Excellent Environmental Research

Savings Bank Foundation and KIT Grant Environmental Awards to Young KIT Scientists

This year, environmental awards are granted to two PhD and three diploma theses as well as to one student project. (Photo: Gabi Zachmann)

Measurement of meteorological data by a tram, research into biofuels based on straw or algae: KIT research covers a wide scope of environmental topics. For the 31st time, the Savings Bank Foundation and KIT grant environmental awards to young KIT scientists whose research projects may contribute to preserving our environment. This year, the award in the total amount of EUR 10,000 goes to six projects in the fields of chemical and mechanical engineering, geosciences and economics, architecture, and chemistry. Michael Huber, Chairman of the Sparkasse (savings bank) Karlsruhe-Ettlingen, and KIT Vice-President Dr. Elke Luise Barnstedt will hand over the awards on May 19 at the Allgemeines Verfügungsgebäude (Campus South, building 50.41, Adenauerring 20) at 17 hrs.

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The first prize of EUR 2,500 each goes to Markus Delay and Massimo Genoese for their PhD theses.

Ecologist Markus Delay submitted a PhD thesis entitled “Contribution to Evaluating the Recyclability of Waste Materials.” If these materials are applied to soil, a “seepage water prognosis” is required according to the German federal soil protection regulations. This prognosis is intended to estimate the introduction of substances into the groundwater. So far, statistical shaking tests have been used for this purpose. However, they do not allow for any close-to-reality estimation of the release of substances from solids over time. Delay has developed a close-to-reality, dynamic column elution process that allows to vary central factors influencing the release of substances, considers various precipitation events, and takes into account flow interruptions and fluctuations of the flow rate. This process is associated with a reasonable expenditure.

Economic engineer Massimo Genoese wrote a PhD thesis on “The Development and Application of an Agent-based Simulation Model for the German Electricity Market.” Due to liberalization, increasing efforts to reduce greenhouse gas emissions, and the massive extension of renewable energies, the electricity sector has changed considerably. New market places for electricity and CO_2 emission rights have been generated. In view of this change, an agent-based simulation is a promising approach to analyzing the actors individually, reaching a high flexibility of the models, and to taking into account interactions between electricity costs and the planning of capacity extensions.

EUR 1,500 each are granted to three diploma theses by the Savings Bank Foundation and KIT. Fabian Müller from the Department of Architecture has contributed to improving the integrated urban development concept for Filderstadt, which started in 2008. In his diploma thesis, he developed a planning vision with the activation of “remote population groups” by alternative media elements, the development of visualizations and picture language, and a sensitization for the functioning of a city by a combination of factual data with spatial representations in a geo-information system. The geodesist Thomas Fuhrmann focused on the interaction of signals of global satellite navigation systems and the Earth’s atmosphere. His GPS analysis strategy allows for the inexpensive and precise determination of the water vapor content of the atmosphere by global navigation satellite system observations. The diploma thesis of Claudia Melanie Diehm concentrates on the catalytic partial oxidation of

fuels in reformers, in the course of which hydrogen is generated by the catalytic combustion of a fuel. This hydrogen can be used in fuel cells of modern electricity generators for heating and cooling trucks. In her thesis, the chemist combines this type of power production that reduces the consumption of fossil fuels and the emission of greenhouse gases with the use of biofuels based on renewable resources and she determines optimum fuel mixtures.

For his student project on the concept of a small wind power plant, Aljoscha Göbel is granted EUR 500. So far, small wind power plants have not been economically efficient. The components of various plant types are too costly and wind conditions at low height are not optimum. The student of mechanical engineering tested ascending wind turbines to solve this problem.

The environmental award of the Savings Bank Foundation and KIT does not only honor extraordinary scientific activities, but also projects that are of public interest in the broadest sense and may contribute to solving environmental problems. One semester prior to the granting of the awards, the KIT departments submit their proposals from among all PhD and diploma theses, student projects, and other student activities. A foundation council decides on the winners of the award in a multi-stage evaluation process.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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