»No one makes it alone«

FVV has been presenting the Young Researchers Award for outstanding scientific achievements by students since 2006. The prize winners **Dr. Denise Chan**, **Bastian Lehrheuer** and **Marcus Wiens** speak here about their experience with FVV projects and what is expected of engineers and scientists.

During your studies, you all worked on FVV research projects. What were you able to take away from this time for your later careers?

! For me there were three points besides the professional insights: Firstly, I was able to gain an insight into industrial research, which was incredibly valuable. Secondly, I was able to gain my first experience in project management. And I found the interdisciplinary collaboration particularly enriching. In the working group, I had to make the chemical structures understandable to many mechanical engineers. This taught me how important it is to find common ground when it comes to communication. If you can do that, you can combine expertise from different disciplines, which is the best way of solving complex problems. In fact, this has accompanied me throughout my entire professional career.

! From a technical point of view, I've not really moved too far from the issues I focussed on during my studies. I first learned the methodology needed to answer such questions through the coursework in an FVV research project. The structured approach of creating a model and then testing it in an experiment is still helpful today. I also loved the fact that I wasn't just handing in written coursework that gets marked and then disappears into a drawer. I found it very motivating to produce a piece of work that others could build on and which found its way into the final report.

! I can only agree with all of that. My Bachelor's thesis within the FVV project was the first topic I worked on independently as a junior researcher. This also showed me that not everything always works out the way you imagined it would right away. Going on to try something new, something that no one has ever done before, is what still intrigues me about science to this day. There's something else I also took away: my fuel conversion topic had some chemical aspects that were completely new to me at the time. Not to be put off by this, but to ask experts for explanations is something that has proved invaluable time and again later in my life.

How do you view the social responsibility of engineers and scientists today?

You always have to look at the bigger picture. I am currently researching electricity generation from wind power. But there are still many questions to be answered about the use of this electricity. And there probably won't be just one answer either. For example, in the future we perhaps could electrify all small cars, but run heavier vehicles, especially in goods transport, on hydrogen and synthetic fuels. I definitely still see potential for the combustion engine.

The most important thing is that engineers and scientists remain curious and keep searching for new answers – and in a way that is as interdisciplinary and open-ended as possible. We learned how to do this systematically in our studies.

This is especially true for the transformation to a sustainable world. We have the knowledge to look for new answers in a targeted manner; for example, switching to renewable energies and effective storage technologies. Another example is that there is still a great deal of research needed in chemical recycling, both in terms of catalysts and process technology. Ultimately, we are heading towards a world where carbon from fossil sources is no longer available.

Beyond the technology, what else do you think is important for achieving this transformation?

Interdisciplinary collaboration! No Company and no industry can manage the transformation to a circular economy on its own. Everyone needs to pull together because we need the entire supply chain to achieve this and we have to look at the entire life cycle of the products. This also requires policymakers to create the right framework conditions. There are numerous good approaches, but implementation is subject to so many things. For example, permits take far too long even for the conversion of existing plants. Planning certainty would be very helpful.

Policymakers must set framework conditions that address the fundamental problems instead of prescribing technology decisions. At the moment, these policymakers are oversimplifying things. They work with prohibitions without these having a sound scientific background. We're talking about the house being on fire. And we have three fire extinguishers: electromobility, hydrogen and synthetic fuels. Instead of using all three fire extinguishers, policymakers are discussing which fire extinguisher we are allowed to use.

Policymakers are also responsible for the expansion of wind energy. We have a tremendously big goal, after all. And to achieve it, we have to solve enormous tasks. However, if we merely focus on small problems, we will not be successful. But this should not distract from the fact that we as engineers are responsible for tackling many new things and constantly scrutinise the status quo.

DR. DENISE CHAN
studied chemistry at the Karlsruhe Institute of Technology. She completed her dissertation as part of an FVV project on the simulation of exhaust gas catalysts and received the FVV Young Researcher Award for it in 2010. After completing her doctorate – also on exhaust gas catalysis – Chan began her career as a laboratory manager at Covestro (Bayer at that time) in 2014. After another role with global technology responsibility, she assumed her current position as Executive Assistant to the Chief Technology Officer of Covestro at the beginning of 2021.

BASTIAN LEHRHEUER
studied mechanical engineering in Aachen. In 2010, his student research project on a real-time gas exchange model, which was developed as part of an FVV project, was honoured with the Young Researcher Award. After completing his studies, he initially worked as a research assistant at what is now the Chair of Thermodynamics of Mobile Energy Conversion Systems at RWTH Aachen University, coordinating FVV projects among other things. Lehrheuer became chief engineer in 2018 and took over the management of the ›The Fuel Science Center‹ excellence cluster in 2019.

MARCUS WIENS
first studied mechanical engineering at RWTH Aachen and completed his Bachelor's thesis, which was awarded the Young Researcher Award, on modelling reduced reaction mechanisms for gasoline fuels as part of an FVV project. He then switched to energy technology for his Master's degree, which he completed with a thesis on the control of wind turbines. Since 2019, he has worked as a research associate at the Fraunhofer Institute for Wind Energy Systems, where his primary focus is on simulation issues.

With your experience today, what do you recommend when it comes to the training of future scientists?

! At our university today, interdisciplinarity is at the top of the agenda. There are more and more degree programmes that cross over into several faculties. In FVV projects, too, different disciplines are working together more often. When you're sitting together over a beer after a working group meeting, it doesn't matter what discipline you work in.

! We take great care to ensure that young people who come to us not only achieve good results working alone behind closed doors, but can also work together with others. A great wish of mine is for there to be greater diversity in professional technical fields and in FVV projects.

! It is good that Germany offers Bachelor's and Master's theses are often carried out in industrial companies or within the framework of Industrial Collective Research. This ensures that young researchers are working on topics with industrial relevance. This is something we need to continue at all costs! //

Photos: Covestro (Chan), RWTH (Lehrheuer), FVV (Wiens)