# Parameter estimation in stochastic hyperbolic equations

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(joint work with W. Liu)

**Abstract**

Consider the stochastic wave equation

$$\frac{\partial^2 u}{\partial t^2} = \theta_1 \frac{\partial^2 u}{\partial x^2} + \theta_2 \frac{\partial u}{\partial t} + \dot{W}(t,x),\ 0 < t < T,\ 0 < x < \pi,$$

with zero initial and boundary conditions, driven by space-time white noise $\dot{W}$. The solution of this equation can be written as a Fourier series

$$u(t,x) = \sqrt{\frac{2}{\pi}} \sum_{k=1}^{\infty} u_k(t)\, \sin(kx).$$

The objectives of the talk are:
(a) to construct and investigate the maximum likelihood estimators of the unknown numbers $\theta_1 > 0$ and $\theta_2 \in \mathbb{R}$, given $\{u_1(t), \dots, u_N(t)\}$, $t \in [0,T]$, the first $N$ Fourier coefficients of the solution.
(b) To extend the approach to more general stochastic hyperbolic equations.