

Feldkirchen near Graz, November 23<sup>rd</sup> 2022

## Vienna University of Technology wins Hans Roth Environmental Award 2022

The award for young scientists has been presented for the seventeenth time, with this year's main prize going to Caroline Roithner of Vienna University of Technology (TU Wien). The assessment method that she has developed for the recyclability of products will help to create the conditions for more sustainable product design. In addition to Vienna University of Technology (TU Wien), University of Natural Resources and Applied Life Sciences Vienna (BOKU Wien), the University of Leoben and the University of Graz, FH St. Pölten was also taking part for the very first time. Other award-winning work was concerned with high-tech waste classification and sorting, smart energy use and strategic innovation management for companies. Award winners were celebrated during festivities held yesterday evening at Landhausschiff in St. Pölten.

**How recyclable is a product?** Up until now, the only comparable measure for successful recycling has been the recycling rate. This value does offer a means of quantification, but does not offer any information about the quality of the recycled material produced during the recovery process. Environmental Award winner Caroline Roithner used statistical entropy in her dissertation to identify a solution that would allow for additional qualitative assessment of recycling performance based on the composition of materials. The new indicator allows for meaningful comparison between different methods of recycling, and constitutes an important addition to the conventional recycling rate used. The innovative method can already be used in product design, and gives an indication of how well a product can be recycled at the end of its service life. In turn, this helps to create the conditions for more sustainable product development. The insights of this and the other award-winning work will help to support the EU's circular economy targets, improve recycling performance overall, and protect the climate.

**Award winners celebrated.** Deputy Provincial Governor Stephan Pernkopf, along with other guests, was at yesterday evening's award ceremony at Landhausschiff in St. Pölten to celebrate the five winners of the Hans Roth Environmental Award on behalf of Provincial Governor Johanna Mikl-Leitner. 'Innovation and passion are the ingredients we need to achieve progress. These are young scientists who are breaking new ground in pursuit of the circular economy. The focus on digitalisation, added value and sustainability is not just topical, but also essential – it's about preserving Lower Austria as we see it today for future generations. On top of renewable energy and security of supply, a carefully considered circular economy has a very important role to play.' The main prize was awarded to Caroline Roithner of TU Wien. Anna Korak of BOKU Wien, Michael Vonwald of FH St. Pölten, Nikolai Emanuel Kuhn of the University of Leoben and Nora Kober of the University of Graz also received awards. The main prize winner received 3000 Euros, while other winners received a prize of 1500 Euros.

**Promoting innovation.** The objective of the award is to improve the digitalisation, added value and sustainability of waste management and the circular economy. In their evaluation, the jury emphasises concrete methods, originality and practicability for implementation and their economic and ecological benefits in day-to-day life. The reduction of harmful climate gases is also an important criterion. Sponsor of the award and founder of Saubermacher Hans Roth was impressed by the competence and originality of the work submitted for the award, 'I'd like to congratulate all winners for their outstanding dissertations. It's essential that young scientists are promoted and championed if we want to maintain and improve the innovative capability of our country, and the waste management industry in particular. The level of commitment to an environment worth living in is both praiseworthy and impressive.' The award has been presented annually since 2005, at five Austrian and three Slovenian universities. Saubermacher CEO Ralf Mittermayr and Head of R&D Astrid Arnberger represent the organisation.

The independent expert jury responsible for choosing the winners is composed of representatives from partner universities and colleges, as well as figures from business and public administration. Professor Helmut Rechberger/TU Wien, Professor Rupert Baumgartner and

Professor Ulrike-Maria Gelbmann/University of Graz, Professor Marion Huber-Humer/BOKU Wien, Professor Roland Pomberger/University of Leoben, Professor Marlies Temper and Professor Thomas Felberbauer/FH St. Pölten, Christoph Scharff/ARA Altstoff Recycling Austria AG, Christian Holzer/BMKUEMIT, Gerald Brantner/Billa AG, Rene Haber/Treibacher Industrie AG, Peter Giffinger/Saint-Gobain Austria GmbH, Alfred Riedl/Association of Austrian Local Authorities, Werner Kraus/T-Mobile Austria GmbH, Stephan Roth/Saubermacher.

### **An overview of the winners:**

#### **Winner of the Hans Roth Environmental Award for Austria (main prize)**

***Caroline Roithner/TU Wien with her dissertation: 'Multiple application of statistical entropy: new methods for evaluating the efficacy of recycling processes and the recyclability of products.'***

Caroline Roithner used statistical entropy in her work to identify a solution that would allow for additional qualitative assessment of recycling performance based on the composition of materials. The new indicator allows for meaningful comparison between different methods of recycling, and constitutes an important addition to the conventional recycling rate used. The method developed can already be used in product design, and gives an indication of how well a product can be recycled at the end of its service life. In turn, this helps to create the conditions for more sustainable product development. The insights from Ms Roithner's dissertation will help to support the EU's circular economy targets and improve recycling performance overall.

#### **Winner of the Hans Roth Environmental Award – University of Natural Resources and Life Sciences Vienna**

***Anna Korak with master's dissertation: 'Data basis for selective recyclable material ejection from a splitting plant for commercial and bulky waste.'***

Her dissertation looks at the use of a camera to view and classify delivered waste according to its content of potentially recyclable material. Ms Korak has considered whether or not assessing recyclable materials at the time at which they are handed over is worthwhile, what potential content of recyclable material is in the sample examined and whether, in addition to

ecological benefits, the data can also be used to determine whether or not economically effective sorting is possible.

### **Winner of the Hans Roth Environmental Award – FH St. Pölten**

**Michael Vonwald** with bachelor's dissertation: *'Smart energy. Benefits in energy management through networking of industrial machinery.'*

The bachelor's dissertation looks at the potential benefit in energy management that can be achieved from the networking of industrial machinery. He examines whether delayed operation of machinery can prevent power peaks in energy consumption, and thus save costs. He tested the efficacy of the power peak management system with the aid of a simulation application and historical data.

### **The winner of the Hans Roth Environmental Award – University of Leoben**

**Nikolai Emanuel Kuhn** with master's dissertation: *'Development of an object detection algorithm for a multi-sensor sorting system based on an artificial neural network and sensor data fusion.'*

The objective of Nikolai's dissertation is to develop a method for improved sorting of waste electrical and electronic equipment to allow more of it to be recycled and reused and to help save natural resources, such as rare earths. Using a near-infrared and visible light multi-sensor system, the displays and rear covers of smartphones can now be detected and separated by automatic sorting machinery. The principle of sensor data fusion and machine learning-supported data evaluation can be applied to numerous material streams with difficult sorting properties.

### **Winner of the Hans Roth Environmental Award – University of Graz**

**Nora Kober** with master's dissertation: *'Strategic innovation management at the front end of an innovation process: a case study.'*

The dissertation shows the options for action and concrete methods of how innovative ideas can be created within companies in a targeted fashion. Ms Kober developed a detailed assessment tool for innovation projects to act as an aid in complex decision-making situations. The assessment tool takes into consideration both the social and economic criteria so that ideas can be verified for their contribution to sustainability.

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The recommended measures support the selection of appropriate ideas and projects as well as the strategic and operational embedding of innovation activities within a company.

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