

PL2.2 - Keynote



Lessons Learned in (Micro-)Acoustic Sensing

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Abstract:

This talk focuses on some general aspects that the author encountered in almost three decades of research in the area of acoustic and microacoustic sensing. Some of these works were applied and some were more fundamental with results being specific to the respectively considered problems. At the same time, there are insights that are of a more general relevance, which may be useful for one or the other fellow researcher in the field. In particular, the concept of “physical chemosensors” and “orthogonal sensors” as well as the selection of driving mechanisms (Lorentz-forces vs. piezoelectricity), operation frequency, and vibration modes will be discussed for selected fluidic sensing applications.

In these cases, also the consideration of the second coefficient of viscosity has proven to be beneficial. Challenges associated with highly viscous liquids can be turned into useful features when considering alternative sensing principles. Similarly, using weakly coupled acoustic systems can yield design advantages overcompensating the associated loss in signal level. Also, in terms of fabrication technologies as well as modeling techniques, one can benefit from using methods from neighboring disciplines introducing additional methodological flavors in one’s research. Finally, when it comes to applications, the relevance of algorithms and electronics must not be under-estimated. This exemplary list of aspects will be illustrated and discussed using examples from several ongoing and finalized research projects.