



CASE STUDY /

# Ansys + Team Bath Racing

“Team Bath Racing uses Ansys software to provide design validation and verification for structural components, optimization of components for mass and strength, simulation of fluid flow over individual components and full car models. Without Ansys software, significantly more time and resources would be needed to conduct physical testing, increasing costs and lead times alike. Ansys solutions empowered us to create a new, winning design capable of performing at the highest level. Specifically, our team was able to increase the rear wing and side wing’s downforce by 11% with the use of Ansys tools.”

**Samir Patel**

Business manager / Team Bath Racing

# Team Bath Racing uses Ansys Software to provide Accurate FEA and CFD Data and Analytics

Team Bath Racing (TBR) is the University of Bath’s internal combustion Formula Student team. The team is run by the students themselves with the same goal each year: design and build a brand-new Formula Student car from scratch. TBR use engineering simulation to reduce design time and the need for costly prototyping and physical testing.

## / Company Description

TBR is the University of Bath’s combustion Formula Student team, consisting of mechanical and electrical engineering undergraduate students. Founded in 2000, TBR is the UK’s most successful combustion Formula Student team, most recently winning FSUK2020 with our latest design, TBR21. Each year, the team designs a new car from scratch, covering the complete design of the powertrain, chassis, vehicle dynamics and aerodynamics.

## / Challenges

Designing and building a brand-new Formula Student car from scratch each year means the team has limited time and funding. As design time is limited, it is crucial that any simulation software must be easy to use and capable of producing accurate results no matter the size of the component or model.

## / Ansys Products Used

Ansys Fluent & Ansys Mechanical

## / Engineering Solution

Ansys software packages are used for FEA and CFD purposes, the latter being crucial to the design of the car’s aerodynamics package. Simulation is a key part of TBR’s design process, aiding designers with quicker and more accurate modeling. Simulation also allows the team to reduce costs by removing the need for costly prototyping and wind tunnel usage. The wide range of features offered by Ansys means designers can develop and test ideas effectively and reliably.

## / Benefits

Simulation allows TBR to deliver a more reliable and optimized car each year. FEA ensures components comply with the Formula Student rules and can withstand the conditions of a Formula Student competition, while CFD produces year-over-year improvements to the aerodynamics package. Simulation allows new ideas to be trialed effectively and without cost. For example, new chassis winglets that redirect flow back towards the ground increasing the rear and side wing downforce by 11%.



Figure 1. A TBR Formula Student car designed and built by our team of undergraduate engineers (TBR18).

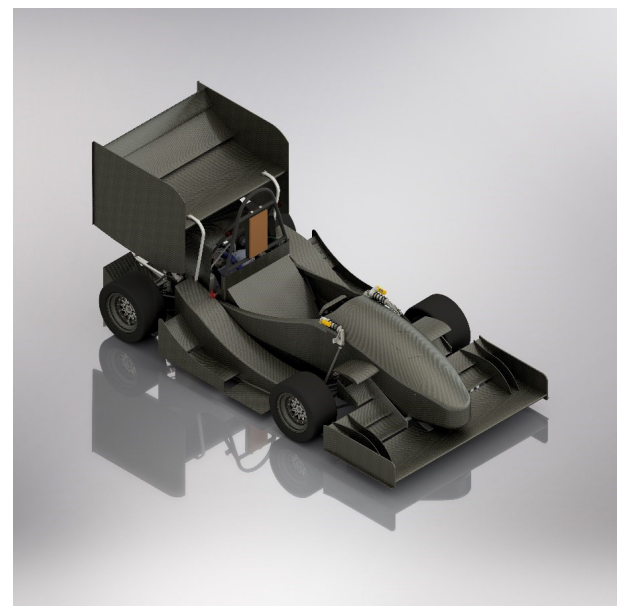


Figure 2. The newest TBR21 car which will be built this academic year for 2021 FS competitions.

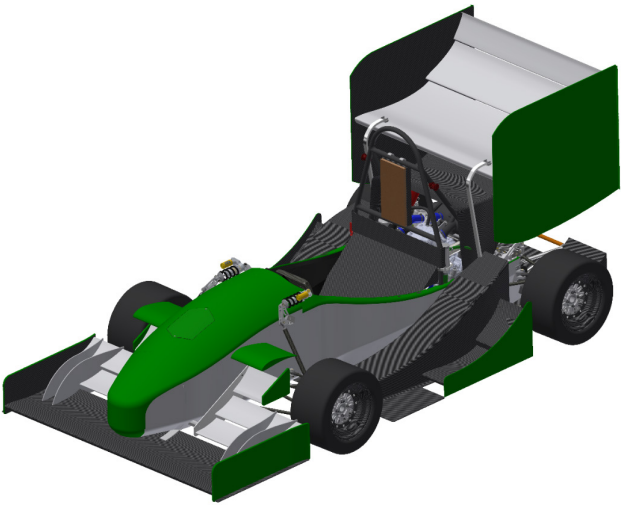


Figure 3. A CAD model of TBR21 highlighting the full aerodynamics package designed using Ansys Fluent.



Figure 4. A view of TBR21's rear packaging.

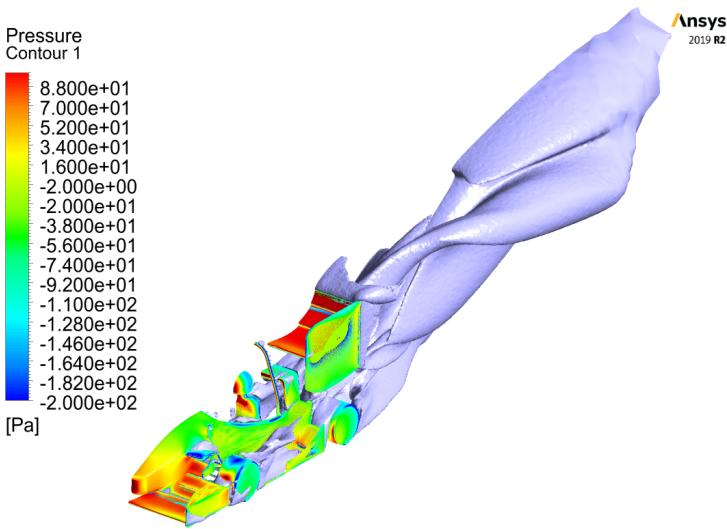


Figure 5. A full car simulation of flow over TBR21, generated using Ansys Fluent.

**ANSYS, Inc.**  
Southpointe  
2600 Ansys Drive  
Canonsburg, PA 15317  
U.S.A.  
724.746.3304  
ansysinfo@ansys.com

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge or put on wearable technology, chances are you've used a product where Ansys software played a critical role in its creation. Ansys is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and engineer products limited only by imagination.

Visit [www.ansys.com](http://www.ansys.com) for more information.

Any and all ANSYS, Inc. brand, product, service and feature names, logos and slogans are registered trademarks or trademarks of ANSYS, Inc. or its subsidiaries in the United States or other countries. All other brand, product, service and feature names or trademarks are the property of their respective owners.

© 2020 ANSYS, Inc. All Rights Reserved.