

### CNDE Webinar Presentation December 17, 2021 10:00 am CST

This webinar will be recorded and made available on the CNDE website

#### **Fundamentals of Instrumentation and Measurement for NDE**

**Presented by: Research Associate Professor Tayeb Al Qaseer**  
**Center for Nondestructive Evaluation (CNDE)**  
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**Iowa State University**



#### **Speaker:**

**Mohammad Tayeb Al Qaseer** is a Research Associate Professor with the Electrical and Computer Engineering Department, Iowa State University (ISU). He is a member of the Center of Nondestructive Evaluation (CNDE) at ISU, where he conducts research in microwave and millimeter-wave NDE. His research covers high-frequency instrumentation and measurement and its application for nondestructive testing, material characterization and 3D imaging. His other interests include RF circuits, antennas, and numerical electromagnetic analysis. He published numerous refereed journal articles, and conference proceedings. He has 10 awarded patents in the areas of microwave and millimeter wave imaging and nondestructive testing.

#### **Abstract:**

Accurate measurements play a crucial role in advancement of science and engineering. The needs for nondestructive evaluation (NDE) of advanced materials and structures put extraordinary demand on performing accurate measurements. Understanding the capabilities of an instrument and the basics of measurement concepts in time domain or frequency domain is critical for successful NDE experiments. In this technical presentation, I will present techniques used in signal conditioning, digitization using analog to digital convertors (ADC), as well as signal processing techniques for improved throughput. Important signal and system properties such as jitter or phase-noise, minimum detectable signal, effective number of bits, and dynamic range will be discussed. Furthermore, signal processing techniques for improving signal-to-noise will be presented.

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