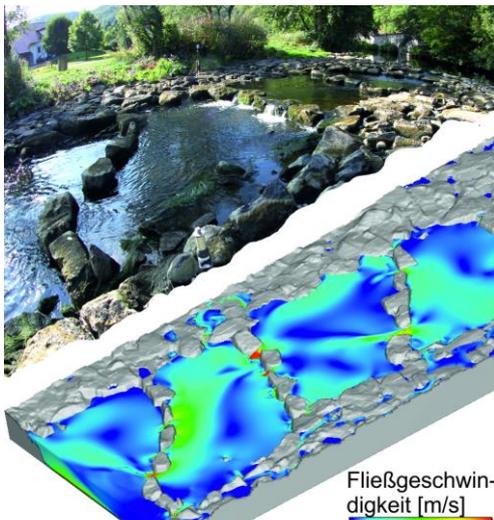


## Hydraulic Engineering, Photocatalysis, and Biomass Use

Annual Conference of the KIT Climate and Environment Center on July 09 – Sparkasse Environmental Awards Ceremony – Keynote Speech about Georesources



Highly resolved flow models are used to optimize fish ladders (*Fließgeschwindigkeit* = Flow rate). (Photo: IWG, KIT)

During the annual conference of the KIT Climate and Environment Center on July 09, three young scientists of KIT will be granted the Sparkassen-Umwelt-Preis (Sparkasse Environmental Award) for their outstanding graduation theses. Franz Dichgans studied the hydraulics of a riverbed slide that allows fish to pass the river again. Dr. Jan Ungelenk optimized a photocatalyst for use in water treatment and the medical sector. Dr. Frederik Trippe developed a technico-economic model to assess biomass-to-liquid concepts. Representatives of the media and the interested public are cordially invited to attend the awards ceremony at the Tulla Lecture Hall on KIT Campus South.

With the 2013 Sparkasse Environmental Award in the total amount of EUR 15,000, the Karlsruhe Institute of Technology (KIT) and the Environmental Foundation of the Sparkasse Karlsruhe Ettlingen acknowledge outstanding doctoral, diploma, and master theses or academic project work relating to environmental research. The departments of KIT are requested to propose candidates. For the year



KIT Climate and Environment Center:  
For an environment worth living in

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2013, the award is granted to one diploma thesis and two doctoral theses.

The diploma thesis **“Numerical Modeling of a Close-to-nature Riverbed Slide”** by Franz Dichgans contributes to enhancing the ecological compatibility of hydraulic engineering structures. To allow fish to pass rivers again, numerous fish ladders were built in the past years at river weirs and other lateral structures in the water. The so-called riverbed slides compensate height differences. Hydraulic dimensioning of such structures is very difficult due to the formation of complex flow patterns. Dichgans studied the hydraulics of an existing riverbed slide in detail by combining terrestrial laser scanning with high-resolution hydrodynamico-numerical models. His study provided comprehensive information on the flow characteristics of the construction. This allows conclusions to be drawn with respect to the (fish-) ecological and hydraulic dimensioning of future riverbed slides.

**“Tin Tungstate – A Solar Activable Photocatalyst”** is the subject of the doctoral thesis written by Dr. Jan Ungelenk. Photocatalysis allows for the direct conversion of light energy into chemical energy. It is used to decompose environmental pollutants and to reprocess water by photodisinfection. Tin tungstate cannot only be activated by UV, but also by longer-wave light. Hence, the natural solar spectrum can be used efficiently as a light source. This opens up new applications in medicine, such as minimally invasive therapy of tumors by irradiation with cell-compatible visible light. Dr. Jan Ungelenk characterized the so far hardly accessible cubic tin tungstate, optimized it for photocatalysis, and tested its application potentials.

A **“Technico-economic Assessment of Process Configurations Other than the Production of Biomass-to-liquid (BtL) Fuels and Chemicals”** is in the focus of Dr. Frederik Trippe’s doctoral thesis. Biomass can be used for the direct production of electricity and heat as well as for the production of fuels and chemicals. Using the KIT-developed **bioliq<sup>®</sup>** process as an example, which is a BtL concept using residues from agriculture and forestry, Dr. Frederik Trippe developed a technico-economic assessment model that combines technical design parameters directly with their economic impacts. The model yields results for energy and mass balances, estimated investments, and costs of the conversion and production of intermediate and end products.

At its annual conference, the KIT Climate and Environment Center will present latest research results. The **keynote speech** will be made by Professor Frank Schilling, Head of the Petrophysics Divi-

sion of the Institute of Applied Geosciences (AGW) of KIT. His subject will be **“Georesources – Protecting the Environment or Exporting Risks.”** Among others, Schilling will speak about CO<sub>2</sub> separation and storage, shale gas, geothermal energy, and mineral resources. A poster exhibition at the conference will cover doctoral theses that are presently being written at the GRACE Graduate School. At GRACE, the KIT Climate and Environment Center, together with the University of Darmstadt and the ESADE Business School, Barcelona, conveys specific and interdisciplinary knowledge as well as key qualifications to doctoral students.

**Program: Annual Conference of the KIT Climate and Environment Center**

Wednesday, July 09, 2014, 16.30 hrs, Tulla Lecture Hall (building 11.40), KIT Campus South

**Welcome Addresses**

Professor Detlef Löhe, KIT Vice President for Research and Information

Dr. Frank Mentrup, Lord Mayor of the City of Karlsruhe

Michael Huber, Chief Executive Officer of the Sparkasse Karlsruhe Ettlingen

**2013 Sparkasse Environmental Awards Ceremony and Short Presentations by the Winners**

Franz Dichgans

Numerical Modeling of a Close-to-nature Riverbed Slide

Dr. Jan Ungelenk

Tin Tungstate – A Solar Activable Photocatalyst

Dr. Frederik Trippe

Technico-economic Assessment of Process Configurations Other than the Production of Biomass-to-liquid (BtL) Fuels and Chemicals

**News of the KIT Climate and Environment Center**

Professor Johannes Orphal

Scientific Spokesman of KIT's Climate and Environment Center

**Keynote Speech: Georesources – Protecting the Environment or Exporting Risks**

Professor Frank Schilling, Institute of Applied Geosciences

**Reception with snacks and music and  
Poster session about GRACE doctoral theses**

**The KIT Climate and Environment Center develops strategies and technologies to secure the natural bases of life. For this purpose, 660 employees of 32 institutes produce fundamental and application-oriented knowledge relating to climate and environmental change. It is not only aimed at eliminating the causes of environmental problems, but increasingly at adapting to changed conditions.**

**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. Research activities focus on energy, the natural and built environment as well as on society and technology and cover the whole range extending from fundamental aspects to application. With about 9400 employees, including more than 6000 staff members in the science and education sector, and 24500 students, KIT is one of the biggest research and education institutions in Europe. Work of KIT is based on the knowledge triangle of research, teaching, and innovation.**

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