



Authenticity assurance made in Wuppertal

Prof. Dr. Bela Gipp / Data and Knowledge Technology

Photo: UniService Transfer

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Prof. Dr. Ing. Bela Gipp on the global opportunities for computer science

What if you could use an app to prove beyond any doubt that the damage to the booked holiday home or the scratch on the rental car was not caused by you, but was already there before you booked? Bela Gipp, a computer scientist from Wuppertal and director of the Chair of Data & Knowledge Engineering in the Faculty of Electrical Engineering, Information Technology and Media Technology at the University of Wuppertal, has developed a new technology for this purpose. And it can be used in completely different areas as well.

Three-time winner in the state youth research competition

The enthusiasm and talent in the field of information technology was actually nothing the Berlin native had since childhood. "Maybe it is because I was a Waldorf pupil," he laughs, "and as a Waldorf pupil you do not actually have access to technology. Sometimes, it is therefore easier to partly develop the technology for yourself when you have no direct access to it." And that is what he does from then on. A good example of this, he says, was his interest in model helicopters at the time. "I did not get that one, but my parents said if you want to build one yourself, we are willing to support you." Gipp got started right away, got the necessary components in the form of a motor etc. and, together with a friend, built his own flying object out of wood. Through this hobby, the scientist then also found his profession and says: "I think it is always the best option if you turn your hobby into a profession." He won the state competition Jugend forscht three times, with the development of a thermal imaging helicopter for the rescue of avalanche victims. At the time, he was only 17 years old. A company provided him with a device worth 50,000 marks for this purpose. "I was very nervous when I picked the package up at the post office," he says looking back.

Stay in Silicon Valley & Tokyo

Gipp studied at Otto von Guericke University in Magdeburg. In 2009, he was awarded with a four-year research scholarship at the University of California in Berkeley. He describes the proximity to Silicon Valley as an "incredibly exciting time" that he would not want to miss. "It was a great opportunity to come together with the best-known companies and also the best-known scientists in the world, including Nobel Prize winners," he says, because UC Berkeley is one of the best-known universities in the world in the field of computer science. "We had a joint research project with Google and also saw that the things we were researching were directly implemented by Google. It was great to see that you are working on something that is used by millions of people." In general, it is much easier and less bureaucratic to get in touch with big players than in Germany, and that simplifies a lot. Gipp gets to know young start-up founders who now run billion-dollar companies. "After work, we met for a beer together with other founders who are very successful today. That is when people gave each other tips and helped each other," he says. The financial opportunities are often supported by so-called business angels, he says, which are wealthy individuals or large companies that offer this support professionally. "Financing is no problem at all, if you have a good idea in Silicon Valley." The flat hierarchies are also an advantage and potential young entrepreneurs can quickly get in touch with those in charge of large companies.

Gipp also likes to take advantage of the university leisure activities. That is where the successful networking takes place, and that, he makes clear, is only there. "Today, we can use these contacts that we built up back then for the students as well, because these contacts are still there." For example, several of his students have already been able to finish their theses at Wikipedia in San

Francisco. "And now functions, like visualising formulas, have also been co-developed in Wikipedia by our students. This is now being used by Wikipedia worldwide," he says proudly. "Turning good ideas into successful businesses still gives me great pleasure. That is why I regularly support students and PhD students in founding start-ups." After his time in Silicon Valley, Gipp moved to Tokyo to do research at Japan's most important research institute for computer science. The contacts he made there also regularly benefit his students for research internships and theses. Gipp sums up: "In the meantime, about 20 students have completed research stays in Tokyo."

Chair for Data & Knowledge Engineering

Since 2018, Gipp has held the Chair of Data & Knowledge Engineering in Wuppertal.

"We are primarily concerned with the topic of data science. Today, this is a fashionable term for things like artificial intelligence or the processing, analysis and visualisation of large amounts of data. Another focus is the development of methods for artificial intelligence. Then I also work in the field of information retrieval." Due Many people are familiar with information retrieval due to the applications at Google. It involves filtering out information from the oversized amount of data via a search engine, he says. And as if that was not enough, his chair is also working on so-called blockchain technology, a forward-looking technology that is already being used very successfully in cryptocurrency.

Blockchain based timestamp

Even for the most accomplished scientist, summarising the topic of blockchain briefly is not easy. Especially, since he usually lectures about it for about 90 minutes. Nevertheless, he tries. "A blockchain allows data to be stored in a globally distributed manner using a data structure that cannot be manipulated. And this immutability is the special highlight of it, he says. "With a normal database, you can change data," says Gipp. "A blockchain has the crucial difference that it is not just in one place, but is a globally distributed data structure. Anyone who wants to can participate in such a blockchain, as it is the case with the cryptocurrency Bitcoin, for example. This now enables a decentralised system that ensures that the data cannot be manipulated." On this basis, the scientist also developed the app OriginStamp. This web-based service uses the Bitcoin blockchain. Users can use it to anonymously create a tamper-proof timestamp for any digital content. And here we come back to the initial example of the holiday home. Anyone can then retrieve and verify the photographic entry with the time stamp. The free use of this technology is particularly pleasant for the consumer. "In a court of law, you can prove that the data already exists at a certain point in time", and this is, especially for large, responsible companies, an advantage, Gipp explains. Pharmaceutical companies, for example, also use this software in the production of medicines when they want to prove that everything proceeds correctly in their production. International media, such as the British news and media provider Guardian, also rely on the time stamp, Gipp says. "They time-stamp photographs from crisis areas to be able to prove that this photo was actually taken that way and not manipulated afterwards."

OriginStamp in teaching

In Corona times, the benefit for students is the ability to use this technology to prove that, for example, the thesis was already completed at a certain point in time, even if one was not able to hand it in at the secretariat. "In science, this technology is already used a lot", Gipp says. "By timestamping a scientific paper you can prove that you were the first to have the corresponding idea described in the paper, when you submit it somewhere. This can be interesting in scientific studies, in order to not enable the manipulation of studies afterwards."

Uwe Blass (Interview on April 19, 2021)

Prof. Dr. Ing. Bela Gipp has been director of the Chair of Data & Knowledge Engineering in the Faculty of Electrical Engineering, Information Technology and Media Technology at the University of Wuppertal since 2018.

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