



# CSC Seminar

## SPEAKER

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## TITLE

**Challenges in Data-Driven Modelling of Acoustical Systems: A State-Space Perspective**

## ABSTRACT

Adequate modelling of acoustical transmission systems can be a challenging task not only because of the complex dynamical system behaviour but also the level of fidelity required for keeping up with the human auditory system. Many physically motivated modelling approaches, e.g. modal formulations or FEM simulations, impose structural assumptions and simplifications on the model which can therefore exhibit large deviations from the real-world system. In these cases, data-based descriptions may be preferred and thus high-dimensional measurement data is oftentimes available in acoustical research and engineering practice. Recently, the conjoined use of efficient low rank matrix factorizations and classical system identification methods has enabled the construction of large state-space realizations from high-dimensional measurement data. State-space models provide access to a plethora of sophisticated model order reduction and interpolation techniques which sheds new light onto many acoustical modelling challenges.

This talk aims to provide an overview of the specific challenges in data-driven acoustical modelling such as dispersive wave propagation and I/O interpolation and suggest new directions of research that arise of these. Several aspects are highlighted by means of different examples and the results of a validity application of the generalized Eigensystem Realization Algorithm with randomized SVD to room impulse response measurements are presented. Finally, the previous considerations are boiled down to a wishlist of problem solutions.

Tuesday, April 5, 2022 at 2 pm

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