TEMPLE UNIVERSITY
Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

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Geometric analysis on singular and non-compact spaces

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The geometric objects which arise naturally in mathematics are frequently and in important cases not smooth. Instead, many have structured ends which look for example like cones, horns, or families of these; a paradigmatic example is the Riemann moduli space of surfaces of genus $g > 1$ with the Weil-Petersson metric, which near its singular locus is approximately Riemannian products of families of horns. This talk concerns geometric analysis on such spaces, especially the analysis of naturally arising differential operators like the Hodge-Laplacian, the Dirac operator, and the D'Alembertian (wave operator). The analysis of such operators is substantially more complex in the non-smooth setting, but we will present tools from microlocal analysis which provide both a clear picture of and a resolution for many problems. We will focus in particular on recent progress in index theory and spectral theory.