Initiated in groundbreaking works by Hairer and Gubinelli, the theory of “Singular Stochastic PDEs” has made spectacular progress over the last few years. A systematic solution theory for various interesting and previously intractable equations from Mathematical Physics is now available. Examples include the KPZ equation and the stochastic quantisation equations for the \(3D \Phi^4\) and Yang Mills measures. These solutions have been shown to arise as scaling limits of discrete models of Statistical Mechanics and to display interesting phenomena, such as phase transitions, in their own right. In this talk I will review some aspects of these developments. A main focus will be the question of global existence / a priori bounds for solutions: The first works on regularity structures and paracontrolled distributions were mostly concerned with constructing local-in-time solutions using a fixed point argument in a suitable space of distributions. The focus was primarily on the description of solutions on small scales and dealing with “infinite terms” which arise when applying non-linear functions to distributions. The matching a priori bounds were only developed more recently, among others in a series of papers by Mourrat, Moinat, Chandra and me.

I will explain these results, the main challenges and the arguments that permitted to overcome them.

**Tuesday, October 20, 2020 04:30pm - 05:15pm**

IST Austria Campus Online via Zoom

This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: https://ist.ac.at/en/campus/how-to-get-here/ The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.