

Wolfgang Betz

Engineering Risk Analysis Group – Technische Universität München

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Education

- since 2012 PhD student at the Engineering Risk Analysis Group,
Technische Universität München, **expected to finish end of summer 2016.**
- 2014 Visiting Researcher, visiting *Prof. James L. Beck* (2.5 months),
California Institute of Technology, Caltech, Pasadena, USA
- 2015 Visiting Researcher, visiting *Prof. Jasper Vrugt* (1 month),
University of California, Irvine, USA
- 2009–2012 **M.Sc. (Hons)** in Computational Mechanics,
Technische Universität München.
- 2011 Visiting Student Researcher, University of California, Berkeley (5 months)
- 2010–2012 Student of the Honors Program of the Bavarian Graduate School of Computational Engineering (BGCE)
- 2005–2009 **Dipl.-Ing. (FH)** in Civil Engineering,
Georg-Simon-Ohm University of Applied Sciences, Nürnberg.

Honors & Awards

- 2013 *SOFiSTiK prize* for the best thesis of the faculty regarding numerical methods.

Research Interests

- Bayesian updating and Bayesian model class selection
- Probabilistic modeling
- Reliability analysis in high dimensional spaces
- Discretization/simulation of random fields

Software Development

- Fesslix** *main developer [C++]*. Fesslix is a Free Software program for stochastic analysis, reliability analysis and Bayesian updating. (since 2009)
- Rely** *main developer [Fortran]*. Rely is a module of SOFiSTiK (a commercial finite element software package) that performs finite element reliability analysis. (since 2013)
- Strurel** *implementation of reliability methods and external interfaces [Fortran]*. Strurel is a commercial program for reliability analysis. (since 2013)

Publications

- Journals**
- Betz, W., Papaioannou, I., and Straub, D. Transitional Markov Chain Monte Carlo: Observations and Improvements. *Journal of Engineering Mechanics*, 142(5) (2016).
- Straub, D., Papaioannou, I., and Betz, W. Bayesian analysis of rare events. *Journal of Computational Physics*, 314:538–556 (2016).
- Papaioannou, I., Betz, W., Zwirgmaier, K., and Straub, D. MCMC algorithms for Subset Simulation. *Probabilistic Engineering Mechanics*, 41:89–103 (2015).
- Betz, W., Papaioannou, I., and Straub, D. Numerical methods for the discretization of random fields by means of the Karhunen–Loève expansion. *Computer Methods in Applied Mechanics and Engineering*, 271:109–129 (2014).

Conference papers

Betz, W., Eckl, M., Papaioannou, I., Heidkamp, H., and Straub, D. Reliability Analysis of a Tunnel Design with RELY. *SOFiSTiK Seminar 2016, München, Germany* (2016).

Betz, W., Papaioannou, I., and Straub, D. Adaptive variant of the BUS approach to Bayesian updating. *9th International Conference on Structural Dynamics (EURODYN), Porto, Portugal* (2014).

Betz, W., Mok, C. M., Papaioannou, I., and Straub, D. Bayesian model calibration using structural reliability methods: application to the hydrological abc model. *2nd International Conference on Vulnerability and Risk Analysis and Management (ICVRAM), Liverpool, UK* (2014).

Papaioannou, I., Betz, W., and Straub, D. Bayesian model updating of a tunnel in soft soil with settlement measurements. In *Proc. 4th International Symposium on Geotechnical Safety and Risk, Hong Kong* (2013).

Ranjan, R., Betz, W., Papaioannou, I., and Straub, D. A two-step approach for reliability assessment of a tunnel in soft soil. In *Proc. 3rd International Conference on Computational Methods in Tunnelling and Subsurface Engineering EUROTUN* (2013).

Betz, W., Papaioannou, I., and Straub, D. Assessment of methods for the numerical solution of the Fredholm integral eigenvalue problem. *11th International Conference on Structural Safety & Risk (ICOSSAR), New York, USA* (2013).

Betz, W., Papaioannou, I., and Straub, D. A finite cell approach for discretization of random fields. *10th International Probabilistic Workshop, Stuttgart, Germany* (2012).

Betz, W. Ein Dom aus Nudeln – Traglastwettbewerb an der Hochschule Nürnberg. *SOFiSTiK Seminar 2010, Nürnberg, Germany* (2010).

Teaching and Supervision

Teaching.....

since 2013 Teaching Assistant for the course *Zuverlässigkeit und Lastannahmen* attended by Undergraduate Civil Engineering students at the Technische Universität München.

Summer 2012 Teaching Assistant for the course *Risk Analysis 1* attended by Master's students of Civil and Environmental Engineering at the Technische Universität München.

Supervision of Master's theses.....

Winter 2014 Senft, Florian: *Bayesian updating of numerical models: Comparison of the BUSS and DREAM algorithm*, Technische Universität München.

Summer 2013 Neufeind, Sebastian: *Bayesian updating in hydrological modeling – A comparison of GLUE and formal Bayesian approaches*, Technische Universität München.

- Winter 2013 Taherzadeh, Niousha: *Bayesian updating in model prediction*, Technische Universität München.
- Winter 2013 Ranjan, Rohit: *A two-step approach for reliability assessment of a tunnel in soft soil*, Technische Universität München.

Supervision of Study projects.....

- Summer 2014 Senft, Florian: *Statistical Analysis of RAMMS::Rockfall simulation results*, Technische Universität München.
- Summer 2013 Taherzadeh, Niousha: *Prediction of catchment discharge based on past rainfall and discharge measurements using Bayesian Networks*, Technische Universität München.

Attended Conferences and Workshops

- 04/2016 25th SOFiSTiK Seminar, 2016, München, Germany.
- 04/2016 SIAM Conference on Uncertainty Quantification, 2016, EPFL Campus, Lausanne, Switzerland.
- 05/2015 1st International Conference on Uncertainty Quantification in Computational Sciences and Engineering (UNCECOMP), 2015, Crete Island, Greece.
- 07/2014 2nd International Conference on Vulnerability and Risk Analysis and Management (ICVRAM), 2014, Liverpool, UK.
- 07/2014 9th International Conference on Structural Dynamics (EURODYN), 2014, Porto, Portugal.
- 06/2013 11th International Conference on Structural Safety & Reliability (ICOSSAR), 2013, New York, USA.
- 11/2012 10th International Probabilistic Workshop (IPW), 2012, Stuttgart, Germany.
- 10/2012 TUM Institute of Advanced Study workshop on *Structural Reliability, Risk Assessment and Decision-Making: Past, Present, Future*, Engineering Risk Analysis Group, Technische Universität München, Germany
- 06/2012 Workshop on *Model Identification & Learning from Data*, Karlsruhe Institute of Technology (KIT), Institute for Water and River Basin Management, Karlsruhe, Germany.
- 04/2016 22nd SOFiSTiK Seminar, 2016, Nürnberg, Germany.

References

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