



**FRIAS**

FREIBURG INSTITUTE  
FOR ADVANCED STUDIES  
ALBERT-LUDWIGS-  
UNIVERSITÄT FREIBURG

The Freiburg-Strasbourg research group on  
Financial and Actuarial Mathematics



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## Invitation to our workshop

10.00 Stefan Tappe, University Freiburg

**Stochastic mortality and interest rates: An infinite dimensional approach**

11.00 Thomas Krabichler

**A Joint Modelling Framework for Credit and Liquidity Risk**

*Tuesday, 2. October 2018, 10.00*

*FRIAS, Alberstr. 9, 79104 Freiburg, Großer Seminarraum*

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Abstract S. Tappe

This presentation aims to discuss a joint framework for mortality and interest rates, and it is divided into three parts:

- 1) First we present a model for the so-called forward mortality rates, which are a measure for the danger of death up to a specified time for individuals of a population. We show that the mortality rates have to satisfy certain consistency conditions, and we translate their dynamics into a stochastic partial differential equation (SPDE) for the mortality rates.
- 2) Then we review Heath-Jarrow-Morton (HJM) type forward rate models in the spirit of the Benchmark Approach, and we also derive a SPDE for the interest rates.
- 3) Note that we have formulated both SPDEs under the real-world probability measure  $P$ . In the last step, we bring these two approaches together and suggest a unified SPDE for mortality rates and interest rates.

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Abstract T. Krabichler

We consider an arbitrage-free financial market with zero-coupon bonds that are exposed to credit and liquidity risk. We revisit the famous Jarrow & Turnbull setting in order to account for these two intricately intertwined risk types. We provide an example of tractable term structure models that are driven by a two-dimensional affine jump diffusion. Furthermore, we derive explicit valuation formulae for marketable products.

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