Chemical reaction networks (CRN) comprise an important class of models to understand biological functions such as cellular information processing, the robustness and control of metabolic pathways, circadian rhythms, and many more. However, any CRN describing a certain function does not act in isolation but is a part of a much larger network and as such is constantly subject to external changes. In [Shinar, Alon, and Feinberg. "Sensitivity and robustness in chemical reaction networks." SIAM J App Math (2009): 977-998.], the responses of CRN to changes in the linear conserved quantities, called sensitivities, were studied and the question of how to construct absolute, i.e., basis-independent, sensitivities was raised.

In this talk, by applying information geometric methods, such a construction is provided. The idea is to track how concentration changes in a particular chemical propagate to changes of all concentrations within a steady state. This is encoded in the matrix of absolute sensitivities. For quasi-thermostatic CRN, a linear algebraic characterization of this matrix is derived via a Cramer-Rao bound for CRN, which is based on the the analogy between quasi-thermostatic steady states and the exponential family of probability distributions.