DIMITRI KOROTKIN, Concordia University
Symplectic geometry of the moduli space of projective structures

We introduce a natural symplectic structure on the moduli space of quadratic differentials with simple zeros and describe its Darboux coordinate systems in terms of so-called homological coordinates. We then show that this structure coincides with the canonical Poisson structure on the cotangent bundle of the moduli space of Riemann surfaces, and therefore the homological coordinates provide a new system of Darboux coordinates. We define a natural family of commuting "homological flows" on the moduli space of quadratic differentials and find the corresponding action-angle variables. The space of projective structures over the moduli space can be identified with the cotangent bundle upon selection of a reference projective connection that varies holomorphically and thus can be naturally endowed with a symplectic structure. Different choices of projective connections of this kind (Bergman, Schottky, Wirtinger) give rise to equivalent symplectic structures on the space of projective connections but different symplectic polarizations: the corresponding generating functions are found. We also study the monodromy representation of the Schwarzian equation associated with a projective connection, and we show that the natural symplectic structure on the the space of projective connections induces the Goldman Poisson structure on the character variety. Combined with results of Kawai, this result shows the symplectic equivalence between the embeddings of the cotangent bundle into the space of projective structures given by the Bers and Bergman projective connections. Talk is based on joint work with M.Bertola and C.Norton.