

Robert Fitzner

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Personal information

Name: Robert Jörg Fitzner

Date of Birth: 27.07.1981

Place of Birth: Berlin, Germany

Research areas

Keyword: Percolation, Statistical Mechanical Models, Mathematical Physics, Random Graphs, Algorithms
Most of my research was in the field of statical physics and probability. With regards to this field I am most interest in den spatial evolution of systems in which we can observe phase transitions and other critical phenomena.

In 2013-2019 I had the fortune to work with chemists and advised them in the experimental design stage (which experiment to run to detect the desired mechanisms) and help them in the treatment of the measure data.

Academic work experience

Eindhoven University of Technology

Postdoctoral Research Fellow at the Department of Mathematics

Eindhoven

09/2015–04/2019

Stockholm University

Postdoctoral Research Fellow at the Department of Mathematics

Stockholm

10/2013–08/2015

Eurandom / Eindhoven University of Technology

PhD Student at the Department of Mathematics

Eindhoven

09/2008–07/2013

Non-academic work experience

GDV (German Insurance Association)

Applied Mathematician and Programmer

Berlin

05/2019–present

Forschungsverbund Berlin e.V.

System administrator

System administration and user support to the accounting office.

(Unix server administration, SAP/R3 support)

Berlin

01/2005–06/2008

Education

Eurandom/Eindhoven University of Technology

PhD July 2013

Eindhoven

10/2008–07/2013

Supervisor: Remco van der Hofstad

Thesis title: *Non-backtracking lace expansion*

Thesis abstract: We extend a technique, known as lace expansion, to improve mean-field results for various models in the nearest-neighborhood setting. The grand challenge was to prove that nearest-neighbor percolation above 6 dimensions displays mean-field behavior. Before such results were only known above 18 dimensions.

We derive the non-backtracking lace expansion (NoBLE) for percolation, self-avoiding walk, lattice trees and lattice animals. We developed an analysis that is substantially simpler and currently proves critical mean-field behavior percolation in $d > 10$. Our numerical computations, in the form of Mathematica-notebooks, are available on my homepage.

Berlin University of Technology
dipl.math.oec. (German version of Master)

Berlin
10/2002–08/2008

Major: finance mathematics

Minors: computer science and economics (with a focus on accounting)

Diploma thesis:

Title: *Superhedging under soft constraints in discrete-time market model*

Supervisor: Alexander Schied

Grants

Magnusons fond by the Royal Swedish Academy of Science, (15.000 SEK) (2014)

Travel grand by the ESF to participate the Winder School: Spatial Models in Statistical Mechanics in Darmstadt (500 Euro) (2014)

Travel grand by the PIMS to participate the Summer School in Probability 2009 at PIMS-UBS (1100 CAD) (2009)

I received three similar grants to cover travel and lodging expenses to attend given conferences.

Publications

Publications.....

[1]: R. Fitzner and R. van der Hofstad. The non-backtracking random walk. (2013), Journal of Statistical Physics.

[2]: L. Albertazzi, D. van der Zwaag, C.M.A. Leenders, R. Fitzner and R. van der Hofstad. Probing Exchange Pathways in One-Dimensional Aggregates with Super-Resolution Microscopy. (2014), Science Magazine

[3]: R. Fitzner and R. van der Hofstad. Generalized approach to the non-backtracking lace expansion. (2017), Probability Theory and Related Fields

[4]: R. Fitzner and R. van der Hofstad. Nearest-neighbor percolation function is continuous for $d > 10$. (2017), Electronic Journal of Probability

[5]: M. Deijfen and R. Fitzner. Birds of a feather or opposites attract - effects in network modelling. (2017), Internet Mathematics

[6]: N. Feiner-Gracia, A. Olea, R. Fitzner, N. El Boujnouni, A. van Asbeck, R. Brock, L. Albertazzi. Super-resolution imaging of structure, molecular composition and stability of single oligonucleotide polyplexes. (2019) Nano Letters

[7]: G.E. Comi, R. Fitzner, S. Kolumbán, F.P. Pijpers, R.M. Pires da Silva Castro, R.A.J. Post, and A.J. Vromans. Causal effects of government decisions on earthquakes in Groningen.(2019) conference proceeding

[8]: R. Fitzner and R. van der Hofstad. NoBLE for lattice trees and lattice animals. (to be published 2021), Journal of Statistical Physics.

Selected Talks

Invited Talks

Probability Seminar Essen	Essen 20/10/2015
Workshop: Probability and Graphs	Eindhoven 08/01/2014
Oberseminar: Biological Models and Statistical Mechanics	Berlin 22/10/2012
Mark Kac Seminar	Utrecht 05/10/2012

Contributing talks

Cluster expansions: from combinatorics to analysis via probability	Oberwolfach 08/02/2017
12th German Probability and Statistics Days 2016	Bochum 02/03/2016
Spatial Models in Statistical Mechanics	Darmstadt 24/02/2014
40th Probability Summer School	Saint Flour 06/07/2010
PIMS-UBC Summer School in Probability	Vancouver 22/06/2009

Teaching

Eindhoven University of Technology <i>Lecturer of a Bachelor course in financial mathematics</i>	Eindhoven 02/2015–04/2018
Stockholms Universitet <i>Lecturer of Bachelor and Master course in financial mathematics</i>	Stockholm 04/2014–01/2015
Eindhoven University of Technology	Eindhoven 09/2008–2011

Instructor for seven courses on bachelor level for statistic, probability and calculus

- Statistics for architecture (Fall 2008, Fall 2008, Spring 2010)
- Statistics for innovation sciences (Spring 2011)
- Introduction to mathematics for applied physics (Fall 2011)
- Calculus for engineering (Fall 2010, Fall 2011)

Supervision

Since 2017 I supervise Master and Bachelor projects.

Creation of supplementary material for the course

Together with a colleague, Tim Hulshof, I created a 30 page summary for a bachelor course on probability and statistic for non-mathematicians in Dutch. This summary is based on the text book: Applied Statistics and Probability for Engineers (Montgomery).

R. Fitzner and T. Hulshof, Algemeen overzicht inleiding kansrekening en statistiek. (2010)

Languages

German: Mother tongue

English: Fluent

Dutch: Good

French: Basic

Computer skills

Languages: Java, C++, JavaScript, SAS

Simulator: I created an applet that generates images and real-time animations for several stochastic models that is intended to be used within teaching/research. The model creates simulations of random walks, percolation, bootstrap percolation and the sandpile model. The program has already been used by me and others to introduce the percolation model and its phase transition in talks and courses on percolation.

Numerical studies: In two projects, one with Mia Deijfen and another one with Tim Hulshof, I have studied the behavior of large networks using a simulation study.

Visualisations: To visualise the topic presented on the networkpages.nl I have create a number of interactive animation(JavaScript). These visualisation, as well as the simulator and code for the numerical studies can be found on my webpage <http://fitzner.nl/simulator/index.html>

Computed assisted proofs: For results obtained in the NoBLE project certain numerical condition need to be satisfied. These condition have been verified using Mathematica notebooks. An overview of this project and these files can be found at www.fitzner.nl/noble/index.html