Theory of infinite dimensional Teichmüller spaces

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We explain recent developments of the theory of infinite dimensional Teichmüller spaces. In particular, we observe the dynamical behavior of the action of the Teichmüller modular group on the Teichmüller space and investigate the moduli space of a Riemann surface of infinite type. We also consider the asymptotic Teichmüller space and determine the subgroup of the asymptotic Teichmüller modular group that acts on the asymptotic Teichmüller space trivially. The stable quasiconformal mapping class group plays an important role in this research and we construct a new Teichmüller space whose biholomorphic automorphism group coincides with the asymptotic Teichmüller modular group. Then we have a relationship between the moduli space and the asymptotic Teichmüller space, and obtain the fixed point theorem on the asymptotic Teichmüller space. We also explain several problems and future plans of my research.