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Often, there's not all that much to separate damage and good. Doctors are particularly familiar with this truth, since they are constantly weighing up the treatment benefits against the harmful side effects of a specific surgery or medicine. Radiotherapy is a good example, whereby radiation is applied to cancerous tissue, damaging the DNA of cancerous cells. The aim is to destroy the unhealthy tissue while preserving the healthy tissue as far as possible.

Katrin Teichert knows all about the problem – and she thinks she knows the way to solve it. She works as a mathematician at the Fraunhofer Institute for Industrial Mathematics ITWM and worked on the project that developed a fantastic piece of software that helps doctors with precisely this dilemma. Planning a course of treatment is a highly complex task that calls for modifications to individual parameters to gauge the respective effect. The result was a piece of planning software that features multi-criteria treatment planning, allowing even physicians and doctors who are unfamiliar with this technology to determine the best course of treatment for their patient – and much faster than before.

Katrin studied mathematics at the Technische Universität Dresden (TUD). When she's asked why she chose math as a career, she responds dryly: "My Dad is a physicist and my Mom is a mathematician, I didn't really have much choice..."

Her route to Fraunhofer after completing her studies was a roundabout one. First, she completed an internship at the HZDR – Helmholtz-Zentrum Dresden-Rossendorf in the field of medical imaging – an experience she found so enriching that she resolved to make working at a research institute her career goal. When she came across a web page detailing the projects at Fraunhofer ITWM, she was hooked. And it just so happened that the researchers at the institute were looking for an enthusiastic doctoral student who was well versed in mathematics and had experience of medical applications.

The partnership was made, and the collaboration proved extremely fruitful. Katrin successfully completed her doctorate, and the nine members of the research team taken from Fraunhofer ITWM, Massachusetts General Hospital, the University Hospital of Heidelberg, the German Cancer Research Center and the University of Munich were able to see through a particularly successful project. And the project's crowning glory came when it was also awarded the Stifterverband Science Prize. Today, the software is on sale around the world, and will soon be available at 60 percent of treatment planning centers worldwide.

For Katrin, the project is not yet over. She continues to work on the integration of multi-criteria planning into the systems of industrial clients. It is an aspect of her work at Fraunhofer that she values very much: the direct link to application and customers from industry.

