

# A U S H A N G

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**FREIE UNIVERSITÄT BERLIN**  
**Fachbereich Mathematik und Informatik**

Promotionsbüro, Arnimallee 14, 14195 Berlin

## **D I S P U T A T I O N**

**Freitag, 13. März 2015, 14.00 Uhr**

**Ort: Raum 053, Takustraße 9, 14195 Berlin**

**Disputation über die Doktorarbeit von**

**Frau Yuan Yang**

**Thema der Dissertation sowie der Disputation:**

**Sample-based Probabilistic Estimation  
for Indoor Positioning and Tracking Under Ranging Uncertainty**

**Die Arbeit wurde unter der Betreuung von Prof. Dr. M. Kyas durchgeführt.**

Abstract: Indoor positioning systems can be categorized into range-free and range-based positioning methods. Range-based method on Local Indoor Positioning System (LIPS) (i.e., wireless sensor networks or WLAN) has been proposed as an efficient solution, with the advantages of self-organization, fast processing, high flexibility and low cost, etc. The critical problem in range-based indoor positioning is the severe ranging uncertainty, which typically resorts to the probabilistic perspective. Since there is no analytical solution to the nonlinear and non-Gaussian positioning problem, the research trends have moved towards exploring sample-based approximations in the probabilistic frame. This thesis studies the sample-based probabilistic positioning to achieve the tradeoff in performance (accuracy and robustness), cost (time and space complexity), and usability (in terms of the required number of samples and implementation difficulty).

In this talk I will provide an overview of both range-free and range-based positioning methods. The first part of the talk presents one simulation of device-free localization using radio tomographic imaging. The second part provides extensive statistics and modeling results of the real-world TOA ranging measurements from the Nanotron platform. Then, it presents the sample-based positioning algorithms evaluated by both indoor tracking simulations and experiments.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

**Interessierte werden hiermit herzlich eingeladen**

Der Vorsitzende der Promotionskommission  
Prof. Dr. M. Kyas