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## Interview mit Ille C. Gebeshuber, Physikerin an der TU Wien, seit 2009 in Malaysia – Erfahrungen als Wissenschaftlerin und Lehrende in Malaysia

### 1. Please tell us about the nature of your researches in Malaysia.

Malaysia is a wonderful country with amazing nature and great people. In our research we learn from both, from the natural environment and from the people, for the sake of humanity. Some of the students are from my host university in Malaysia (I am Professor at the Institute of Microengineering and Nanoelectronics at the Universiti Kebangsaan Malaysia) and some of them are from Austria, my country of origin. I hold a permanent position at the Institute of Applied Physics at the Vienna University of Technology, and the university management in Austria is so generous to grant me various years of research in Malaysia, in an environment that is completely different to where I come from. I have the unique opportunity to get to know new approaches, different ways of thinking and living, and I have ample time to deeply think about what I see and learn and experience. Nature is one of our greatest teachers. On frequent scientific expeditions to the virgin rainforests we learn about sustainability, and about elaborate materials, structures and processes. We identify underlying principles of what we see, and transfer these to human applications, for example to engineering and the arts, for the sake of a better future. The students love these activities – besides the science, they learn so many transferable skills. For example, they realize how complicated it can be to learn to communicate across cultures and religions (Malaysia is an Islamic country). In Malaysia, where many cultures and religions live and work together, such cross-cultural and inter-religious communication is a necessity, and the locals are perfect at it. And it is so interesting to see Austrian and Malaysian engineering and natural science students working together. Their education is very different. Initially, they have problems finding a common ground. But after a while, some weeks, synergetic effects dominate, and the whole becomes much larger than the sum of its parts. Last year, for example, one of the physics engineering BSc students from Austria coming to Malaysia for a couple of weeks was Oliver Futterknecht. He is very interested in bees, and their senses. Together with my two Malay PhD students, they were investigating new ways of navigation inspired by the ability of honeybees to navigate utilizing the polarization of the skylight. It was amazing to watch them grow together and develop their very own ways of doing research. And they came to great results, some of them already published. In 2010 I joined the Scientific Advisory Board of the Lifeboat Foundation, a Think Tank safeguarding humanity, and my approaches are therefore growing even wider in scope than they used to be. Most scientists of our time are specialists; they are very very good in a tiny little area of their field. I see myself as a different, new type of scientist: I am a generalist who increasingly deals with large-scale connections and structures, developments and trends, concepts and ideas. Successful addressing of the various global challenges we have to deal with at the time being needs people who can deal with interconnectedness and interdependence, across fields, across levels of education, across cultures. And this is exactly what I aim to live and teach.



### 2. What is the most interesting findings that you had made (in Malaysia)?

You will be surprised: the most interesting finding was to experience how people are driving in Malaysia!  
And to experience how a group of 150 Malays, with whom I was in the deep rainforest for one week, said goodbye to each other at the end of the expedition. And to see how my university in Malaysia works, how the people interact and what they do for each other. I was used to rules and regulations, to being a lone fighter, to blow the horn of my car if I did not get justice on the road. Here in Malaysia, it is different. In many cases, people here do not act as individuals, but as parts of one large entity. They are initially friendly when they first meet you, give you a smile, and assume the best of you. In Europe and the US, I see a rising amount of people with burnout syndrome and what I miss on my visits there is the optimism I got so used to in South-East Asia. I think the most interesting finding is that we need to approach our pressing issues together, benefitting from each other's values and experiences. Albert Einstein once said "We can't solve problems by using the same kind of thinking we used when we created them." Climate change, the increasing rich-poor gap, health issues arising from increasingly resistant microorganisms, transnational organized crime and global ethics are just some examples of global challenges that need being addressed.

### 3. In your researches, you often journey into many remote and exotic locations. Can you tell us some interesting experiences during these expeditions?

I love to travel to remote and exotic "locations" - in my mind and in reality. The scientific freedom I enjoy here in Malaysia gives me this opportunity. Soon after I arrived here about three years ago I went on my first scientific expedition. You cannot imagine how stunned I was! There are ferns, not green, but blue, changing color when you look at them from different angles, real beauties. What a little fern can do for technology? Well, the fern has no chemical pigments that produce the

#### Veranstaltungskalender

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blue color. It does it via tiny tiny structures. Imagine coloring cloths and cars, houses and books, papers and photographs, without pigments, just with structures! There would be no need for toxic paints, there would be no pollution of rivers from cloth coloring factories, no chemical dyes, no bleaching of the colors in the sun, no fading of photographs. You know the Morpho butterflies from the Costa Rica rainforests? The gorgeous metallic blue coloration on their wings comes from structures, not from pigments. You know the wonderful iridescence of the train feathers of peacocks? No pigments, just structures - like frozen rainbows or organic gemstones!

#### 4. What are your words of encouragement to researchers in similar discipline?

Do not blindly progress doing science in the typical Western way. The inherent wisdom in Asia is amazing. I would recommend researchers from around the world to get to know this different way of doing research and to apply it in their science. And a general recommendation: Try to focus on understanding, not on learning by heart. Let the children play and think, experience the world with their hands, and noses, and hearts. Give them time and freedom to see the big picture, do not let them get lost in unnecessary details. Let the children stay playful, and they will become the best scientists possible - the ones who are a motor of change towards a better future for humanity.

#### 5. What are your future research plans?

At the moment, many researchers find out many things that they publish in their respective specialist journals or in books. The mutual beneficial interaction between separate fields is very important but also a challenge because of the different inherent cultures and communication protocols. My future plans for my researches are to reach a deep understanding of the world around us and to develop a joint language in arts, science and engineering, a language in which descriptions at different levels of detail are more compatible, a tree of knowledge that is accessible for all.

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From left to right: Caroline Schweda, Oliver Futterknecht, Dominik Pichler, BSc students (Physics Engineering, TU Wien); physicist Dipl.-Ing. Teresa Makarczuk (Swarovski, Austria); Siti Zaleha Mat Diah, biologist, and Salmah Karman, engineer, PhD students (Nanoelectronics and Biomimetics, Universiti Kebangsaan Malaysia); Nicole Hirhager, BSc student (Architecture, TU Wien), and ICG, discussing their research in Kuala Lumpur, Malaysia.