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Testimonial/Internet Report
12 Scientists

"Science Needs International Networks"

Prof. Dr. Rafiq Azzam, Department of Engineering Geology and Hydrogeology, RWTH Aachen University

Building Networks

Rafiq Azzam, professor of engineering geology and hydrogeology, researches and teaches at RWTH Aachen University. Important questions relating to environmental and water management are his main concerns. He attaches great importance to international exchange because "we can learn a lot from one another".

How can we supply megacities with clean drinking water? Is it possible to transform coal into electrical energy without damaging the environment? Which innovative technologies can provide early warning of dangerous landslides? These are questions Professor Rafiq Azzam is trying to get to the bottom of. The Jordanian-born scientist has held the chair of engineering geology and hydrogeology at RWTH Aachen, one of Germany's Universities of Excellence, since 2002. Environmental and water management are among his main areas of work. These fields are becoming increasingly important around the world and now attract a large number of students. Last semester a total of 290 young men and women began Bachelor's degree programmes in applied geosciences and georesource management at RWTH Aachen – three times as many as three years ago. The department is also a magnet for international students: Rafiq Azzam is currently supervising four Chinese PhD students.

Links all over the world

Rafiq Azzam is a networker, a knowledge manager who tirelessly establishes links abroad and initiates cooperative partnerships: "Science needs international networks. And the network grows larger with every PhD student that engages in international work or comes to us from abroad." He maintains close contacts with researchers in the Arab world, in Mexico, Canada and Australia. He also supports the German-Arab/Iranian Higher Education Dialogue and the new Indo-German Centre of Excellence for Sustainable Development, which were established by the German Academic Exchange Service (DAAD). His graduates often focus on international subjects – such as research on groundwater quality in Indonesia or the weathering of rocks in the cliff city of Petra. In 2008 Rafiq Azzam concluded an official cooperation agreement with the University of Shanghai for Science and Technology. "It's exciting to see how others solve problems. The Chinese, for example, frequently work in a more theoretical way with models, while we take a more experimental approach. We can learn a lot from one another."

Excellent RWTH Aachen

"The RWTH has an excellent reputation outside Germany," says Professor Azzam, "and interest in coming to Aachen is correspondingly great." That is something the son of Christian Palestinian parents, who was born in 1951, can very much understand. As a young man he was also attracted to Germany by a study programme at RWTH. After gaining his PhD, his

academic career initially took him to Australia and then on to a first chair at Freiberg University of Mining and Technology (TUBAF) in Saxony, before he returned to Aachen. The father of four is married to a German and clearly feels very much at home in the small city of Aachen with its large technological university.

Innovation through lateral thinking

Learning, increasing knowledge – these are activities that have driven Rafiq Azzam since he was a small boy: "My scientific curiosity is simply enormous." It ranges far beyond his own specialist area. Lateral thinking is Rafiq Azzam's passion – and his research also benefits from it. When he read about cigarette box-sized minicomputers that monitor the movements of containers in self-organizing networks, he immediately had an idea. Couldn't they also be used to control networks of sensors in early warning systems for natural disasters, such as the landslides that threaten many regions of the world? Today this research project is one of the most important in his department. It uses sensors from the automotive industry that normally trigger airbags. The goal is a totally new form of highly economical and close-meshed early warning system that can warn of imminent tsunamis, forest fires and floods. Rafiq Azzam is happiest when, as here, high-tech knowledge can be combined with simple implementation, because then research results can also be applied in the world's poorer regions.

Environmentally friendly energy production

RWTH engineering geologists have also attracted attention in the energy industry with another research project supervised by Professor Azzam. The CO2SINUS project uses a new approach to extract energy from coal by converting the coal into gas in the seam. The innovative feature of this process is that the resulting carbon dioxide can be immediately stored underground, thereby preventing the greenhouse gas from even entering the atmosphere. The process thus has an exemplary climate footprint and is also economical. The CO2SINUS project complies perfectly with one of Professor Azzam's guiding principles: "I believe science must always be of concrete benefit to people and the environment."

Text: Janet Schayan

"Science Needs International Networks"

Testimonial

Prof. Dr. Rafiq Azzam,

**Department of Engineering Geology and Hydrogeology,
RWTH Aachen University**

"Science needs international networks. Without these it would now be totally inconceivable. Today's world has shrunk, moved closer together, so no one can believe they are isolated and can achieve something on their own. It's also exciting to see how others solve problems. Science has always fascinated me; I always wanted to know how everything fits together – and not only in my field, engineering geology and hydrogeology. You can create lots of synergies if you take inspiration from other fields. Science gives me the greatest satisfaction when an idea becomes a success story. The research projects that are especially dear to my heart are those that combine high-tech knowledge with low-tech applications, which also makes them interesting for developing countries.

I feel very grateful to RWTH Aachen University. It is a leading international higher education institution and can hold its own against all the world's great universities in the technological disciplines."

Professor Rafiq Azzam Answers Three Questions

Professor Azzam, how would you rank RWTH internationally?

Aachen is one of the top institutions of higher education, even if that's not always made clear in the international rankings. However, rankings often tend to concentrate on the number of scientific papers published in international journals, and that is something we have not been paying enough attention to. Nevertheless, the strength of RWTH's research is clearly demonstrated by the extraordinarily high level of external funding. After all, industry only awards contracts where expertise is available.

Does German science distinguish itself through exceptional achievement in your research area?

In Germany environmental issues were taken up very early in engineering geology and hydrogeology. In the area of waste disposal technology, in dealing with past environmental damage, knowledge from Germany finds international application.

What made you choose engineering geology and hydrogeology?

When I came to Germany, I initially studied electrical engineering. As so often in life, however, it was a matter of luck that I found my way to engineering geology and hydrogeology. The subject is varied and exciting, and furthermore I was able to use a large number of synergies here due to my interest in electrical engineering – for example, in the development of measuring techniques.

Kontext-Infoboxen:

Aachen

The westernmost German city is proud of its past as an imperial capital: 1,200 years ago Charlemagne ruled over large parts of Europe, and Aachen was the emperor's main residence. Today Aachen is the centre of Europe for one day a year at least: when the Charlemagne Prize, the most prestigious European honour, is awarded. Yet Aachen is also a modern congress city, a technology and research centre and, with its thermal springs, a popular spa resort. Aachen has 245,940 inhabitants (December 2008), of whom one in seven is a student at RWTH or the city's university of applied sciences.

RWTH Aachen University

Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen was founded in 1863 and is one of Germany's largest technological universities with 30,103 students in some 85 different programmes (winter semester 2007/2008). Roughly 5,000 students come from abroad. As part of the Initiative for Excellence, RWTH was one of nine universities selected on the basis of its institutional research strategy and is now receiving special funding. As RWTH Aachen University attaches considerable importance to international relations, it maintains its own representative office in Beijing and runs institutes such as the Thai German Graduate School (TGGS) in Bangkok and the German University of Technology (GUTech) in Oman in conjunction with partner institutions.

Engineering Geology and Hydrogeology

The Department of Engineering Geology and Hydrogeology at RWTH Aachen University belongs to the Faculty of Georesources and Materials Engineering and to the Geosciences and Geography Section. It offers Bachelor's and Master's degree programmes in applied geosciences and in georesource management. The applied geosciences make an important contribution to the sustainable use of the Earth's resources – in other words, rocks, minerals and ores, petroleum and natural gas, water and geothermal energy. Georesource management focuses on the meaningful sustainable use of raw materials such as water, soil and fuels. It also involves limiting the potential consequences of natural disasters in densely populated regions as well as of human intervention on planet Earth (environment and climate changes).

Links:

Further Information

RWTH Aachen University

The website of the Rheinisch-Westfälische Technische Hochschule Aachen provides a wealth of information about its history, study programmes and current developments. It also offers information about the Initiative for Excellence and many details for potential international students (German, English and Dutch).

<http://www.rwth-aachen.de>

Department of Engineering Geology and Hydrogeology at RWTH Aachen University

The website offers lots of information on current research projects and provides insights into its academic work and the organization of courses (German and English).

<http://www.lih.rwth-aachen.de>

CO2SINUS Research Project

For its research project on CO₂ storage in converted coal seams the Department of Engineering Geology and Hydrogeology at RWTH Aachen University has been honoured as a 2009 Selected Place within the framework of the Germany – Land of Ideas initiative (German and English).

<http://www.co2sinus.org>

Bildzuschriften

Dateiname 01_Jan_Prof_Azzam_01

Professor Azzam and his research staff examine rock samples

Photo: Jan Greune

Dateiname 01_Jan_Prof_Azzam_02

Soil samples in the geotechnical laboratory at RWTH Aachen University

Photo: Jan Greune

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Discussion with undergraduate and PhD students from RWTH Aachen University

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Rock samples and drilling cores are kept at the engineering geology store

Photo: Jan Greune

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Prof. Dr. Rafiq Azzam, Department of Engineering Geology and Hydrogeology, RWTH Aachen University

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Dateiname 01_Jan_Prof_Azzam_06

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