2018 Training Workshop on **Real-time Digital Radiation Measurements in FPGA**

Friday, June 08 - Sunday, June 10
Nuclear Engineering and Radiological Sciences, University of Michigan
Baer Room, 2355 Bonisteel Blvd., Ann Arbor, Michigan 48109

Tentative Schedule

Day 1: Digital Processing and Hardware Description Language	
7:45-8:15	Breakfast
8:15-10:00	Analog and digital radiation measurements, fundamentals of digital design
10:00-10:15	Break
10:15-12:00	Digital filtering in radiation measurements, FPGA-based digital pulse processors
12:00-13:00	Lunch Break
13:00-14:45	VHDL fundamentals 1: syntax , data types, operators, if & case statements
14:45-15:00	Break
15:00-16:45	VHDL fundamentals 2: modeling flip flop, processes, design hierarchy, state machines

Day 2: Getting Started with FPGA	
7:45-8:15	Breakfast
8:15-10:00	What is Field-Programmable Gate Array (FPGA)? Example 1: A simple traffic signal controller: design, simulation, programming and tests
10:00-10:15	Break
10:15-12:00	Example 2: A simple system trigger: design and simulation
12:00-13:00	Lunch Break
13:00-14:45	Digital pulse shaping in FPGA Digital pulse-shape discrimination in FPGA Coincidence measurements in FPGA
14:45-15:00	Break
15:00-16:45	Realizing a digital multi-channel analyzer (MCA) in FPGA: design structure

Day 3: Digital Gamma Spectroscopy in FPGA	
7:45-8:15	Breakfast
8:15-10:00	Digital multi-channel analyzer (MCA) in FPGA: synthesis and implementation of the MCA design in Xilinx ISE, experiment setup
10:00-10:15	Break
10:15-12:00	Generating FPGA programming file, programming, and troubleshooting
12:00-13:00	Lunch Break
13:00-14:45	FPGA readout of organic scintillators for the UM Environmental Weather Station FPGA programming, radiation measurements with a NaI detector
14:45-15:00	Break
15:00-16:45	FPGA programming, radiation measurements with a NaI detector (cont.)