Olof Heden, Julianne Lehmann, Esmeralda Nastase* (nastasee@xavier.edu) and Papa Sissokho. Extremal Sizes of Subspace Partitions.

Let $V = V(n, q)$ be the vector space of dimension $n$ over the finite field with $q$ elements. A subspace partition of $V$ is a collection of subspaces of $V$ whose pairwise intersection is the zero vector. Vector space partitions have been extensively studied, but they have been proven difficult to characterize. In this talk, we determine the minimum size of a subspace partition of $V$ in which the largest subspace has dimension $t$, and the maximum size of a subspace partition of $V$ in which the smallest subspace has dimension $t$. Furthermore, we discuss the following application. A partial $t$-spread of $V$ is a collection of $t$-dimensional subspaces of $V$, whose pairwise intersection is the zero vector. We apply the result on the minimum size of a subspace partition of $V$ to find the minimum size of a maximal partial $t$-spread in $V(n+t-1, q)$. This is joint work with Olof Heden, Julianne Lehmann, and Papa Sissokho. (Received September 21, 2011)