

# Tutorial 3 - FDTD Methods for Physical Modelling Sound Synthesis and Audio Effects Processing

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## **Abstract**

This tutorial is intended as an introduction to time stepping methods for physical audio synthesis and effects processing, with some emphasis on how they fit into the larger picture of more standard audio signal processing/synthesis techniques. Various examples will be discussed and worked through in detail, spanning the range of acoustic musical instruments, electromechanical instruments and reverberation devices, and full 3D room acoustics simulation. Audio and video examples will be presented, along with Matlab code walk throughs.

## **Bio**

Stefan Bilbao is currently a Senior Lecturer in Acoustics at the University of Edinburgh. He was formerly a lecturer at the Sonic Arts Research Centre, at the Queen's University Belfast, and a post-doctoral research associate at the Stanford Space Telecommunications and Radio science Laboratory. Prior to that, he received the MSc and Ph.D. degrees in Electrical Engineering at Stanford University while working at the Centre for Computer Research in Music and Acoustics, and a BA in Physics at Harvard University, and in between spent two years in the real-time group at the [Institut de Recherche et Coordination Acoustique/Musique](#) in Paris.

His main interests are in sound synthesis, numerical method design, and parallel processing for audio on GPUs.