

**University of California, Irvine
Statistics Seminar Series**

**DETECTION OF NUCLEAR
MATERIAL IN CONTAINERS
ENTERING PORTS:
A BAYESIAN APPROACH FOR
ANALYZING RADIATION
PORTAL DATA**

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Given the potential for illicit nuclear material being used for terrorism, most ports now inspect all goods entering national boundaries for illicit nuclear material. For example, US Department of Homeland Security (DHS), is moving towards one hundred percent inspection of all containers entering the US at various ports of entry for nuclear material. Towards that end SAIC and Ludlum PVT (Polyvinyl Toluene) radiation portals, based on Pacific Northwest National Labs (PNNL) specifications, have been deployed at most ports of entry. Around ninety-eight percent of the containers entering at US ports of entry are currently being inspected. This has enabled collection of terabytes of radiation data on millions of containers and their contents. We propose a Bayesian approach to create a real time decision system to detect illicit nuclear material and demonstrate its efficacy in an illustrative example by simulations. The results are encouraging and given the magnitude of available data, it should be feasible to implement this approach.

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