



Contribution ID: 109

Type: **Parallel session talk**

## Modern Electronics Education with AI/ML and FPGA

*Thursday 9 October 2025 11:40 (20 minutes)*

PHYS476 at the University of Hawai'i at Mānoa is an upper-division course that teaches modern electronics through real-world applications in experimental physics. Students gain hands-on experience with digital circuit design, FPGA programming, and AI/ML techniques for real-time data analysis, combining laboratory work with targeted lectures.

The course centers on project-based learning. Using the hls4ml framework and Vitis HLS, students design and optimize neural networks, then deploy them on FPGA hardware. For their final project, they choose between waveform signal processing or 2D fast tracking, both modeled after realistic use cases in particle and nuclear physics.

By testing their designs through simulation and FPGA hardware implementation, students develop skills in reproducibility, hardware–software integration, and real-time verification. This approach not only strengthens their preparation for academic research but also addresses workforce development needs in AI/ML hardware, equipping graduates with expertise that is increasingly in demand across science and technology sectors.

**Author:** YOSHIHARA, Keisuke (University of Hawaii at Manoa)

**Presenter:** YOSHIHARA, Keisuke (University of Hawaii at Manoa)

**Session Classification:** RDC 4 Readout & ASICs

**Track Classification:** RDC 4 Readout & ASICs