We are immensely grateful for our sponsors  
who supported us in 2024.**

We hope to continue working with them for another successful year where we can bring as much value to them as they have to us.

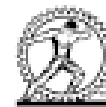
These are the wonderful companies who helped turn our 2023-2024 vision into reality:


 The logo for rotork, featuring the word "rotork" in a bold, red, sans-serif font. A registered trademark symbol (®) is located at the top right of the letter "k".


 The logo for Mewburn Ellis, featuring the company name in a purple serif font. Below the name is the tagline "The forward-looking IP firm" in a smaller, sans-serif font. A small, stylized purple cube icon is positioned to the right of the name.


 The logo for VECTOR, featuring the word "VECTOR" in a bold, black, sans-serif font.


 The logo for ZUKEN, featuring the word "ZUKEN" in a bold, black, sans-serif font. A registered trademark symbol (®) is located at the top right of the letter "N".


 The logo for MPC DesignWorks, featuring the letters "MPC" in a bold, black, sans-serif font, with "DesignWorks" in a smaller, sans-serif font below it.


 The logo for Multimatic, featuring the word "Multimatic" in a bold, black, sans-serif font, with a registered trademark symbol (®) at the top right.


 The logo for babcock, featuring the word "babcock" in a bold, blue, sans-serif font. A trademark symbol (TM) is located at the top right of the letter "k".


 The logo for AB DYNAMICS, featuring the letters "AB" in a bold, blue, sans-serif font, followed by "DYNAMICS" in a smaller, blue, sans-serif font. A trademark symbol (TM) is located at the top right of the word "DYNAMICS".


 The logo for PcbTrain, featuring the word "PcbTrain" in a bold, green, sans-serif font.


 The logo for Newbury Electronics, featuring the word "Newbury" in a bold, black, sans-serif font, followed by "Electronics" in a smaller, blue, sans-serif font. The word "Altium" is written in a bold, italicized, black, sans-serif font to the right. A registered trademark symbol (®) is located at the top right of the letter "m".

# Ansys brunner ::

## frewer

Engineering, design & analysis



## CREATED



## RENISHAW



## Red Bull

apply innovation™



## 3Dconnexion

get it

## made



## easycomposites

With special thanks to...

**Mr Bob Rogers | Professor Gary Hawley**



# TBRe25 Team Leaders



**Abbey Marsden**

Team Principal  
MEng Mechanical Engineering with  
Automotive Engineering



**Daniel Pérez Thomson**

Technical Director  
MEng Mechanical Engineering  
with Automotive Engineering



**Alexander Crisan**

Aerodynamics Lead  
MEng Aerospace  
Engineering



**Seb Hall**

AI Lead  
MEng Integrated Mechanical  
and Electrical Engineering



**Federica La Scala**

Chassis Lead  
MEng Mechanical  
Engineering



**Sam Snudden**

Composite Lead  
MEng Mechanical with  
Automotive Engineering



**Karolis Banys**

Driver Environment Lead  
MEng Mechanical with  
Automotive Engineering



**Alex Cucchiara**

Electrical Systems Lead  
MEng Integrated Mechanical  
and Electrical Engineering



**Sam Mutton**

Powertrain Lead  
MEng Mechanical  
Engineering



**Ivan Chan**

Vehicle Dynamics Lead  
MEng Mechanical with  
Automotive Engineering



**Chiara Marquet**

Marketing Lead  
BSc Management with  
Marketing



**Audrey Raguin**

Co-Business Operations Lead  
BSc International  
Management



**Emma Dickson**

Co-Business Operations Lead  
BSc Management with  
Marketing

# Faculty Staff

Our achievements wouldn't have been possible without the help of the dedicated members of the University of Bath's Engineering faculty who have supported and guided us throughout the years. Their passion towards TBRe has been a constant motivator for us, and their outstanding expertise in each of their fields has given us invaluable technical insight.



**Dr. Benjamin Metcalfe**

Head of Electronic and  
Electrical Engineering  
Department



**Prof. Patrick Keogh**

Head of Mechanical  
Engineering Department



**Dr. Jamie Gawith**

Lecturer, Department of Electronic &  
Electrical Engineering  
(IAAPS)



**Dr. Christopher Vagg**

Lecturer, Institute for  
Advanced Automotive  
Propulsion Systems



**We hope that our TBRe 2025 prospectus has provided valuable insight into the team and our ambitions for 2025 and beyond.**

**If you would like more information, or simply want to follow our progress, please follow us on our media platforms. Our platforms are very active and will provide continuous updates on all the new developments in our fast-moving project.**

**Whether you want to sponsor us or just want to find out more about what we do, we look forward to hearing from you in the near future.**



[www.TeamBathRacingElectric.com](http://www.TeamBathRacingElectric.com)



[TeamBathRacingElectric@gmail.com](mailto:TeamBathRacingElectric@gmail.com)



[@teambathraceelectric](https://www.instagram.com/teambathraceelectric)



[@TeamBathRacingElectric](https://www.facebook.com/TeamBathRacingElectric)



[@TeamBathRacingE](https://twitter.com/TeamBathRacingE)



[Team Bath Racing Electric](https://www.linkedin.com/company/team-bath-racing-electric)



[@TeamBathRacingElectric](https://www.youtube.com/TeamBathRacingElectric)



[@teambathraceelectric](https://www.tiktok.com/@teambathraceelectric)



[teambathraceelectric.com](http://teambathraceelectric.com)



