



# THE UNIVERSITY OF CHICAGO

Department of Statistics

## SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR

---

CHRISTIAN MOLLET

Mathematics Institute  
University of Cologne

### Quasi Optimality for Petrov-Galerkin Solutions of Parabolic Random PDEs in Space-Time Weak Form

Friday, May 27, 2016 at 12:30 PM

Math-Stat Building (Stevanovich Center), Room 112, 5727 S. University Ave.

#### ABSTRACT

We consider parabolic evolution problems with random coefficients formulated in a full space and time weak sense. Having strict uniform bounds for the spatial operator, the almost sure existence and uniqueness of a solution is inherited from the deterministic case by a pathwise treatment. Now we relax this restriction of having uniform bounds and allow them to be random variables instead. That means, that the elliptic operator does not need to be bounded from above and below by strict constants, but rather by random variables which may depend on the stochastic parameter. We allow the coercivity constant to tend to zero and/or the continuity constant to tend to infinity. Therefore also unbounded operators are covered. Depending on the number of existing moments for these bounds, we can prove existence of  $p$ -moments for the solution. Moreover, we go along similar lines and show existence of  $p$ -moments for Petrov-Galerkin solutions and also prove quasi-optimality with uniform constant  $L_p$ -spaces. We will be able to show quasi-optimality with uniform constant independent of the refinement level of the discretization as well as the stochastic parameter for suitable discrete subspaces.

---

#### Organizers:

Lek-Heng Lim, Department of Statistics, [lekheng@galton.uchicago.edu](mailto:lekheng@galton.uchicago.edu), Ridgway Scott, Departments of Computer Science and Mathematics, [ridg@cs.uchicago.edu](mailto:ridg@cs.uchicago.edu), Jonathan Weare, Department of Statistics and The James Franck Institute, [weare@uchicago.edu](mailto:weare@uchicago.edu). SSC Seminar URL: [http://www.stat.uchicago.edu/seminars/SSC\\\_seminars.shtml](http://www.stat.uchicago.edu/seminars/SSC\_seminars.shtml).

If you wish to subscribe to our email list, please visit the following website:  
<https://lists.uchicago.edu/web/arc/statseminars>.