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**RAPHAËL PONGE**, Seoul National University  
*Spectral Theory and Conformal Geometry*

This talk will have two parts. In the first part, I will give a version in conformal geometry of the inequality eigenvalue of Vafa-Witten for Dirac operators. I will also present a reformulation of the Atiyah-Singer index formula for Dirac operators that takes into account the action of the group of conformal diffeomorphisms. This leads us to a whole new family of conformal invariants that are not of the type of the conformal invariants considered by Spyros Alexakis in his proof of the Deser-Swimmer conjecture. In the second part, I present the construction of conformal invariants from nodal sets of conformal invariant operators (e.g., Yamabe and Paneitz operators) and describe applications to curvature prescription problems. The first part is joint work with Hang Wang. The second part is joint work with Yaiza Canzani, Rod Gover, Dmitry Jakobson and Andrea Malchiodi.