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Award-Winning: Female Researchers Working on Particle Accelerators, New Cancer Therapies, and Autonomous Driving

This year's Dr. Wilhelmy VDE Prize goes to Dr.-Ing. Anna Ziegler (Technical University of Darmstadt), Dr.-Ing. Angelika S. Thalmayer (Friedrich-Alexander University of Erlangen-Nuremberg), and Dr.-Ing. Felicia Ruppel (University of Ulm). Their outstanding dissertations impressed the jury and are representative of the excellent work being done by many young female researchers in Germany. The award ceremony, with each prize carrying a cash award of €3,000, took place on November 24, 2026, as part of the VDE Capital Forum in Berlin.

(Frankfurt am Main, November 26, 2026) Highlighting the achievements of young female engineers in electrical engineering and information technology, presenting innovative technologies to a broader public, and inspiring enthusiasm through role models: this is what the Dr. Wilhelmy Foundation and the VDE aim to achieve with awards such as the annual Dr. Wilhelmy VDE Prize. After all, bright minds and visionary women are essential for driving forward future-oriented topics and maintaining the region's competitiveness. At the VDE Capital Forum in Berlin, where this year's three award recipients received their honors, the Information Technology Society within VDE (VDE ITG) also presented its awards for outstanding scientific publications in information technology.

Developing Resonators for Particle Accelerators Faster

Dr.-Ing. Anna Ziegler specialized in simulation methodology during her studies in computational engineering at TU Darmstadt. As part of her doctoral thesis, "Efficient Methods for Parameterized Eigenvalue Problems in Electromagnetism," she focused on the question of how electromagnetic resonators for particle accelerators can be developed more efficiently. "I always compare how resonators work to a guitar," explains the simulation engineer. "We set the guitar's soundbox into vibration to generate acoustic waves—we do the same with the resonator, except

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that in this case, we generate electromagnetic waves." This accelerates the particles further and further, though the key is to excite the right waves.

To identify the appropriate frequency, experts painstakingly analyze field images. Ziegler has automated this part of the process so that it runs at the push of a button. In resonator optimization, calculations are also frequently run multiple times, which is very time-consuming. "Through clever model order reduction, it's possible to boil down thousands of equations to 50 to 100 equations and save time," says Ziegler. "We were also able to reduce the processing time for calculating uncertainties from two weeks on a mainframe to 15 minutes on a workstation, while achieving more precise results."

Ziegler currently works as a consultant, but she remains passionate about simulation methodology: "In the long term, I'd like to use my knowledge to identify opportunities for efficiency gains in the energy transition and help implement them."

Delivering Cancer Drugs Directly to the Tumor Using Magnetic Nanoparticles

Field theory, sensor technology, and physics-oriented electrical engineering are the disciplines that Dr.-Ing. Angelika S. Thalmayer studied during her academic career. In her dissertation, "Magnetic Nanoparticles in Magnetic Drug Targeting—Control and Modeling," she applied her expertise to address a fundamental topic in medical technology: Magnetic Drug Targeting (MDT). The basic idea behind MDT is to load iron oxide particles with cancer drugs and inject them into the vascular system near a tumor. Thalmayer investigated how the particles can be navigated as precisely as possible to achieve the best effect while minimizing the burden on the body.

To this end, she combined the properties of permanent and electromagnets for the first time in such a way that the resulting hybrid combines the best of both worlds. "In this way, I reduced the power consumption of the magnet we use for control to one-tenth and significantly curbed unwanted heat generation," explains Thalmayer. "In addition, the magnetic field can be turned on and off, enabling precise control." In her dissertation, Thalmayer used a simulation model to demonstrate how the hybrid magnet works and optimized the control system through metrological experiments.

Following a research stay in Spain, the Assistant Professor (on a temporary basis) at FAU Erlangen continues to work in the MDT field and is focusing on new therapeutic approaches.

Improving Environmental Perception for Autonomous Driving Through Deep Learning

Dr.-Ing. Felicia Ruppel aimed to make the transition from the abstract signal processing she studied in college to practical applications when she began her dissertation in 2020, titled "Joint Multi-, Object Tracking, and Object Detection with Transformer Models." At its core, the goal

was to improve environmental perception—as the basis for decisions made by autonomous driving systems—by processing sensor data using object recognition and tracking. To this end, Ruppel developed a Transformer-based model (TransMOT) at the University of Ulm in collaboration with Bosch Research.

“The basic principle is a Transformer architecture, just like with ChatGPT,” explains the engineer. “In one case, the model receives sequences of words and must determine how the words are related and what they mean. My model, on the other hand, receives measured information from sensors, packaged as tokens, and learns how these are related and which parts are particularly relevant. Through detection, an object is first identified, and when a new sensor image is generated in the next time slice, the model assigns the new data to the existing object in order to track it.” Based on this, TransMOT can prioritize data and assess the situation.

Ruppel was already able to test this approach in real vehicles while working on her dissertation. Today, she works as a research engineer at Bosch, where the concept now also encompasses other parts of an autonomous vehicle’s processing chain. This focuses in particular on behavior planning and control—that is, the step toward data-driven decision-making as the foundation for autonomous driving.

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