

# Canonical metrics, Geometric Invariant Theory, and the Bergman kernel

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**Abstract:** Finding a canonical Riemannian metric that has special curvature properties is a natural and important question in differential geometry, and often amounts to solving a nonlinear PDE. A mantra propounded by Atiyah–Bott, Fujiki, and Donaldson states that the curvature of smooth complex projective varieties is an “infinite dimensional” moment map, and hence canonical metrics can be formulated as a zero of a moment map. On the other hand, the Kempf–Ness theorem states that a zero of a moment map is stable in the sense of Geometric Invariant Theory, indicating a connection between canonical metrics and stability notions in algebraic geometry. This colloquium talk aims to be an informal survey of this area of research, highlighting the role played by a complex analytic object called the Bergman kernel. Part of the results presented in this talk is based on a joint work with Julien Keller.