Uniqueness and Multiplicity for Bistable Equations in Unbounded Domains

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In this talk, we explore the influence of geometry on bistable elliptic equations with Dirichlet boundary in unbounded domains. We present a surprising dichotomy between epigraphs that are bounded from below and domains containing a cone of aperture greater than π. The former admit exactly one positive bounded solution, while the latter support infinitely many. In the first case, we strengthen the method of moving planes to treat noncompact sublevel sets. In the second, we exploit a connection with Delaunay surfaces in differential geometry. This represents joint work with Henri Berestycki and Juncheng Wei.