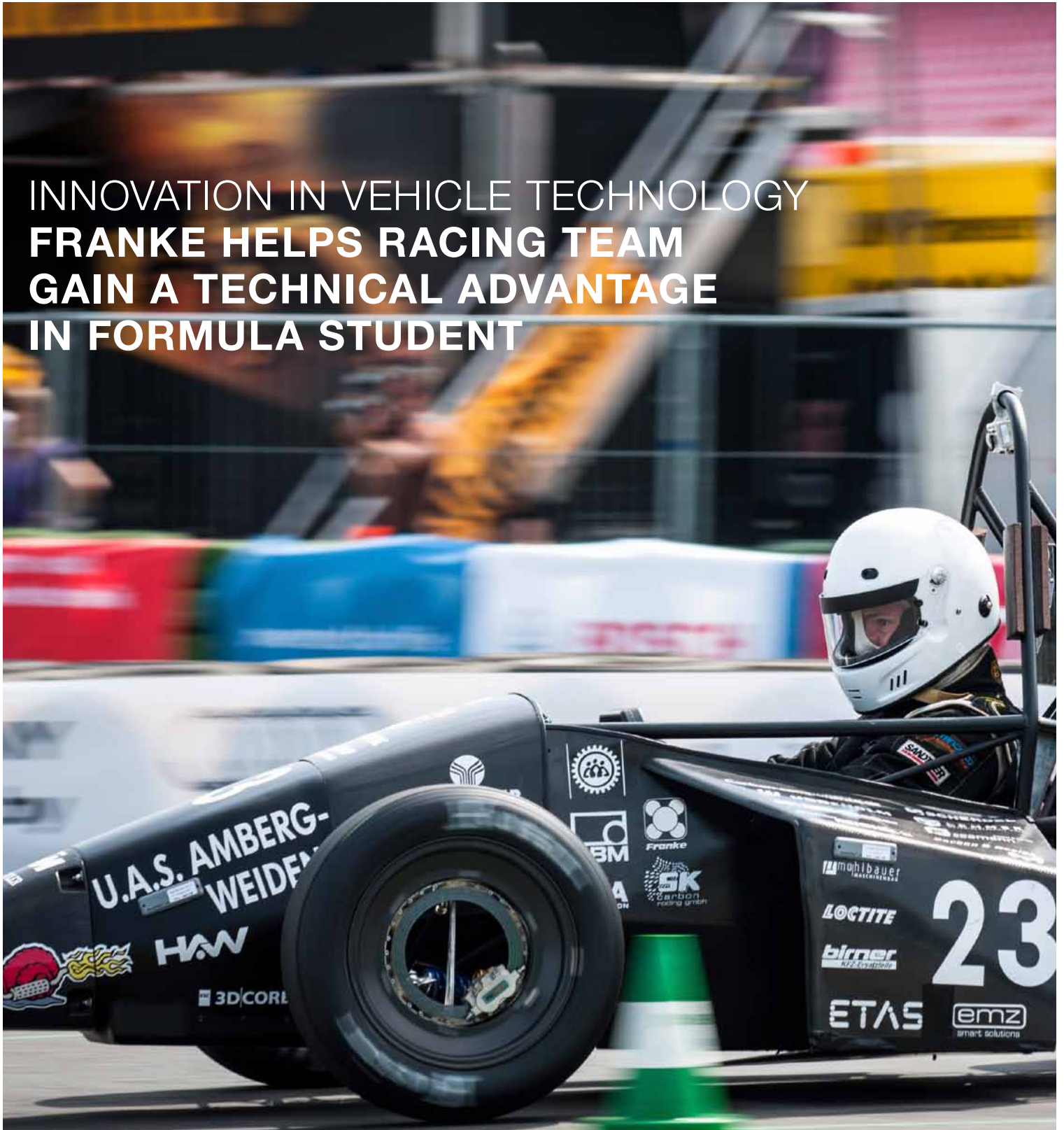




# FRANKE INNOVATIV

SPECIAL ISSUE MOTOR RACING

INNOVATION IN VEHICLE TECHNOLOGY  
**FRANKE HELPS RACING TEAM  
GAIN A TECHNICAL ADVANTAGE  
IN FORMULA STUDENT**



# Light – fast – no hub

## Franke Wire Race Bearings in automotive engineering

Do race car rims really need central hubs? “No” said the students from the Running Snail Racing Team at the University of Amberg-Weiden, simply discarding the notion of heavy components and central wheel bearings. They chose instead the filigree Wire Race Bearings to speed round the racetracks in their nippy little car as part of the Formula Student Tour.

Formula Student is an international design competition, organised for the first time 1981 in the United States, and now held in 49 different countries. Each year, the competition involves a large field of international participants from the United States, along with Germany, England, Italy, Australia, Brazil and Japan. In total, 300 racing teams have come together, 80 from Germany alone.



### Space for creativeness

The rules in Formula Student provide the participating students with a lot of leeway to enable innovation. But there are several important characteristics that a vehicle must satisfy in order to compete. For example: a four-stroke engine with no more than 610 cm<sup>3</sup>, single seaters with exposed wheels, wheelbase at least 1,525 mm. But there are no limits to creativeness apart from this, and the students at the Running Snail Racing Teams fully intend to use this in order to keep their fireball's weight as low as possible. The teams now start in the newly created class Formula Student Electric (FSE), using electrically powered vehicles. This is where in future, Wire Race Bearings with integrated wheel hub motors will reveal the full benefits of their design.

### Noticeably lighter

The hubless carbon rim on the front wheel is without doubt a spectacular result of the thoughts invested by the Running Snail Racing Team.

The use of lightweight materials and the dispensation with a central module significantly reduce the unsprung mass. The brake disc on the inside receives enhanced cooling and can hence be scaled smaller also, which makes the wheel as a whole noticeably lighter. “This means that we can design the suspension and the shock absorption in a more filigree and lighter style”, says Johannes Braun from the team division suspension/steering, adding: “Additionally, the pivot points affixed to the outer diameter also provide vastly improved absorption of the shear forces”.

### The benefits of compact size

The students became aware of Wire Race Bearings while searching for a suitable solution. A filigree aluminium housing was created in cooperation with the Franke engineers, accommodating the bearing rings and offering connection points for the braking system and the carbon rim. The developers profited from the extremely compact mounting space required by the Franke Wire Race Bearings. “We are very happy with this solution”, says Johannes Braun, expressing his thanks for the positive cooperation with the Franke team.

### Sponsor for students

The Franke Development Department looked after the project from the start, conducting numerous tests and analyses. All design resources and the finished bearings themselves were made available to the Running Snail Racing Team free of charge. Hence Franke joins the ranks of the many high-class sponsors in the university racing series.

### Technology with role model function

Other teams have since become aware of the hubless rim. The benefits this solution offers are more than just reduced weight and improved wheel control. The direct response of steering and suspension, along with the lower forces impacting on the shock absorbers and chassis, are positive and noticeable features in racing. It is indeed possible that rimless wheels with integrated Wire Race Bearings by Franke will, in the foreseeable future, become standard elements on racing cars.

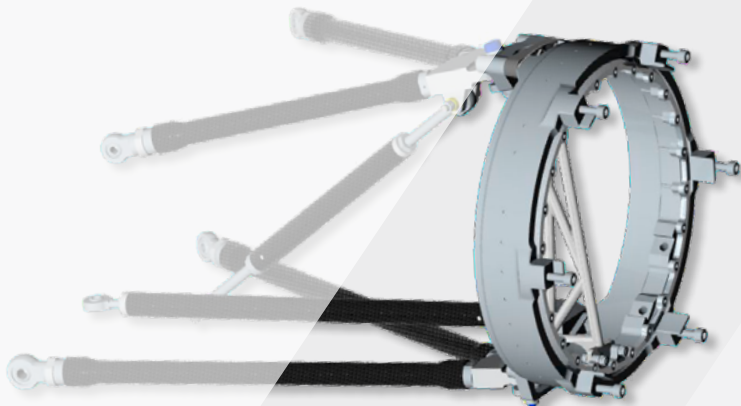


	Information
	
Please find further information on the internet: <a href="http://www.running-snail.de">www.running-snail.de</a>	

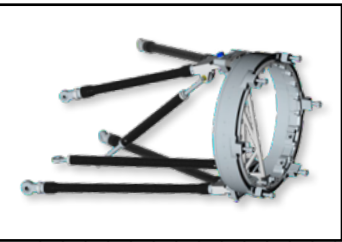




The Running Snail Racing Team was founded in 2004, bringing together various specialist faculties at the University of Amberg-Weiden. Their numbers swelled with time to around 30 members.



Rim-riders offer many different benefits, for instance the bearings mounted directly in the housing, a lower weight, direct force absorption in the suspension and an integrated braking system.



# “We reveal our core competence in individual solutions”

Arne Jankowski from Technical Sales and Franz Öhlert from the Development Team spoke with FRANKE INNOVATIV about the race car rim project and about how Wire Race Bearings helped satisfy the particular requirements of this application.

*Mr. Öhlert, what went through your mind when your colleague Arne Jankowski first came to you with the idea of rim bearings?*

**Franz Öhlert** (grins): You know, the people at Technical Sales are always coming up with surprises, so my first thought was: interesting – but are they serious?

*Were you confident, Mr. Jankowski, that the Development Department would be able to come up with a solution to the enquiry from the University of Amberg-Weiden?*

**Arne Jankowski**: Absolutely. The people there are true professionals with years of experience in adapting Wire Race Bearing technology to individual applications. Wherever you go in the world, Franke is known for its ability to satisfy special requirements. It's where we get to demonstrate our core competence, fulfilling that kind of individual solution.

*What was so special about this specific application?*

**Franz Öhlert**: Apart from the usual suspects you always have with special solutions, for instance the small mounting space, the large open centre and the filigree aluminium housing, this case was also faced with high dynamics and the very rapid change in load ratios.

**Arne Jankowski**: Let's not forget that we're talking about a race car! Its acceleration is

pretty phenomenal, also its braking and steering in the bends.

*What did you do to satisfy these requirements?*

**Franz Öhlert**: Franke Wire Race Bearings are 4-point bearings; this means they can absorb equal loads from all different directions. The main aspect was to select the cross-section of the wire and the diameter of the balls in such way that the load peaks are safely absorbed. We simulated this in various computer analyses and then verified the results in numerous in-house laboratory tests.

**Arne Jankowski** (nods): You have to say that the students from the university were very cooperative and really played their part in the overall project. We had engineers from the racing team here with us, and we went through the details together. We believe that close contact with our customers is a major factor in our success when implementing this kind of technology.

*Were you able to give the Running Snail Racing Team what they were looking for?*

**Franz Öhlert**: No doubt about that. The front wheel is lighter due to the Wire Race Bearing hub, more rigid, too. The inner brake disc is more filigree and the wheel suspension and shock absorbers were kept leaner. The use of carbon and the optimisation of other units

halved the total weight of the race car, compared with its predecessor.



**Arne Jankowski**: You shouldn't forget also that this racing series is not just about driving and winning; it's also about technical innovation. That kind of thing has just as much reputation as winning the race. I do believe that this kind of wheel bearings represents a truly spectacular innovative leap.

*Have you seen any signs that this technology is raising eyebrows already?*

**Arne Jankowski**: The Running Snail Racing Team was so kind as to lend us the wheel mount for the trade fair in Hanover. Our Advertising Department put on an eye-catching video in the background; this combination attracted representatives from a large number of competing teams to our stand, all wanting to play around with the Wire Race Bearing rim. It is perfectly possible that pretty soon, we'll be sponsoring other teams, too. (winks at his colleagues)

*It sounds promising! What does the Development Department have to say about this outlook?*

**Franz Öhlert** (thumbs up): No problem for us. Just bring it on!

	Film
	Take a look at the YouTube video for Running Snail 

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