Speaker: Frauke Bleher

Title: On the module structure of holomorphic differentials in positive characteristic

Abstract: This talk is about joint work with Ted Chinburg and Aristides Kontogeorgis. Let $X$ be a smooth projective curve over an algebraically closed field $k$ of positive characteristic $p$. Suppose $G$ is a finite group with non-trivial cyclic Sylow $p$-subgroups acting faithfully on $X$. In this talk, I will describe how to determine the $kG$-module structure of the module $H^0(X, \Omega^1_X)$ of holomorphic differentials of $X$. I will begin by reviewing some relevant facts from characteristic $p$ representation theory of $G$ which allow to reduce this problem to the case when $G$ is a semidirect product of a normal cyclic $p$-subgroup and a cyclic prime-to-$p$ group. In this case, one compares the radical filtration of $H^0(X, \Omega^1_X)$ to the global sections of subquotients of the radical filtration of the sheaf $\Omega^1_X$. This leads to a description of the module structure of $H^0(X, \Omega^1_X)$ in terms of the ramification data of the cover $X \to X/G$. 