Canceled

Unfortunately, the speaker Hans Zanna Munthe-Kaas got into the quarantine because of the new coronavirus in recent days and he had to cancel his trip to Brno.

We shall find a new timeslot in the future, but the lecture will not take place this Wednesday.

March 4, 2020 from **4:30 PM** at **Mendel Museum´s Augustinian Abbey Refectory at Mendel Square**

Hans Munthe-Kaas

Symmetry: From Conway's Magic Theorem to Archimedes' Labyrinth and Beyond

Abstract:
Symmetry is a topic which has inspired artists and mathematicians from ancient to modern times. A fundamental problem is the classification of discrete groups of isometries, such as the 17 planar wallpaper groups, which have been used in mosaics since medieval ages and were classified by Fedorov in 1891 in a complicated proof.

Conway's Magic Formula can be used to classify discrete symmetries for spherical, plane and hyperbolic surfaces and yields the 17 wallpaper groups, the 7 frieze patterns and all discrete spherical symmetries as special cases. The formula and its proof is so simple that it is accessible to advanced high school students.

Recently, Munthe-Kaas was involved in the design of a mathematical maze in Bergen Botanical garden. Inspired by Conway, he ended up with a highly symmetric design. Under some reasonable assumptions, only one of the 17 wallpaper groups fulfils his original design criteria.

The labyrinth, called ***Archimedes' labyrint*** consists of 1234 yews (Taxus baccata, Tis červený) in 2m height and covers an area of about 800 m^2. It was presented in Science Magazine, October 2018.

In the last part of this talk we move beyond Conway, and discuss the problem of multivariate polynomial interpolation. Based on kaleidoscopic symmetry groups (Coxeter groups), we find interpolation points with remarkable properties. We show that for any d and k, there exists a unisolvent set of interpolation points for d-variate polynomial interpolation of order k. These points have optimal Lebesque constants and allow fast computation by symmetric fast Fourier transforms.