

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Seminar

A Deep Direct Sampling Method for Electrical Impedance and Diffuse Optical Tomography

By

**Dr. Ruchi Guo
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Abstract

Electrical impedance tomography (EIT) and Diffuse Optical Tomography (DOT) are promising techniques for non-invasive and radiation-free type of medical imaging. They all can be considered as inverse boundary value problems to identify PDE coefficients. But a high-quality reconstruction is always challenging due to its severe ill-posedness. Based on the idea of direct sampling methods (DSMs), we present a framework to construct deep neural networks for solving these two problems. It is able to capture the underlying mathematical structure from background projection of boundary measurement to coefficient distribution. The resulting Deep DSM (DDSM) is easy for implementation and its offline-online decomposition inherits efficiency from the original DSM that does not need any optimization process in reconstruction. Additionally, it is capable of systematically incorporating multiple Cauchy data pairs to achieve high-quality reconstruction and is also highly robust to large noise.

Date: 25 November 2021 (Thursday)

Time: 10:00-11:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 918 7768 2373)

Speaker: Dr. Ruchi Guo, University of California, Irvine

Host: Prof. Yanping Lin, The Hong Kong Polytechnic University

Click to join:

<https://polyu.zoom.us/j/91877682373?pwd=anFqdFB1Wm1ZdVRZWlMlMENUd0N6dz09>



[Click to join \(Zoom\)](#)

***** ALL ARE WELCOME *****

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 24 November 2021