Mathematical and Geometric Tools for Conformal Field Theories

Recent years have seen substantial work on systematizing our understanding of conformal and superconformal field theories in diverse dimensions. This development has been possible thanks to many different techniques, which include but are not limited to conformal bootstrap, Seiberg-Witten technology, F/M-theory constructions, BPS quivers and wall-crossing formulas, supersymmetric localization, superconformal indices and partition functions, tt^* equations, discrete gaugings and anomaly matching, class S constructions, and ubiquitous dualities. Combining the insights obtained using all these different approaches could be of tremendous help in advancing our systematic understanding of conformal theories. Arguably one of the main impediments is the breadth of the specialties involved. This workshop aims at overcoming this impediment by bringing together researchers from these different communities. Our goal is to explore how these, sometimes orthogonal, pieces of information about conformal theories can be combined to chart out the space of consistent ones and to determine their basic properties.

The workshop will be three weeks long. The first two weeks will have a traditional format consisting of a light schedule of talks meant to encourage discussions and interactions between the participants. In the final week we will try something less traditional by devoting the week to collective research. The idea is to identify a few concrete fundamental problems arising from the discussions and collaborations developed in the first two weeks of the workshop, and keeping and even lighter schedule of talks. Participants in the final week will collectively work on the identified problems, potentially ending with publications describing the progress made. We hope that such an active and focused collaboration among researchers with different but overlapping expertise can have a positive impact on our field.