

THEMATIC SESSION: Discrete Mathematics

### **Extremal graphs in the generalized Turán problem**

Alexandra Wesolek (Technische Universität Berlin)

One of the first results in extremal graph theory is Turán's theorem, which states that the Turán graph  $T(n, r)$  maximizes the number of edges in an  $n$ -vertex graph that does not contain  $K_{r+1}$  as a subgraph. More generally, given two graphs  $H$  and  $F$ , the generalized Turán number  $ex(n, H, F)$  is the largest number of copies of  $H$  in an  $n$ -vertex  $F$ -free graph and such graphs with  $ex(n, H, F)$  copies of  $H$  are called extremal graphs. For fixed  $H$ ,  $F = K_{r+1}$  and  $r$  large enough, we recently showed in a joint work with Morrison, Nir, Norine, and Rzażewski, that the extremal graph for the generalized Turán problem is the Turán graph  $T(n, r)$ . This talk discusses this result and more broadly, results on generalized Turán numbers.