



## INFORMATION, COMMUNICATION & COMPUTING

Fields of Expertise TU Graz

Source: istockphoto.com



**Kay Uwe Römer,**  
**Information, Communication &  
Computing**

Source: Lunghammer – TU Graz

TU Graz's Information, Communication & Computing Field of Expertise is currently undergoing massive expansion. Silicon Austria Labs, which focuses on electronic-based systems, is establishing its headquarters at TU Graz and will increase its Graz-based staff to 200, and to 500 in Austria overall in the next few years. The new SGS cybersecurity research and certification centre will be established at Campus Inffeldgasse and named Cybersecurity Campus Graz. It will focus on security and the Internet of Things, and eventually employ 400 people. As a result of the new university financing scheme, the base funding of the Faculties of Mathematics, Physics and Geodesy; Computer Science and Biomedical Engineering; and Electrical and Information Engineering will grow by an average of some 15%. This translates into roughly another 100 new ICC research staff. But where will we find the high-quality researchers to fill all these positions? There is already enormous competition for ICC graduates in the Graz area due to the density of high-tech industry here. Demographic trends indicate that student numbers will decrease rather than increase over the next few years, and many universities (including TU Graz) have experienced a decline in numbers in some ICC subjects recently. Due to the intense focus on digitalisation in developed countries, it will also not be easy to attract talent from these countries to Graz. There is certainly a lot of talent in places such as Iran and India; however, there is also a great deal of bureaucracy involved in getting these people to Graz. The formal paperwork required for a PhD student from such countries can easily take between six and ten months to complete, based on my personal experience. The result is that many candidates lose patience and go elsewhere. I would welcome any clever ideas for solving this human resource problem – feel free to drop me an e-mail.

You can read more about ICC in this edition of TU Graz research, which has a fresh new design, in the contribution by Stefan Thonhauser from the Institute of Statistics in which he presents his research on financial and insurance mathematics. I wish you an enjoyable read!

**Stefan Thonhauser:**

## Stochastic Optimisation in Financial and Insurance Mathematics

Stochastic models are now indispensable for answering practical questions on finance and insurance. Their use needs to be based on a careful model validation process and an awareness of model limitations. In risk management, being able to react to negative trends is essential. Resulting questions can be directly linked to stochastic optimisation problems.

### BACKGROUND

Financial and insurance mathematics is playing a prominent role in current probability theory. Its contributions are twofold: the analysis of practical problems is leading to deep theoretical findings, and results, which had been considered to be purely of a theoretical nature, are also feeding into applications.

In research and the application of research findings, a distinction needs to be drawn between various aspects – or fundamental problems. One group of questions deals with the correct pricing of financial claims. In finance, the notion of a fair price broadly speaking dictates that a financial market should remain free of arbitrage after the introduction of a new product. Trading opportunities which lead to riskless profits should not arise. In insurance, however, the correct price of some newly insured risk should maintain the financial stability of an insurer. >