



# Gaussian Hilbert Spaces

## Seminar in the Summer Term 2020

Gaussian Hilbert spaces are Hilbert spaces consisting of centered Gaussian random variables. Accordingly, Gaussian Hilbert spaces are located at the intersection of probability and Hilbert space theory and turn out to have a rich and powerful structure with various applications. Gaussian Hilbert spaces and related concepts appear, for instance, in stochastic analysis and in quantum field theory and have applications even outside probability theory like in Banach space geometry and in the area of partial differential equations.

In this seminar, we want to give an introduction to the theory of Gaussian Hilbert spaces following the identically named book by Svante Janson. We will discuss the main pillars of that subject, including the Wiener chaos decomposition, Wick products, the Fock space and the hypercontractivity phenomenon, as well as some of the beautiful applications in stochastic integration, Malliavin calculus,  $U$ -Statistics and operator theory.

Participants are thus supposed to have some prior knowledge of probability theory (especially of measure theory) and a solid background in functional analysis (primarily Hilbert spaces and operators on Hilbert spaces).

**Time and Place: Tuesdays, 16–18, HS IV, Building E2 4**

Interested students are requested to **register** by writing an email to one of the organizers **before March, 31**.

For further information, please contact Marwa Banna ([banna@math.uni-sb.de](mailto:banna@math.uni-sb.de), room 223 in building E2 4) or Tobias Mai ([mai@math.uni-sb.de](mailto:mai@math.uni-sb.de), room 225 in building E2 4). See also:

<https://www.math.uni-sb.de/ag/speicher/lehre.html>