

Mission possible

“To tackle big problems like climate change, we first have to measure invisibly tiny aerosols of the atmosphere.” – Academy Professor Markku Kulmala wants to construct a world-wide net of observational stations

“I want to contribute to fundamental physics – and, besides, to brake the climate change. And I want not only to promote science, but to advance its industrial applications as well. Preferably, all this simultaneously.”

This is how Academy Professor, physicist Markku Kulmala describes his mission. His words are anything but rhetoric: Kulmala’s achievements are convincing. He is the most cited scientist internationally in the area of geosciences. His major contribution, the theory of neutral clusters, was proven in early 2013 and published in *Science* the same year, drawing the attention of the scientific communities everywhere.

Kulmala is known as the primus motor of many multinational research projects, all of which have focused the various climate phenomena and their interlinking with air quality. He has from the very beginning of his career tackled the challenges of atmosphere with diversified research groups combining the expertise of chemists, physicists, biosciences and especially forestry.

“The problems of the atmosphere are so severe that no human or no discipline can solve them alone,” as he puts it.



Fig. 1 The observational station consists of several laboratory buildings. But in addition to them, measurement instruments are fixed up to canopies and located on the surface of the ground as well. Image: Juho Aalto



Professor Kulmala co-ordinates the work of over 400 physicists, chemists and forest experts all over the world

Experimental science, tangible results

The scientific success of his group is based not only on multidisciplinary, but even more on long term data collected in several observational stations established by Kulmala. Most of these well equipped field laboratories are located in distant forest areas around Finland, but their significance in global research projects cannot be overestimated.

At the moment, Kulmala plans to widen the network of the stations over Siberia and China. This kind of massive construction initiative extending over ten years would be based on the co-operation of several leading Russian and European institutes – and political decision makers. With good reason, Kulmala is optimistic: he has already successfully set up similar laboratories in China and Estonia.

It is probably a less known fact that Kulmala’s work in atmospheric physics has been fruitful in business, too: spin-off company Airmodus was founded in his division in the University of Helsinki. Today Airmodus works in designing and manufacturing particle counters sold worldwide. One growing client group for Airmodus is the car industry hit by gradually tightening emission limits.

Markku Kulmala has been working on environmental physics since he was a pre-graduate student, but he does not seem to get bored. After 30 years with molecular-level procedures of the atmosphere and laboratory work in the middle of Arctic forests he still enjoys deriving equations or planning experiments.

“If we do not know the details of procedures governing the birth and lifetime of the nanosize particles in the air, we cannot understand the mechanism of global warming either.”



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