



# International Seminar on SDEs and Related Topics

## Statistics for SPDEs

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### Abstract

Stochastic partial differential equations (SPDEs) are used more and more often to model real-world phenomena. Currently, statistical methodology for these equations is developing rapidly. If there is not only dynamic noise, but also measurement error ('static noise'), we study estimation of coefficients in a parabolic SPDE (e.g. diffusivity, transport or source terms), either parametrically or as functions in space. The analysis exhibits a fundamentally different impact of dynamic and static noise levels. We establish minimax optimality of the convergence rates. Lower bounds are achieved by bounding the Hellinger distance between noisy SPDE observations in path space and a general framework for (linear) stochastic evolution equations in Hilbert space. This gives an information-theoretic insight which coefficients can be easier estimated than others and open problems are pointed out. Some motivation by cell motility experiments in biophysics are provided.

### About the speaker

Markus Reiß received his PhD from Humboldt University of Berlin in 2002 under the supervision of Uwe Küchler. In 2005, he was appointed full professor at the University of Heidelberg and then returned to Humboldt University, where he has been full professor for Mathematical Statistics since 2008. Markus Reiß is a leading expert for the (nonparametric) statistics of stochastic processes, including stochastic partial differential equations, stochastic delay differential equations, and Lévy processes, but his broad range of research interests also covers statistical inverse problems and high-dimensional statistics with a view towards machine learning. Markus Reiß has been serving on the editorial boards of several journals (e.g., the Annals of Statistics) and was a co-editor in chief of Bernoulli from 2019 to 2021.

### Date

May 03, 2024

### Time

12:30 pm–1:30 pm (London)  
1:30 pm–2:30 pm (Berlin, Paris)  
2:30 pm–3:30 pm (Helsinki)  
7:30 pm–8:30 pm (Beijing)

### Zoom

<https://jyufi.zoom.us/j/61891007917>

Meeting ID: 618 9100 7917

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<https://www.aimsociences.org/PUQR>

