

# Curriculum Vitae for Anne Elisabeth Haxthausen

## June 2017

**Name:** Anne Elisabeth Haxthausen.

**Nationality:** Danish.

**Date of Birth:** 13 February 1961.

**Current Position:** Associate Professor at

DTU Compute, Technical University of Denmark, DK-2800 Lyngby, Denmark.

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### Education:

- M.Sc. in Engineering, Technical University of Denmark, 1985.
- Ph.D. in Computer Science, Technical University of Denmark, 1989.

### Main Employment:

- 1988-94: Software Engineer at Dansk Datamatik Center and CRI A/S in Denmark.
- 1995-97: Assistant Professor at Technical University of Denmark.
- 1997-now: Associate Professor at Technical University of Denmark.

### Secondary Employment:

- 1992-94: External Lecturer at Technical University of Denmark.
- 1993: Guest researcher at Electrotechnical Laboratory, Japan.
- 2005/06: Guest Professor at Universite Paris XIII.

**Research Interests:** Formal methods in software engineering - from theory to practical applications, in particular specification and modelling languages and their semantic foundations, refinement, verification techniques (theorem proving and model-checking), and tool support. Domain-specific languages, methods and tools. Current industrial applications has main focus on safety-critical systems, especially railway control systems.

**Research Experience:** Has 30 years of experience in theory and practice of formal methods for software development.

Was one of the leading persons in the development of several formal software development methods and languages and their theoretical foundations in the RAISE (Rigorous Approach to Industrial Software Engineering) EU ESPRIT project 1985-90, LaCoS (Large-scale Correct Software using formal methods) EU ESPRIT project 1990-94, the EU ESPRIT funded CoFI working group 1995-2004, and the Overture open-source tools project, where she since 2012 has been a member of the Language Board. One of the scientific highlights was the design of RSL, a very powerful specification language that is unique and famous for its unified integration (at both the syntactic and the semantic level) of many specification styles and paradigms.

Her *application-oriented research* focuses primarily on the formal development and verification of safety and security critical, cyber-physical systems. For instance, she participated in the Mondex Case Study project that was conducted as a part of the world-wide “Grand Challenge in Verified Software”. The case study concerned verification techniques to prove smart-card security. Since 1996 she has had special focus on railways: is founder of the *DTU Railway Verification Group*, is co-founder of the *European Technical Working Group on Formal Methods in Railway Control*, and has contributed with new railway-specific methods for modelling and verification of railway control systems and she has applied these methods to several Danish and German railway control systems. Participated in the EU ESPRIT FMERail project (concerning adoption of formal methods in the railway industry) 1998-99. She was one of the principal investigators of the RobustRailS (Robustness in Railway Operations) research project 2012-2017, funded by

Innovation Fund Denmark, being the leader of a work package concerning the application of formal methods to the forthcoming Danish ETCS/ERTMS level 2 based signalling systems. She regularly co-operates with industry, including Thales, Siemens, DSB (the Danish state railways), Railnet Denmark and the Danish Traffic Authorities.

She also contributed to the development of the LYCOS experimental hardware/software co-synthesis system and has made research in continuous, dynamic models (using partial differential equations) and numeric simulation of physical processes (seismic waves).

**Research-based Consultancy Experience:** Has been a consultant for Rail Net Denmark and the Danish Transport Authorities since 2010.

**Teaching Experience:** She has taught courses on a variety of topics at the BSc-, MSc- and PhD-levels: Formal specification and verification methods, semantics, object-oriented programming, functional programming, algorithms & datastructures, software engineering, and database systems. She has also supervised many students at the BEng-, BSc-, MSc- and PhD-levels.

**Other professional activities:**

- **Member of steering and advisory committees:** for RailTech DTU (2016- ), for RobustRailS (2012-17), for the DTU MSc education in Computer Science and Engineering (2013-) and the DTU BSc education in Software Technology (2006-10).
- **Member of language boards:** The Overture Language Board, since 2012. This board has a strategic role in the development of the VDM languages.
- **Member of the editorial board** for the Formal Aspects of Computing journal.
- **Member of program committees:** for 25 international conferences, co-chair and co-organiser for several of these.
- **Reviews:** for 38 international conferences, 14 journals, and several research European councils.
- **Member of evaluation boards:** Ph.D theses, habilitations theses, and research positions in Europe and Canada.

**Honours and Awards:**

- Lektor Marie Lønggaards Travel Grant, September 1998. (115,000 DKK ~ 15,455 EUR)
- Three weeks round-trip May/June 1999 to universities and research labs in the US, arranged and paid by the United States Information Agency.
- Best-paper-award for a paper at 10th Symposium on Formal Methods for Automation and Safety in Railway and Automotive System, Braunschweig, October 2014. (1000 EUR funded by Siemens.)
- Invited speaker/papers at many conferences.

**Publications:** Co-author of 4 books and more than 70 refereed articles in international journals, conference proceedings and books. A publication list can be found at <http://www.imm.dtu.dk/~aeha/publications.pdf>. In addition to that, her railway research has led to three popular scientific publications:

- Matematik mindsker risiko for togkollision i Dynamo no. 43, 2015, pages 26-29. Available online: <http://www.imm.dtu.dk/~aeha/Railway/index/dynamo43-artikel.pdf>
- Matematisk gennembrud ger togsikkerheden i DTUavisen no. 9, 2015, page 16. Available online: <http://www.imm.dtu.dk/~aeha/Railway/index/DTUavisen.pdf>
- Rail Safety: Back in the Spotlight i Technologist Magazine, n0. 9, pages 42-43, EuroTech Universities, 2016. Available online: <http://www.imm.dtu.dk/~aeha/Railway/index/Technologist9-2016-EN.pdf>