1:00pm-5:00pm | Oct 21, 2015 (Wednesday)

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Title:	**Acoustical Imaging; from acoustic field equations to imaging and inversion**
Lecturer:	**Dr. Koen W.A. van Dongen,** Laboratory of Acoustical Wavefield Imaging, Faculty of Applied Sciences, Delft University of Technology, the Netherlands**.**
Abstract:	To understand the propagation of acoustic wave fields in heterogeneous media, it is important to have knowledge about the underlying physical mechanisms of these fields. During this course, the acoustic field equations (equation of motion and equation of deformation) will be derived, and it will be shown that the acoustic field is described via a pressure and a velocity wave field. Next, linearized versions of the field equations are used to derive a wave equation for linear acoustics. A similar approach is used to show how the Westerveld equation used for non-linear acoustics may be obtained. Finally, different solution methods for modelling acoustic wave fields in heterogeneous media will be explained, followed by a discussion about imaging and (non-linear) inversion for quantitative imaging.
Outline	• Formulation of acoustic field equations for linear acoustics (Newton's law and Hooke's law); • Wave equation for linear acoustics (Helmholtz equation) and Non-linear acoustics (Westerveld equation); • Inhomogeneous media (solution methods for modelling acoustic wave fields, formulation of integral equation, Born approximation); • (Quantitative) Imaging and nonlinear inversion.

Biography

Koen W.A. van Dongen received his MSc degree from Utrecht University in 1997. From 1998 to 2002, he worked for T&A Survey on the development of a directional borehole radar system. This work resulted in a PhD degree from Delft University of Technology in 2002. In 2002 and 2003 he worked as postdoctoral researcher on ground penetrating radar in the Laboratory of Electromagnetic Research at the same university. From 2003 to 2005, he worked as a Marie-Curie Fellow on ultrasound thermometry in the Ultrasonic Research Group at University College Cork. In 2006, he moved to the Laboratory of Acoustical Wavefield Imaging, Delft University of Technology. His major research interests include imaging, inversion, and modelling of (nonlinear) acoustic wave fields for medical applications.