

# Curriculum Vitae

## Personal Data

Alexandra Mehlhase

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Nationality: German

## Academic Education and Positions

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|-------------------|---|
| 1/2017 - now      | <b>Lecturer</b><br><i>Software Engineering,</i><br>Arizona State University   |
| 10/2015 - 12/2016 | <b>Post-Doc</b><br><i>Programming Languages and Compiler Group,</i><br>Technische Universität Berlin  |
| 06/2015           | <b>Ph.D. (magna cum laude)</b><br><b>Title</b> (translated from German):<br><i>Concepts for modeling and simulation of variable-structure models</i><br>Technische Universität Berlin |
| 10/2009 - 09/2015 | <b>Research/Teaching Associate</b><br><i>Software Engineering Group,</i><br>Technische Universität Berlin   |
| 09/2009           | <b>Diploma in Computational Engineering Science, with distinction</b><br><i>(70% Mechanical Engineering, 30% Computer Science)</i><br>Technische Universität Berlin                   |
| 05/2006 - 04/2009 | <b>Student Job</b><br><i>Software Engineering; Modeling in Simulink and Modelica,</i><br><i>Modeling of combustion engines,</i><br>IAV-Berlin   |
| 10/2003 – 09/2009 | <b>Studies in Computational Engineering Science</b><br>Technische Universität Berlin  |
| 2001 – 2003       | <b>Abitur (High School Graduation)</b><br>Lessing Gymnasium Berlin  |
| 2000 – 2001       | <b>Student exchange</b><br>Belleville-Mennonite High School in USA/Pennsylvania   |
| 1996 – 2000       | <b>High School</b><br>Lessing Gymnasium Berlin  |

## **Skills**

### **Modeling and Simulation:**

- Matlab/Simulink, Matlab/Simscape,
- Modelica (Dymola, OpenModelica, MapleSim, SimulationX)
- modeling and simulation with differential-algebraic equations, numerical methods
- variable-structure modeling, co-simulation

### **Computer Science:**

- Software Engineering: UML, formal specification, agile software development methods, object-oriented software design
- Programming Languages: Java, Python, C, Matlab, Maple

### **Engineering:**

- thermodynamics, mechanics, electrical circuits
- combustion engines

### **Languages:**

- German: Native
- English: Excellent
- French: High School level

## **Activities**

- 2014    **Organization of the EOOLT Workshop 2014**  
6th International Workshop on Equation-Based Object-Oriented Modeling Languages and Tools
- 2013    **Coordinator of the DFG (Deutsche Forschungsgemeinschaft) proposal for the AMSUN project**  
Accepted for a 3 year period, with 2 part-time, 1 full-time and 4 student positions
- 2012    **Member of the Modelica Association**
- 2011    **Founder of the Modelica User Group Berlin**
- 2006    **Philotherm Award in Thermodynamics**

## Teaching Experience

### Arizona State University

- SER 315 Software Enterprise: Tools & Process:  
Coding design, testing, configuration management
- SER 221 Programming Languages and their Execution Environments  
Fundamental programming language concepts, programming paradigm, execution environments

### Technische Universität Berlin

- Software Engineering Basics:  
Software Design with UML, formal specification of object-oriented software, State-charts
- Modelling and Simulation:  
Modeling physical systems with differential-algebraic equations, Modelica, Matlab/Simulink, simulation (symbolic manipulation, numerical methods)

## Research Experience (Ph.D.)

Modeling and simulation of variable-structure models. Currently such models cannot be easily modeled and simulated in common simulation environments (e.g. Modelica).

- Classification of different types of variable-structure models
- Development of methods to model variable-structure models independent of a specific modeling language
- Formalization of variable-structure models and their simulation in Object-Z
- Implementation of a Python framework (DySMo) based on the formalization of the modeling and simulation of variable-structure models. The framework enables modelers to use standard tools such as Modelica or Matlab/Simulink to simulate variable-structure models effectively and efficiently.
- Use of DySMo for modeling and simulating different types of variable-structure models in order to evaluate the developed method. In this assessment several models from other (engineering) departments and also from other universities were used in order to test the approach with models coming from practice.

## Current and Future Research

- Developing a tool- and language-independent scripting language to describe simulations efficiently.
- Using and enhancing DySMo in cooperation with colleagues from the UdK Berlin (Universität der Künste) in order to meet their specific needs in the realm of building simulation.
- Enhancing the methods and framework to include grid changes during simulation.
- Research on methods on how to connect variable-structure models and co-simulation models and efficiently simulate such models.
- Research on methods on how HLA (High-Level Architecture) could benefit from variable-structure/co-simulation models.