SCCER Interviews

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What do you find fascinating/challenging about energy research and the energy transition?
The energy transition is something we all have to worry about as a society and something that needs to take place in the near future. Along with this, we also have to ensure that energy is used today as efficiently as possible. I view this not only as a challenge, but also as an opportunity to generate new ideas and methods to advance the transition to renewable resources and the efficient use of energy resources.

What are your research topics and what is your role within the SCCER Mobility?
My research focuses on advanced polymer composite manufacturing. In particular, it investigates conceiving and processing new lightweight polymer composite materials for many different applications. This is also part of my research efforts within SCCER Mobility and Capacity Area A3. Within this area, we aim at finding cost-effective and sustainable lightweight materials, based on thermoplastic matrices and reinforcing fibers, for the automotive and transport industry to reduce non-propulsive energy demand. I am also the Deputy Coordinator of this Capacity Area.

Why did you become a scientist?
Actually, I would not call myself only a scientist, but also an engineer. In school, I enjoyed math and physics, so it was clear that I would not study history or languages. I always liked understanding how things work and studying sciences was a natural choice for me. I specialized in material science and engineering, as it is a good compromise between fundamental concepts and applied engineering problems, and always a crucial part of new technology developments. I decided to pursue a career in academia, because it allowed me to keep a certain degree of freedom in what I do and for me working in research and development is both useful to society and fun. Additionally, I enjoy training young scientists and being involved in the multiplying power of passing knowledge and skills on to young researchers. The combination of research and teaching is something that attracts me to the academic environment.

What are your main career highlights?
I studied Materials Science and Engineering at the École des Mines de Paris, France. Then I went to MIT, USA, originally to do a master's degree, but ended up staying 7 years completing my PhD in Materials Engineering and a postdoc position. Following that, I returned to France as an assistant professor at École Centrale Paris. This was a permanent position, but my partner at the time, now husband, got a position at EPFL, about 21 years ago. I decided to join him and took a position as post-doc, then senior scientist in the Laboratory for Polymer and Composite Technology. I then became adjunct professor in 2009 in this laboratory. In 2017, I was nominated as Associate Professor and created the Laboratory for Processing of Advanced Composites. In parallel, I got involved in several teaching aspects and was the director of the Materials Science and Engineering Section between 2012 and 2017, before being nominated as Associate Dean of the Faculty of Engineering in 2018, in charge of education.

How do you think mobility will change in the next 10 years and what role will renewable energy play?
Mobility as we know it today will certainly change, but it is difficult to predict exactly to what extent. We are already starting to see new technologies applied in areas we would not have deemed possible only a few years ago, like autonomous vehicles. Future mobility solutions are likely to be more flexible and tailored to the needs of the users. I think less people will own a car in the future; rather car and ride sharing will increase, together with public transport means. Electromobility will certainly play an important role, but we have to be careful in thinking that it will be the perfect solution. Electric vehicles may bring other problems like scarcity of certain resources that are needed for battery production, or displacement of CO_2 and pollution emission due to an increased need of electricity generation. Advancing renewable energy and storage solutions as much as possible along with reducing energy demand using for example lighter materials will always be critical. However, in the future, we may also travel less as communication and IT technologies improve, thus reducing our need to be at a certain place in person. This could save a lot of energy, but of course, it would also be less pleasant as direct human interactions decrease.

What is your "work-life-balance" recipe?
Find a good husband and have good kids (laughs). To keep things in balance, everyone has to be active in the household and share all the tasks, and I learned to accept that things are maybe not always done the way I would like them to be done, but they are done! My husband and kids are very supportive, so that I am able to maintain a good work-life-balance, and I enjoy the possibility to work at home when necessary while being present for the family. I would say that family, work and household take up 98% of my time, but I do not mind as I consider my own leisure activities as being an integral part of family activities as well.

Can you provide recommendations for young scientists wishing to pursue a career in the field of (energy) research?
I would recommend that they should not worry about not following the mainstream and making decisions that may seem strange to other people. Young researchers should follow their instincts and pursue what they enjoy doing and what they feel is right for them. If you follow what you like doing, everything else will fall into place (and if not, at least you tried and learned something!).

What are the important issues related to mobility that public policy makers should consider when developing the Energy Strategy 2050?
I think it is important to be aware of the implications of our technology choices, as what may appear to be good solution today, may not be good in the future. Therefore, we should keep a good balance in terms of available technologies in energy generation and mobility. Furthermore, we should always keep the big picture in mind and make sure some solutions that look attractive at first glance actually fulfill the laws of physics and are sustainable if implemented at large scale. It may be helpful to make some back-of-the-envelope calculations to check if certain technical decisions make sense from a sustainability and global energy balance perspective. Some ideas on simple methods can be found in the book of David McKay, "Sustainable Energy -without the hot air", for example related to the implementation of wind energy versus available land space or the need to better insulate houses in the UK. In any case, progress and economic growth will most probably occur and therefore, it is essential to find new ways for reducing energy consumption and limiting energy waste as much as possible. For example, I was really surprised when I learned in one of our SCCER meetings that a large fraction of the energy consumption in a bus or tram is related to passenger comfort (heating/cooling), and that this point is not really well tackled yet from a vehicle conception perspective.

Interview: Kirsten Oswald, June 2018