BMW GROUP
Corporate Communications

Press release
9 December 2021

BMW Group Quantum Computing Challenge: the winners have been decided.

- BMW Group and AWS announce winners at Q2B 2021
- Follow-up projects for the winning teams
- Successful crowd innovation initiative with encouraging results

Munich. Today marks the end of the BMW Group Quantum Computing Challenge with the winners being announced at Q2B 2021, the leading conference for the application of quantum computing.
The BMW Group, in collaboration with Amazon Web Services Inc. (AWS), invoked the Crowd Innovation Initiative: in July of this year, they called on the global quantum computing community to develop innovative quantum algorithms for four specific industrial challenges and to test them on real quantum computing technologies. One winning team has now been selected for each of the four identified areas. In all, around 70 teams from all over the world took part.

These winning teams have been selected for the four challenges:

1. **Sensor positions for automated driving functions: Accenture**
   Accenture's winning team tackled the problem of optimising the positioning of sensors for highly automated driving functions.

2. **Simulation of material deformations: Qu&Co**
   The jury concluded that the quantum computing start-up Qu&Co stood out with its approach to solving partial differential equations in the field of numerical simulation.

3. **Configuration optimisation of pre-series vehicles: 1QBit and NTT**
   The winning team from 1QBit and NTT came out on top with hybrid algorithms for solving satisfiability problems in propositional logic for optimising equipment configuration.

4. **Automated quality analyses: QC Ware**
   The QC Ware team stood out with its approach, drawn from the field of machine learning, that can be used in image recognition in the area of quality analysis.

The BMW Group worked closely with the Amazon Quantum Solutions Lab Professional Services team, an expert group of professionals, throughout the challenge, right up to the moment when the winners were determined. AWS also provided credits for the use of Amazon Braket, enabling the development and testing of the submitted quantum algorithms. Amazon Braket provides a development environment to explore and create quantum algorithms, test them on quantum circuit simulators and run them on different quantum hardware technologies.

The jury that oversaw the challenge and ultimately decided on the winning teams also included professors from the Technical University of Munich (TUM) as well as representatives of the BMW Group and AWS. TUM is an important partner for the BMW Group for research in the field of quantum computing. The BMW Group announced the establishment of the "Quantum Algorithms and Applications" endowed chair at TUM back in June of this year. Algorithms close to specific use cases along the industrial value chain are being researched at the chair. The BMW Group is providing 5.1 million euros over a period of six years to fund the professorship, staff and equipment at TUM.

Quantum computing is one of the most promising future technologies in the automotive sector. It has enormous potential for research into materials, for complex optimisation problems and for the future of automated driving. The Quantum Computing Challenge once again underlines the BMW Group's leading-edge role in building a quantum ecosystem. As recently as June, the company was a founding member, along with nine other large corporations, of the Quantum Technology and Application Consortium (QUTAC). This aims to specifically accelerate the development of the technology in Germany and Europe. In November this year, the BMW Group and RWTH Aachen University jointly announced the establishment of the "Quantum Information Systems" endowed chair, where software and

industrialisation comeptencies will be created to realise a quantum advantage in the medium term.

Dr Peter Lehnert, Vice President BMW Group Research and New Technologies Digital Car: "We at the BMW Group are convinced that future technologies such as quantum computing have the potential to make our products more desirable and sustainable. We have succeeded in reaching the global quantum computing community with our crowd-innovation approach and enthusing them about automotive use cases. We look forward to continuing to work with the winners."

BMW Group reaches out to quantum computing community worldwide

The BMW Group received around 70 submissions from all over the world from different areas such as international and national research groups, the start-up scene and established companies. The exceptionally high quality of the submissions enables new perspectives and offers potential for innovative approaches to solutions such as the development and further development of new algorithms. The expert jury took into account criteria such as comprehensibility, feasibility, scalability, innovation and benefit for the BMW Group when evaluating the submitted solutions.

All 15 finalists set themselves apart with their high innovation potential and have therefore been shortlisted for future projects. The journey continues straight away for the four winners: they immediately gain the BMW Group as a customer and will be involved in the further development of the pilot projects. The company looks forward to working with these four winners.

The BMW Group Quantum Computing Challenge is structured around the "Supplierthon" methodology, which is the BMW Group's future-oriented supplier scouting method. It marks the company's first global crowd-innovation initiative on this scale. The crowd innovation approach enables innovative solutions to be found within a very short time and to validate them in cooperation with the specialist departments. The challenge also gave the BMW Group

invaluable insights into the status quo of the global quantum ecosystem. This knowledge is crucial in determining the future direction of research on the future technology and the long-term establishment of the market for quantum computing. The successful challenge along with the extremely promising submissions encourage the company to continue to look to the crowd innovation approach in the future.

In the event of enquiries please contact:

Corporate Communications
Susanne Nett
Spokesperson BMW Group IT, New Technologies, Cyber Security, Big Data, Artificial Intelligence
Tel.: +49-151-601-14920, e-mail: susanne.nett@bmw.de

Christophe Koenig
Head of Communication Digital Experience, Automated Driving and Driving Assistance Systems
Tel: +49-(0)176-601-56097, e-mail: christophe.koenig@bmw.de

Internet: www.press.bmwgroup.com/global
E-mail: presse@bmwgroup.com

The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 31 production and assembly facilities in 15 countries; the company has a global sales network in more than 140 countries.

In 2020, the BMW Group sold over 2.3 million passenger vehicles and more than 169,000 motorcycles worldwide. The profit before tax in the financial year 2020 was € 5.222 billion on revenues amounting to € 98.990 billion. As of 31 December 2020, the BMW Group had a workforce of 120,726 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

www.bmwgroup.com
Facebook: http://www.facebook.com/BMWGroup
Twitter: http://twitter.com/BMWGroup
YouTube: http://www.youtube.com/BMWGroupView
Instagram: https://www.instagram.com/bmwgroup
LinkedIn: https://www.linkedin.com/company/bmw-group/