

Subject **[Scdt] SCDT-FlexE Centre Weekly Seminar by Nadeem Firoz
Tue 17.08.2021 at 7:30 PM**

From SCDT, IIT Kanpur <scdt@iitk.ac.in>

Sender <scdt-admin@lists.iitk.ac.in>

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Date 2021-08-16 15:16

Priority Normal

IITK WEBMAIL

Zoom link :

<https://iitk-ac-in.zoom.us/j/96179390744?pwd=YmZubXRNTlcvYn1MMlJXZFVhVUt09>

Meeting ID: 961 7939 0744
Passcode: 567387

Dear Colleagues,

The Ph.D. open seminar by Nadeem Firoz of our centre will be presented in our SCDT-FlexE Weekly Seminar slot this week - on Tuesday, 17th August, 2021 from 7:30 PM. Please note that the zoom link for this event is as given above (also mentioned in the forwarded email of Nadeem's advisor, Prof. Baquer Mazhari below).

Look forward to your joining the weekly seminar of the centre for this week tomorrow.

Thanks!
S.K.I.

----- Original Message -----
Subject: [acadstaff] Open seminar (Dept. of EE)
From: baquer@iitk.ac.in
Date: Mon, August 16, 2021 2:51 pm
To: acadstaff@lists.iitk.ac.in
"eepg" <eepg@lists.iitk.ac.in>

Department of Electrical Engineering

Open Seminar

Title: "Outside Gated Probe Technique for Characterization of Thin Film Transistors and Active Matrix Sensing Applications."

Speaker : Nadeem Firoz (Roll no : 14104271)

Brief Abstract : Thin film transistors (TFTs) are a key element of large area electronics with many prominent applications including active matrix displays, sheet scanners, artificial skin, radio frequency identification tags, etc. This thesis describes use of a floating contact adjacent to source and outside the channel for characterization and sensing applications. Simulation and experimental results obtained with pentacene organic semiconductor as well as indium-gallium-zinc-oxide based thin film transistors are used to illustrate the results of the thesis.

A method for extraction of source resistance in top contact thin film transistors is described that is based on a single measurement of slope of outside gated probe voltage with drain-source bias. A family of universal curves is presented that allows extraction of source resistance using a single transistor without introducing any disturbance in the channel. The proposed technique also allows easy differentiation of ohmic and injection limited schottky contacts. A generalised transmission line approach for non-linear source resistance is described that uses circuit simulation based

optimization technique to extract source resistance.

The outside gated probe represents a four terminal TFT that is also very useful for large area active matrix sensing. In the conventional 1-TFT structure, the TFT channel resistance adds to the sensor resistance, resulting in loss of accuracy and sensitivity to process variations. The proposed structure removes the impact of TFT channel resistance completely without increasing process complexity and only a single additional column line in the active matrix structure. Experimental results obtained with Pentacene organic semiconductor based top contact TFT show that sensor resistances that are less than 1% of channel resistance are measurable using the proposed approach. In addition to improved accuracy, an additional benefit of use of new TFT structure is that it can allow a wider variety of both TFT and sensor materials to become potentially useful for realization of high resolution large area sensor arrays. Temperature sensors based on this approach also show promising results.

Zoom link :

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All are welcome to attend

B. Mazhari (Thesis Supervisor)

Professor, Dept. of EE

IIT Kanpur

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