



UNIVERSITÀ DEGLI STUDI DI GENOVA, SCUOLA POLITECNICA

DIPARTIMENTO DI INGEGNERIA CIVILE, CHIMICA E AMBIENTALE

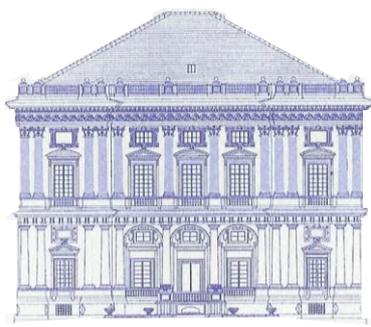
## AVVISO DI SEMINARIO

**“Self-excited acoustic instabilities: the Rijke tube  
and curve squeal of train wheels”**

Prof. Maria A. Heckl

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Mercoledì 21 Ottobre, 2015 – ore 14.00  
Scuola Politecnica  
Aula A11, DICCA  
Villa Giustiniani - Cambiaso



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## Self-excited acoustic instabilities: The Rijke tube and curve squeal of train wheels

Two forms of acoustic instability will be modelled with a Green's function approach: the Rijke tube and curve squeal. In the Rijke tube, the instability is due to a feedback between the heat release and the acoustic field in the tube. Curve squeal occurs when a train goes round a tight bend and is due to a feedback between friction force and lateral wheel velocity in the wheel-rail contact. In both cases, a resonant interaction is produced by a driving process (heat input, friction), which generates perturbations (acoustic waves, wheel oscillations) in the resonator (air-filled tube, wheel) and a feedback process, which couples these perturbations to the driving mechanism (acoustic waves influencing the heat input, wheel oscillations influencing the friction). The Green's function will be introduced for both physical systems. It will be used to derive a governing integral equation from which the instability behaviour can be predicted. Some analytical and numerical results will be presented.

### Brevi cenni biografici su Maria Heckl

Masters Degree in Physics from the Technical University of Berlin (supervisor: Professor Ingo Müller).

PhD degree from the University of Cambridge (supervisor: Professor Shôn Ffowcs Williams).

Academic positions at Keele University since 1988 (post-doc, then lecturer, then senior lecturer)

Professor of Engineering Mathematics at Keele University since 2013.