

# Joint doctoral degree of the research group SAM of Technische Universität Darmstadt and BMW Group

Open innovation collaboration between the Technische Universität Darmstadt and the automotive company BMW Group

## COLLABORATIVE R&D PROJECTS



## Contact

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## Main actors

- Technische Universität Darmstadt
- SAM Research Group
- BMW Group
- Phd Candidate

A member of the research group System Reliability, Adaptive Structures, and Machine Acoustics SAM of Technische Universität Darmstadt is doing research at the automotive company BMW Group in Munich. In this open science environment, high-class research is performed at the interface between university and industry. This type of OI collaboration initiative probably fits best into UISIS #4 mentioned in the proposal (Collaborative R&D&I projects between universities, RTOs, industries, SMEs and public sector entities).

This collaboration initiative relates to open science by the open nature of a doctoral degree. All scientific results gathered, both at the university and industry, will be published in a way that it is accessible by scientific community and society.

## Process Main Stages

### STAGE 1 – AGREEMENT AND SHAPING OF THE RESEARCH TOPIC

Firstly, the Technische Universität Darmstadt and BMW have to agree on a research topic of common interest. Therefore, a cooperation contract is signed between both partners to ensure a good cooperation. And finally, the doctoral student candidate for the job has to be recruited at either the Technische Universität Darmstadt or at BMW Group.

### STAGE 2 – ENSURING A CONTINUOUS ALIGNMENT OF THE RESEARCH

While the doctoral student does research on the defined topic, a continuous communication between all three actors has to be ensured. Simultaneously, a permanent alignment of the research with the expectations of the university and the industry must be safeguarded as well. Finally, the specific parts of the research results are published.

### STAGE 3 – CONFIRMATION AND PUBLICATION OF RESULTS

Once the research phase has been completed, the doctoral student presents the outcomes to both, university and industry. Therefore, after a final review, the results are published within the scientific community and among society. At this point, the doctoral student finally graduates.

### STAGE 4 – STRENGTHENING TIES

Ultimately, the university and the industry agree on future works and projects in order to intensify their relationship and, thus, their mutual benefit.

## Touchpoints & Bottlenecks

### TOUCHPOINT 1 – UNIVERSITY-INDUSTRY INTERACTION

The interface science-industry that takes place at the company between the doctoral student and the industry employees supporting his work, in addition to the supervisors of both entities, who continuously oversee the process.

### **BOTTLENECK 1 – DIFFERENT EXPECTATIONS**

The main bottleneck is the different expectation of the university and the industry towards the research process and the research outcomes. The university is expecting very accurate and detailed research on fundamental questions, while the industry expects ready-to-use outcomes, with which can be monetarized. The doctoral student, who is in between these different expectations, must serve both interests. He is employed at the industry, but is evaluated and graded by the university.

### **BOTTLENECK 2 – COMMUNICATION BETWEEN ACTORS**

Another bottleneck is the communication between all three actors. The doctoral student is doing research at the industry. Hence, the communication between the doctoral student and the industry is much more intense than the communication between the doctoral student and the university. This easily leads to misunderstandings. A regular communication between the doctoral student and the University is necessary in order to avoid problems and to agree upon shared goals.

### **Success Factors / Barriers**

The main objective of Technische Universität Darmstadt is to have a strong and intense cooperation with the industry to learn about the industry's needs in research. The knowledge transfer from university to industry is as direct as possible, but also the knowledge and skills from the industry directly influence the university's research activities. The main success factor is the open and intense communication between the university and the industry.

The main objective of BMW is to have excellent research done in-house. Hence, BMW can profit as much as possible from the high-class research done at the university. With the continuous and intense communication between the company and the university, BMW can stay on track with the newest results in research achieved at the university. The main success factor is to have a motivated and capable researcher as an employee. Additionally, the direct link to the university providing newest research outcomes is an important point.

The main objective of the doctoral student is to graduate as a doctor. To achieve this target, he will do excellent research in a highly motivated way. At the interface between science and industry, he can experience both, the university's and the industry's way of research. With this double experience, he is better prepared for a job in the industry than a doctoral student who has graduated at university only. The main success factor is to have good and reliable supervisors, both at the university and the industry. A good relationship between both supervisors is very important since the doctoral student is right in between.

A clear agreement on the publication of the research results is necessary to allow the university to publish the results within the scientific community and the society. Furthermore, the doctoral student's responsibilities must be clearly defined to ensure that he has enough time to finish his research and will not work too much on daily business.

### **Conclusion**

The overall experience is very positive for all three actors, who all profit of the cooperation. The University gains knowledge about the needs of the industry, the industry gains knowledge about newest research outcomes of the university and the doctoral student can do high-class research right at the interface between university and industry to graduate as a doctor.

#### **DO**

- Detailed definition of the doctoral student's field of research,
- Doctoral student should be motivated and open minded towards innovative research outcomes,
- Formulation of a clear collaboration agreement between the university and the industry,
- Agreement on a mutual publication policy,
- Regular communication between university, industry, and the doctoral student.

#### **DON'T**

- Doctoral student must not be integrated too much into the daily business,
- Task should not be too detailed in order to not prevent innovation,
- Research outcomes must not be kept secret.

