

## EIT reconstruction using virtual X-rays and machine learning

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We introduce a new reconstruction algorithm for EIT, which provides a connection between EIT and traditional X-ray tomography, based on the idea of “virtual X-rays”. We divide the exponentially ill-posed and nonlinear inverse problem of EIT into separate steps. We start by mathematically calculating so-called virtual X-ray projection data from the DN map. Then, we perform explicit algebraic operations and one-dimensional integration, ending up with a blurry and nonlinearly transformed Radon sinogram. We use a neural network to learn the nonlinear deconvolution-like operation. Finally, we can compute a reconstruction of the conductivity using the inverse Radon transform. We demonstrate the method with simulated data examples.

This is a joint work with Samuli Siltanen, Matti Lassas, Rashmi Murthy, Fernando Silva de Moura, Juan Pablo Agnelli, and Melody Alsaker.

**Orateur:** RAUTIO, Siiri