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Where there's a "Will(e)", there's a way: JKU computer scientist Robert Wille will receive the renowned and highly competitive ERC Consolidator Grant to conduct research on quantum computers

This year, one of Europe's most prestigious scientific awards goes to Prof. Robert Wille, LIT at the JKU for his work in developing methods to improve quantum computers.



Professor Robert Wille

The European Research Council's "Consolidator Grant" is presented to outstanding young researchers and is one of Europe's most prestigious scientific awards. The award provides €2 million in funding and, this year, one of them will be presented to a research team that aims to anticipate the future. Prof. Robert Wille (LIT at the Johannes Kepler University Linz) is developing methods for the design of quantum computers.

It's a success story made in (Upper) Austria: Prof. Robert Wille joined the JKU faculty five years ago as one of the university's youngest full professors. Today, he heads the Institute for Integrated Circuits and the Linz Institute of Technology (LIT) Secure and Correct Systems Lab. Since May, Wille has also been the Chief Scientific Officer at the Software Competence Center Hagenberg (SCCH). Prof. Wille's work is internationally acclaimed and now he has been named the recipient of one of Europe's most competitive awards: an ERC Consolidator Grant.

New Phase of Computer Science

According to the experts, the award has been given for good reason. In the foreseeable future, quantum computers will revolutionize science and a race is on around the world to develop and advance these computers. Right now, the first quantum computer models can already handle some selected problems. It is expected that, in some few years, they will gain further maturity. Then, these "quantum computers" can solve specially designed tasks in a short time, whereas even the fastest supercomputers we have now would require millennia to complete the same task.

Focus on Software

However, even the best computers are useless without the corresponding programming and design tools. And compared to current computers, science needs to address and solve completely new approaches and problems. This is where Prof. Wille and his team come in as globally recognized experts. Prof. Wille stated: *"We have highly sophisticated methods and tools to design corresponding programs for conventional computers. But for quantum quantum computers, we are still at the beginning. We run the risk of ultimately developing high-performance quantum computers, but yet remaining unable to take full advantage of the potential."*

The ERC-supported research project aims to study methods designed to simulate and verify the correctness of corresponding quantum programs. In addition, so-called compilers are being developed designed to automatically translate quantum programs so that they can be executed on actual machines. On these topics, Prof. Wille and his team actively collaborate with colleagues in science and industry from around the world. The project will receive two million Euros in funding over the next few years. Prof. Wille added: *"An ERC Grant is a very special recognition for which I am very proud and extremely grateful for. This is the result of two years of preparation and teamwork at the JKU and I am thrilled to be able to begin implementing our ideas now."*

JKU Rector Meinhard Lukas remarked: *"I am extremely happy for Professor Wille and his team. Their research is about nothing less than the future of computers. The ERC Consolidator Grant is an international trademark and the grant most impressively confirms that in the European research community, Professor Wille is among the top researchers. At the same time, this is yet another compliment for LIT and the area of Computer Sciences at JKU, which recently made a great leap forward in the worldwide THE ranking."* This also further confirms that Upper Austria is the ideal location for the new Technical University for Digitization and Digital Transformation and that the JKU should play a key role in establishing the new TU. Rector Lukas added that the grant is recognition for a new, comprehensive understanding of technology, well demonstrated by Prof. Wille and his team. *"This mindset in particular makes progressive developments possible and make us truly stand out when it comes to international comparisons."*

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